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Consolidation and Fluidification:

The Milkfish Assemblage across the Taiwan Strait

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Doctor of Philosophy in Sociology

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Declaration

I, Ko-Kang Chien, certify that the work contain in this thesis is the author's original work. No part of it has been submitted for any other degree or professional qualification.

Signature

Date

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It is exciting to see the thesis about to come to an end. Thinking about completion is one thing, experiencing it is another. The process of writing up the thesis coincides with shocking and far-reaching events around the world: Scottish Independence Referendum, Sunflower Movement in Taiwan, Umbrella Movement in Hong Kong, another power shift in Taiwan since 2008, terrorist attacks in the UK and Europe, Brexit, the U.S. presidential election etc. It may be an illusion to feel part of something special, but I hope that this crystallisation of five years of fieldwork, study and research is more than nothing.

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Abstract

There are two ways of understanding assemblages of humans and non-humans inspired by actor-network theory (ANT): consolidation and fluidification. ANT argues that both subjects and objects take shape as a result of assemblages of numerous heterogeneous ingredients. There is, however, some disagreement over how these subjects and objects travel far and endure while staying the same. On the one hand, 'consolidation' suggests that heterogeneous materials should be consolidated into networks so that the integrity of assemblages remains while subjects and objects relocate. On the other hand, 'fluidification' suggests that fluid-like adaptation may be more feasible, although the integrity of subjects or objects may be at stake. The thesis investigates this tension between the two modes of assemblage via a historical and ethnographic study of milkfish farming in Taiwan and an examination of unsuccessful efforts to export them to mainland China.

This study first explores the mutual formation of milkfish and milkfish farming and argues that not only are the physical characteristics of milkfish shaped alongside the socio-technical transformation of the milkfish assemblage, but the fish also act as an agent involved in the shaping of milkfish assemblage. Secondly, this study draws attention to how an industrial version of milkfish as a bulk commodity takes shape as well as how it is enacted so that it becomes the dominant reality for milkfish. It is argued that, paradoxically, this version of reality is maintained through fluidification, in which human actors compromise with enacted multiplicities of milkfish.

Thirdly, this study turns to the milkfish export scheme. Set up under the auspices of the Chinese government in 2011, milkfish were exported to Shanghai. But milkfish failed to find a market in Shanghai, and so the export scheme was terminated in 2016. This study first reveals that the material characteristics of 'ready-made' milkfish are not

easy to integrate into local ways of cooking and eating. Moreover, the fish are excluded from adaptation, while the scheme was adapted in practice to suit the requirements of various other actors brought together by the scheme. This thesis suggests that the lower the demand for milkfish in China, the higher is the need for such an export scheme in Taiwan, but that such a scheme will most likely take the form of continued ‘consolidation’, keeping the export of unsalable fish going while bringing minimal changes to the status quo of milkfish assemblage.

Overall, this study of milkfish argues for the co-existence, in tension, of consolidation and fluidification. That is, neither mode of assemblage is in opposition to nor replaceable by the other. The implications for material politics of this study include not only a need to make visible the work of ‘purification’ that keeps both subjects and objects apparently separate from one another, and from others within each realm, but also a need to highlight efforts to erase other possible modes of assemblage, in which the formation of objects and of object-oriented collectives are embedded differently.

Lay Summary

This thesis asks: how is milkfish aquaculture in Taiwan assembled so that a yet-to-come Chinese market for milkfish is construed as a solution to this sector in decline? This piece of work is a reflection of my own concerns about how mainland China is seen as a solution to some of the economic difficulties faced in Taiwan. Also, seeing export markets as a solution to political, economic and social issues is not restricted to Taiwan. As European dairy farming faces the issue of oversupply, the EU authorities subsidise dairy suppliers to dump milk powder products into African markets, but this policy undermines the local dairy industry there. Moreover, Norwegian salmon was boycotted by China after, most people believe, the Nobel Peace Prize was awarded to the Chinese dissident Xiaobo Liu in 2010. Recently, though, the salmon export resumes, and the Norwegian government reaffirms the 'One China' policy that will not intervene in Chinese affairs. Likewise, part of the reason for Brexit is that leaving the EU will allow the UK to negotiate with countries, including China, on trade deals without being held back by the EU. Underlying these circumstances is a bulk-commodity form of life: political, economic, social, technical and natural affairs are arranged according to facilitating the production, circulation and consumption of bulk commodities. This study explores how the bulk-commodity way of life takes shape and is practised through the case of milkfish as it takes the form of a bulk-commodity food in Taiwan and was once exported to China under an export scheme. Although the export scheme ended in failure, the participants still hope for an export market to fully realise the potential of milkfish as a bulk commodity. This thesis argues that such a bulk-commodity way of life is an effect of a heterogeneous assemblage in which milkfish play a role in shaping the bulk-commodity way of life, rather than as a mere result of the interplay between political, economic and social forces.

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Introduction

There are two ways of understanding assemblages of humans and non-humans inspired by actor-network theory (ANT): consolidation and fluidification. ANT argues that both subjects and objects take shape as a result of assemblages of heterogeneous ingredients. There is, however, some disagreement over how these subjects and objects travel far and endure. On the one hand, some suggest that heterogeneous materials have to be *consolidated* in such a way that the integrity of assemblages remains while subjects and objects relocate. On the other hand, others suggest that it would be more feasible for heterogeneous materials to be *fluidified* in time and space so that subjects and objects travel far and endure long, although the integrity of these subjects or objects may be at stake. The thesis investigates this tension between the two modes of assemblage via a historical and ethnographic study of milkfish (*Chanos Chanos*) farming in Taiwan and an examination of unsuccessful efforts to export them to mainland China. The case of milkfish may be one of the best to explore this tension. On the one hand, milkfish has lasted for a long time in Taiwan but faced difficulties in traveling farther. On the other hand, it once travelled across the Taiwan Strait to China, but had difficulty lasting for long.

1.1 A Quandary Derived from Actor-Network Theory

1.1.1 How Things Travel Far and Endure

When it comes to scientific activities, ANT argues that the validity of science comes from 'construction' rather than any correspondence between representations and reality (Latour & Woolgar 1979; Latour 1987); for ANT, reality is not independent of representations of it (Latour 1999b). The solid construction of a fact claim requires heterogeneous materials, e.g. humans and non-humans. Saying that they are materially different from one another means that they are often seen as coming from different worlds—‘nature’ and ‘society’—so to speak, and that they are not always well assembled in relation to one another. For instance, a laboratory is equipped with scientists, technicians, assistants, computers and numerous experimental facilities with different functions and of various sizes. What if any one item on this list were to behave unexpectedly? A likely outcome is that a phenomenon recognised as a fact might find difficulty in revealing itself. Thus, it is a heterogeneous, well-assembled and built fact that becomes more solid and more like a ‘fact in itself’. This constructivist view is contrary to common sense that scientific facts are true, and therefore they cannot be constructed.

However, a scientific fact or a technological artefact constructed in a laboratory needs to spread and be accepted by others so as to become universal or widely adopted. A dilemma arises when a scientific fact or a piece of technology departs from its place of origin. In Latour’s (1987) account of the quandary of fact-builders (i.e. scientists and engineers), as long as facts and artefacts move away from their places of origin, they may be modified, adapted or compromised by whomever or whatever they encounter. But if a fact or artefact remains in its place of origin, so as not to be adapted, it is just another piece of locally interesting science or technology. Scientists and engineers have two ways to deal with such a dilemma. One is to ‘harden’ a fact or artefact so that it cannot be modified, while the other is to ‘soften’ it so that it can be adopted widely (Latour 1987).

As far as ‘hardening’ is concerned, if a fact or artefact is expected to move across time and space, the heterogeneous materials that constitute it in the place of origin must move as well. Particularly important is that the relation between these heterogeneous materials must be kept intact. Take Louis Pasteur’s vaccine for anthrax for instance (Latour 1988b). The vaccine, invented and effective in the laboratory, might not have worked when confronting anthrax in the farmyard, where bacilli were interwoven with various circumstances. Thus, Pasteur extended his 'laboratory' by modifying the environment of the farmyard in advance. In other words, the relationship between the vaccine, bacilli, experiment, animals and scientists was moved outside the laboratory. The vaccine could work outside the laboratory only if local circumstances, such as farmyards and cattle that it encountered, had been modified in advance. Thus, the fact and artefact of the vaccine outside the laboratory were as 'hardened' as inside, thanks to the consolidation of heterogeneous materials into 'networks'. This way of assembling heterogeneous materials is what I call *consolidation* (Law 1992; Callon 1987).

However, the 'hardened' fact and artefact may fail to attract others' interest because the cost of converting to such a fact or adopting an artefact is expensive. This is why ANT theorists are devoted to illustrating procedures of translation (Callon 1986a; Latour 1987) through which scientists and engineers can transform, enrol and mobilise many heterogeneous others without compromising original states of facts and artefacts. In the study of Pasteur (Latour 1988b), hygienists were transformed into facilitators spreading and justifying Pasteur and his achievements because, so to speak, the finding that invisible microbes were the source of diseases conformed to measures proposed by those hygienists to eradicate threats to health—sanitization. Defended and spread by hygienists, Pasteur and his achievements were elevated to a level that was pure and unquestionable. Or, we can say, those hygienists did not allow 'Pasteur and his achievements' to be compromised because they may have already subscribed to the notion of sanitization, but this idea had to be pursued in the name of 'pure' Pasteur, rather than prejudiced hygienists. Thus, the status of Pasteur being the initiator of all hygiene movements was hardened.

By contrast, the alternative way to spread and make a fact or artefact endure is to 'soften' it so that it can be used or adapted according to local needs and circumstances, wherever it is placed. Such a fact or artefact is like the proverb: An apple a day keeps the doctor away (this instance is drawn from Latour 1987). Many people refer to it, regardless of circumstances, and indeed it has spread widely, but the cost is that few care about its accuracy or the originator of this proverb. In the ANT of the 1980s, little attention was paid to softening science and technology. The 'softening' was weak, as its own name suggests.

This situation has changed in the mid-1990s, when ANT theorists started to reflect on ANT (Mol & Law 1994; Law 1999; Latour 1999a). By emphasising the consolidation of heterogeneous association, these commentators are concerned with whether ANT contributes to justifying and reinforcing a version of reality dominated by scientists and engineers (Law & Mol 2001; Alcadipani & Hassard 2010; Law & Hassard 1999). The study of a mundane water technology, a bush pump in Zimbabwe (de Laet & Mol 2000), suggests that there may be few instances of widespread technology in which heterogeneous, well-assembled materials are kept entirely intact as they travel widely. In fact, an artefact can travel widely and be accepted primarily because it is as *fluid* as water, so that it can adapt to varied local circumstances (de Laet & Mol 2000; Mol 2010; Law 2011a; Law & Mol 2011b). Therefore, the metaphor of fluids replaces networks, or at least they run in parallel with each other. For instance, the bush pump takes different forms across Zimbabwe because, simply speaking, it is designed to be open to the inclusion of non-original alternative parts. In other words, the bush pump spreads across rural Zimbabwe because it can be modified to fit local needs and circumstances. This way of assembling heterogeneous materials (e.g. relying on villagers and locally accessible components rather than central maintenance teams and alternate parts) is what I call the mode of *fluidification* (García Selgas 2015), through which facts or artefacts travel and endure, although their integrity may be compromised, like the status of original contributors of the bush pump.

To recap on the two modes of heterogeneous assemblage that this study explores, by ‘consolidation’, what I mean is the process, identified in the early ANT literature (e.g. Law 1992; Callon 1987; Callon et al. 1986), of assembling heterogeneous materials into well-integrated ‘networks’ that a singular point of actors can represent. As for the term ‘fluidification’, I borrow it from Garcia Selgas (2015) who uses it to designate a constant tension between stabilisation and de-stabilisation of the social reality. But my idea underlying use of ‘fluidification’ is drawn from de Laet and Mol’s (2000, p.226) ‘fluidity’, whereby things can travel better and endure longer by holding their heterogeneous ingredients together as a ‘fluid’ rather than as a network. In this regard, ‘fluidification’ means a process whereby heterogeneous materials assemble—flexibly, provisionally, changeably and without fixed boundaries—by mutual adaptation.

1.1.2 Different Agendas on Ontological Politics

What is outlined above is the theoretical tension that inspires this study. In one way, it may be costly for things to travel and endure, while the shape of objects and the status of initiators can be kept intact—consolidation. In another way, it may be affordable for things to travel and endure, while both the shape of objects and the status of initiators may be subject to change—fluidification. Either mode offers a respective explanation for how things travel and endure, while still shares a common interest in the ‘politics’ of technoscientific regimes. And yet, the crux of the matter lies on this common ground.

In terms of the consolidation version, both the formation of an emperor and of a great scientist are not different in kind but rather effects of the same mechanism of heterogeneous association (Law 1987a; Law 1986; Latour 1988b; Law 2009; Callon & Law 1997; Latour 1987). It may well be said that an emperor is a scientist without a laboratory, while a great scientist is an emperor without a crown or sword. The ‘power’ of both technoscience and politics comes into view as an effect of the consolidation of heterogeneous ingredients. In this vein, ‘power’ is an effect rather than a point of departure for analysis. In an effort to trace and record the process of consolidation, Latour (2005; 1987) suggests ANT analysts should follow the process of fact-building until ‘hot’ (in the making) situations become ‘cold’ (ready-made). This division between ready-made and in the making is, however, exactly where controversies about ANT arise (MacKenzie 1996). Many critics of ANT feel uneasy about the suggestion that they turn to ‘realism’ from ‘constructivism’ as soon as they can no longer challenge scientists’ and engineers’ claims for facts or artefacts (Latour 1987); it seems that ANT analysts hand over the power of interpretation to a technoscientific regime that should be explained (Collins & Yearley 1992; Bloor 1999). Thus, unintendedly, the consolidation version of ANT analysis may have a tendency to become part of, or even perform, the regime that it describes.

In light of the fluidification mode, however, the division of technoscientific regimes between ready-made and in the making does not appear to be necessary. Science and Technology Studies (STS) in this strand reveal multiple versions of scientific and technological realities enacted in practice, even though the objects under examination have been ‘punctualised’ (Law 1992) and are ‘ready-made’ (Law & Singleton 2003; Mol 2002; Mol & Law 1994; Mol & Law 2004; Law & Mol 2011b; Law & Mol 2002). In this vein, across various ‘contexts’, a putative single fact or artefact is enacted differently so as to cater for local needs and circumstances. Amongst these multiple versions, there is no necessity for a single thread that can connect them all; and sometimes, there is a good reason for keeping one version separate from another (consider the separation between cultivating and butchering cattle for instance) (Mol 2002; Lien 2015; Paxson 2012).

The implication of this strand is that every locale (or actor) has its own interests and concerns that should be *made visible or heard*—particularly, the judgement of what is *good*—and they do not have to compromise themselves so as to cater for 'centres of calculation' at a distance (Latour 1987), centres which are an effect of the consolidation of heterogeneous association. The fluidification mode enriches the discussion about 'ontological politics' (Law & Mol 2008a; Mol 1999; Moser 2008). That is, how heterogeneous materials should be assembled is an ever-present concern, rather than an issue settled once and for all, because they are assembled in various ways, and this matters to the reality we live with. For instance, nowadays, the UK pig-rearing industry depends on manufactured meal, the raw materials of which are drawn from industrial agriculture (Law & Mol 2008a). This way of pig-rearing does not 'speak up' but shapes the reality we live with; industrial agricultural is preferable to other small-scale ways of farming. *Mattering* in this regard is another way of doing politics silently but arranging the way of life deeply. 'Material politics', Law and Mol (2008a, p.141) argue, 'may be understood as a material ordering of the world in a way that contrasts with alternative and equally possible modes of ordering'. Thus, we have to look into how alternative versions of reality relate to the present, dominant one.

In this section, I introduce two modes of assemblage related to ANT but with different possibilities for how science and technology travel and endure. Moreover, they set different agendas for the ontological politics of heterogeneous assemblage. Are they so irreducible to one another? If not, how are they interrelated and embodied in the process of heterogeneous assemblage? We may think of this putative interrelation by considering the following questions. First, if things travel and endure because of their fluidity rather than the solidity of the heterogeneous assemblage, how is it that the fluidification mode is *rendered invisible*? To answer this question, we have to make visible the work of purification (Latour 1993b), deletion

(Law 1994) and simplification (Callon 1987), through all of which uncertainties or multiplicities about the formation of heterogeneous assemblages are hidden. Secondly, what will happen when efforts to consolidate heterogeneous ingredients fail? The consolidation version of ANT exposes the fragility of regimes like technoscience (Law 2009), but it marginally touches upon how attempts at consolidation rarely cease (an exception for instance: Law 1994). With these questions in mind, I intend to explore how the two modes of assemblage are interrelated and performed in the shaping of heterogeneous collectives and individuals (including non-humans). The next section will introduce an empirical case concerning a matter of food-fish to which this study extends the ANT logic of enquiry to explore.

1.2 An Introduction to Milkfish in Taiwan

The empirical case used to shed light on the ANT quandary concerns a food-fish produced in Taiwan—milkfish. It has been farmed in Taiwan for centuries. But the main reason why it attracts my attention is that, quite recently, the rearing of milkfish and accounts of fish farmers' livelihoods were bound up with the Chinese market by means of an export scheme, run under the auspices of the Chinese government, called the 'scheme for cross-straits milkfish contract farming'. This scheme was established in 2011, but it has been suspended since March 2016. It was both the attempt to consolidate the production and consumption of milkfish across the Taiwan Strait and the suspension of the scheme that drew my attention. This case pushes me to ask: how is milkfish aquaculture in Taiwan assembled so that a yet-to-come Chinese market for milkfish is construed as a solution to this declining sector? Let us first take a look at milkfish and milkfish farming in Taiwan.

1.2.1 Milkfish and the Regions

In terms of biology, the milkfish (*Chanos chanos*) is a marine fish that spawns and grows in marine environments but is able to tolerate changes in salinity; thus, traces of this fish can be found in estuaries and lagoons where water salinity is not as high as in marine environments. It is generally regarded as a vegetarian that mainly feeds on algae. It is currently the only known living species of the *Chanidae* family. The milkfish population is mainly scattered across large stretches of water between the Pacific and Indian Oceans and between the Tropics of Cancer and Capricorn. Closer to the equatorial region, it is more likely that a shoal of its fry (recently hatched fish) may be seen and collected all-year round.

As a food-fish, milkfish has never been globally consumed. Milkfish is notorious for its 'bony nature' (Bardach 2000); it is estimated to have over two hundred large and small bones in its flesh. The main countries that consume milkfish are mostly located in Southeast Asia, where milkfish are distributed and milkfish fry can be caught. Some Pacific islands (Andrews 2016) and some provinces in India (Zee News 2015) have started to promote milkfish farming to meet the needs of their growing populations. milkfish are not consumed as a wild caught fish, for reasons that are unknown, but mainly as a farmed food. According to the Food and Agriculture Organization of the United Nations (Nelson & Marygrace 2007), following the Philippines and Indonesia, Taiwan is the third largest site of milkfish farming in the world. Although the milkfish's habitats may include southern China, it is not regarded as a staple food-fish for the mainland Chinese.

Taiwan is located in an area where milkfish fry can be collected, although the country is nearly at the most northerly extreme of where milkfish migrate. It has been suggested that milkfish farming has been an endeavour in Taiwan for over three hundred years, since the Dutch rule in the 17th century (Lin 1968). Although it is said that milkfish farming was brought to Taiwan from Indonesia by the Dutch East India

Company (Schuster 1960; Lin 1968; Chen 1976), as yet there is limited evidence to support this claim. Similarly, limited evidence exists to support the legend that the name milkfish in Mandarin Chinese, *Shi-mu-yu* [虱目魚], came from a Chinese warlord who defeated the Dutch and took over the islands during the 17th century (Chuang 2005).

1.2.2 Excess Supply and Limited Demand

Despite three centuries of milkfish farming, however, milkfish had been treated as a luxury seafood—until the late 1970s. It is suggested that the supply of farmed milkfish from May each year onwards happened to fill a gap in demand for seafood. Then, fishing vessels were not able to go out to catch coastal fish because the sea state was unstable and unpredictable, with typhoons expected.

Since the early 1990s, however, milkfish farming in Taiwan has faced difficulties in expanding domestic market sales, which has put milkfish farmers' livelihoods at risk (Kuo 2000). Many social, cultural, natural and technical factors are drawn upon to explain the difficulties that milkfish aquaculture now encounters. It is noted that consumers nowadays have a variety of food-fish choices, alongside improvements in their economic conditions. Also, culturally, people's tastes for fish-food have changed, and their ability to choose among fish-foods has been honed as well. With regard to the profile of milkfish, fish that are full of bones and that taste 'muddy' on some occasions are not so welcome nowadays. Technically, however, production has been scaled up thanks to both the achievements of deep-water farming in the late 1970s and later artificial breeding, which was first implemented in the mid-1980s (see Chapter 5). The 'overproduction' of milkfish has become a problem for fish farmers' livelihoods. Faced with middle bulk-buyers, fish farmers generally do not have much bargaining power.

The government fisheries agency has implemented measures to alleviate the problem of milkfish overproduction. For instance, fish farmers are encouraged to team up to form small-scale fish processing plants through a programme that provides them with preferential loans. When fish farmers start to sell their produce on their own, at the same time cultivating their own sense of the market, it is hoped that they will be able to regulate the quantities they produce so that the problem of overproduction will be alleviated. The efficacy of such measures, however, is not unequivocal; in some ways, small-scale processing plants act more and more like regular middle buyers.

Another measure to deal with overproduction is through exports. It is intuitive that by exporting a proportion of milkfish produce, the domestic market will be less affected by overproduction. However, the issue is where the demand for milkfish is. It has not been the globally consumed fish yet, unlike salmon and tuna. Plus, Taiwan's milkfish industry has little relative strength in terms of production costs in comparison to countries that are used to consuming milkfish, such as the Philippines and Indonesia. For a long time, the major overseas markets for Taiwan's milkfish have been South Asian communities in the U.S. and the Middle East, but the level of exports has been relatively low.

1.2.3 The Cross-Strait Contract Farming

A new opportunity arose with the signing of an economic deal between Taiwan and China, namely the Economic Cooperative Framework Agreement (ECFA), implemented in mid-2010. Based on this Agreement, Taiwan's milkfish are included on the list of tariff-free items of Taiwan fish exports to China. In the meantime, a cross-strait project called the Scheme for Milkfish Contract Farming (export scheme for short) was initiated under the auspices of the Chinese government in 2011. The export scheme operated through directly making contracts with fish farmers to source their produce at set prices for export to China. If this export scheme could keep going, it was believed that ‘a whole island of milkfish could not meet the demand from China’ (interview, Chairperson Wang, 2014-0317). While the export scheme claimed to support the livelihoods of milkfish farmers, it was also suggested that the export scheme sought to boost fish farmers’ support for reunification with China.[1] In fact, the economic agreement is regarded as an effect of a stable cross-strait relationship since 2008.

The export scheme was initially developed between a production site in Taiwan, Xuejia, whose population is less than 30,000, and a consumption site in China, Shanghai, whose population is over 20 million. However, the ongoing 5-year scheme was suspended in March 2016. Many commentators have tried to explain the failure of the export scheme.

First, some suggest that it was driven by a political intention to win over the hearts of Taiwanese fish farmers. ‘Taiwanese’ as a political identity precedes ‘milkfish’ as a matter of food-fish to be dealt with; thus, few efforts were made to market the fish in Shanghai. On the contrary, every year, voting results from Xuejia would be examined to see if the vote for pro-independence candidates had fallen (Tseng 2013; Chiao 2016). Given that voting results were constant, the scheme ended. Second, some said that milkfish were too bony for, and tasted ‘muddy’, to Shanghai locals (Lai 2011). Thus, the outcome might have been different if the export product had been milkfish fillets that were subject to strict quality controls (Li 2015). Third, local people in Shanghai were unfamiliar with milkfish (Lai 2011), they did not know how to cook it. In sum, the execution of the export scheme was not professional, and thus a well-planned marketing project is required if there is to be a

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[1] At the end of the Pacific War in 1945, the Nationalist government of China came to take over Taiwan; but in 1949, the Nationalist government was defeated by the Communist government and fled to Taiwan. Since then, the Communist government has been keen to ‘take back’ the island and has engaged in a series of political campaigns to build up a united front line with the people of Taiwan.

future for the export scheme (Lai 2011; Lu 2015).

However, on the other hand, some participants of the export scheme denied that the export scheme had anything to do with a political campaign from the Chinese government. They went together, to the government of Taiwan, to appeal for its relaunch, because they believed that closure of the scheme hinged on a shift in policy to do with the 'cross-strait relationship' since 2016.

This section presents a general overview of the development of milkfish farming in Taiwan, and the history and current situation that it faces. Seen from above, there are several aspects that can be analysed through the lens of ANT. First, there is the matter of how *overproduction* comes about in milkfish aquaculture. Although technology has frequently been used to explain this issue, 'technology' is not seen as a realm independent from 'society', in light of ANT approaches. Both technology and society need to be *unbracketed* (Law 1994; Mol 2002; Latour 1993a). Second is the matter of *symmetry* between humans and non-humans (Callon 1986a; Latour 1987). Whether in academic or popular discourses on milkfish aquaculture, non-humans were seen as merely a passive object that had nothing to do with the implementation of the export scheme or the formation of the milkfish assemblage in Taiwan. Third is the issue of *ontological politics* (Mol 1999; Law 2010), as enacted in the implementation of the export scheme. The next section is about how these three issues are interwoven and can be explored in ANT approaches.

1.3 Significance of ANT to the Case of Milkfish

In this section, I am going to consider how ANT insights can shed new light on the case of milkfish, from overproduction to the export scheme. In brief, the closure of the export scheme needs explanation, as does the current state of milkfish farming in Taiwan.

1.3.1 Problems of Overproduction

Overproduction is a judgement made by examining supply and demand together. It cannot be made without first extending the measurement system, otherwise any particular amount of either production or consumption would make no sense in such a judgment of overproduction. In terms of ANT, metrology never merely represents ‘reality’, it also has effects on it (Latour 1999b; Latour 1987). It would be better to take numbers that suggest overproduction as an effect of arranging measurement techniques ‘on’ reality, rather than mere representations. This perspective sheds lights on the fact that text, figures and numbers in official reports or research papers that this thesis refers to could play a role in the formation of the reality they represent. Many ANT-inspired studies have paid attention to the role of official statistics in shaping or ‘characterizing’ a particular version of reality in agriculture and aquaculture (Didier 2007; Lien 2015; Law & Lien 2012). In this regard, the mobilisation of papers and numbers is a critical step towards the formation of centres of calculation and a periphery under control. Therefore, what are the effects that follow from the building and operation of centres of calculation? This issue will be touched upon in Chapters 4 and 5, which suggest that official milkfish statistics help to shape a singular version of reality of milkfish across fishponds.

Another issue with milkfish overproduction is the technology of milkfish farming. As an activity conducted for over 300 years, how has it only confronted the problem of ‘overproduction’ since the 1990s? Many attribute this difficulty to ‘technical changes’ in milkfish farming in the 1980s. That those technical improvements brought about the unintended outcome of overproduction seems intuitive. However, ‘technical changes’ in that regard have bracketed fish farmers, milkfish and all the others in the milkfish assemblage (Law 1994; Mol 2002). Rather, this study argues that the externality of technology to ‘society’ is another effect of networks, one which occurs at the end of network-building when traces of competences exchanged between humans and non-humans are erased (Latour 1993a). In this study, rather than use 'technological factors' to explain social changes, I will instead *describe* the technical changes of milkfish farming as a double movement of *detachment* and *re-attachment* (Lien 2015; Callon 1999), through which some parts of milkfish assemblage are severed while others are incorporated. Chapter 4 describes the previous practices of milkfish farming and the impossible scenario of Xuejia being a major production site for milkfish in the past; from this, Chapter 5 further considers how places like Xuejia have been adapted for milkfish farming.

The other issue evoked by 'overproduction', partly related to the technical issue of milkfish farming, is the *homogeneity* of milkfish. Such a judgement of 'overproduction' does not confine itself to the quantity of produce, but also to its *quality* (Callon & Law 2005). Overproduction suggests that it is the 'same thing' that is produced over-abundantly. Many ANT-related studies of food mention the mutual formation of food and markets (e.g. Sheller 2013; Garcia-Parpet 2007) or the paradox of food products distinguished from other similar ones (Hébert 2010; Callon et al. 2002). Accordingly, how is it that the sameness of milkfish is achieved by evaluation and judgement, regardless of the fact that the fish are gathered from artificial ponds across different regions bound up with different conditions? Chapter 6 shows the widespread use of a market standard for milkfish, which is not only a measure for observation but a way of *intervention* (Heuts & Mol 2013), while it also suggests irreducible multiplicities of milkfish in the application of the market standard.

The point here is not to argue that there is no such thing as overproduction. Rather, it is to make visible the making of overproduction alongside the assemblage of milkfish and humans engaged with it. Saying something is constructed is not to say that it is false but rather that it has a 'humble, visible, and interesting origin'

(Latour 2005, p.88). No doubt, the construction of the same-thing-overproduced has its own material effects. For instance, if the reality of milkfish in Taiwan was presented as being as diverse as cheeses in France, once we said 'milkfish are overproduced', the reply would be 'which kind?'. Why are there no such questions raised about 'which kinds of milkfish are overproduced'? Lien (2015) suggests that farmed salmon in Norway has long been seen as a bulk commodity, different in logic from value-added food items like cheese and wine. Despite this, how the status of a bulk commodity is achieved in the case of milkfish is a focus of the present study. Therefore, the aim of this study is not only to analyse how a particular version of milkfish comes to the fore, but also to show how other versions of milkfish are overshadowed by the enactment of the dominant, present one.

1.3.2 A More Symmetric View

Milkfish is not a new topic in Taiwan, whether it is regarded as a cultural activity regarding production or consumption, or an object of scientific and technological study. But there has been a neat labour of division between the social and the natural sciences. In the humanities and the social sciences, the *materiality* of milkfish is largely made invisible in sociocultural accounts, while fish farmers and related human activities (including researchers or observers of milkfish and milkfish farming) are invisible in technical accounts of milkfish. This study aims to draw upon the principle of generalised asymmetry to explore the formation of heterogeneous assemblages of milkfish.

ANT theorists propose a principle called *generalized symmetry* to bypass the modernist paradox that while the number of nature-culture *hybrids* multiplies, more and more hybrids are *purified* to become either 'Nature' (the world of non-humans) or 'Society' (the world of humans) (Latour 1993b; Callon 1986a; Latour 1992; Latour 1987; Callon 1987; Callon 1986b). This principle is proposed in the context of STS and is a critical construction of the *symmetry* tenet drawn from the Social Study of Knowledge (SSK).[2] This generalised symmetry argues that, because what is counted as nature or society only takes shape after the formation of hybrids of humans and non-humans, and when proof of them once being hybrids is erased, thus we cannot treat one 'effect'—either nature or society—as a cause to explain another.

To demonstrate this principle, ANT analysts adopt three research strategies. First, is to make visible the work of translation or mediation by which both social or natural things take proper shape by switching competences between humans and non-humans (Latour 1993b; Latour 1993a; Latour 1988a; Latour 1991). Second, is to make visible work of deletion or purification through which hybridised social or natural things are filtered into either 'society' or 'nature' (Law 1994; Law 2009; Latour 1993b). Third, and the most controversial one, is treating non-humans like humans with some kind of 'agency' in the making of numerous modern hybrids (Latour 2005; Latour 1986; Callon & Latour 1981). It is argued that both social and natural things are limited in size and shape, or that they could be organised otherwise if no 'non-humans' had been involved in the formation of both the social and the natural (Latour 1994; Latour 1986; Law 1987a). Therefore, there is a need to see non-humans as 'actors', on a par with humans, that can take part in the formation of social and natural things. But note that this is not to suggest that non-humans are born to be actors. Rather, both humans' and non-humans' actorship are relational effects of a heterogeneous assemblage (Law 2009). And how they end up gaining actorship or losing it is a matter of analysis, not a point of departure.

However, the principle of generalised symmetry is not without criticism, such as handing over the interpretation of 'objects' to a

[2] I will review the debate between ANT and SSK in more detail in the next chapter; here, I pay more attention to how the principle of generalized symmetry can be applied in the present study.

spokesperson for those objects, i.e. scientists in the name of 'Nature' (Bloor 1999; Collins & Yearley 1992). We may draw lessons from Pickering's (1995) concept of *material agency* in relation to the generalised symmetry. It is obvious that human actors, such as scientific personnel, have their own intents, interests, plans and goals to achieve, and these may be set up by scientific communities, but they do not take shape without handling scientific instruments and machines (non-humans). More often than not, the intents, plans, interests and goals of scientists are shaped and reshaped in interaction with what non-humans can afford to do or not.

In the same vein, the 'agency' of non-humans in this study, such as milkfish, can be made visible, first, by paying attention to how humans and non-humans interact with each other. Although it is often the case that humans, such as fish farmers, speak for non-humans, we have no reason to assume that this representative relation can always remain. Thus, second, the 'agency' of milkfish can be understood as the extent to which fish resist efforts to consolidate them into networks. If, at a certain point, milkfish show no sign of resistance, this study treats this phenomenon as a result of the heterogeneous assemblage in which the fish are pacified or rendered passive, although this is seldom fully achieved (Law & Lien 2012; Law & Mol 2008b).

Third, the 'agency' of non-humans in this study can be made visible by observing how milkfish assemblage is organised in the name of what 'milkfish' need, under what circumstances milkfish can live and grow, or what is required for produceing market-qualifying fish, what is required to support fish farmers' livelihoods, and so on. By reference to the study of the TSR-2 aircraft design (Callon & Law 1997), this plane was not only a result of existing industry, technology, policy and politics, but also a cause that transformed these realms so that the aircraft that did not exist could take shape. In other words, milkfish's 'agency' as presented in this study is an effect of milkfish assemblage, while it also acts upon the very assemblage (Lien 2015). In sum, the putative agency of non-humans is taken as an analytical tool. Both its presence and absence need explanation.

1.3.3 The Ontological Politics of Milkfish and the Export Scheme

Now we can move on to another theme of this study—the export scheme. Both media (e.g. Lai 2011; Chiao 2015) and academic work (e.g. Tseng 2013) use the frame of 'cross-strait politics/ relationships' to explain the implementation of the scheme. This frame is basically that the Chinese government is attempting to reclaim the sovereignty of Taiwan, so it makes efforts to win people's hearts of Taiwan. In that regard, the export scheme was just another way of doing cross-strait politics. Here, I consider both the export scheme and the ontological politics of 'networks' as enacted by the implementation of the export scheme.

Dominated by the frame of cross-strait politics/ relationships, both academic and public attention are drawn to a *political characteristic* of Xuejia. That is, people in this area are regarded as being opposed to reunification with China. This political characteristic may appear crucial to the export scheme supported by the Chinese government—as an 'experiment' to see whether such a scheme can shake up the existing political landscape of Xuejia. However, this kind of account itself makes some aspects of Xuejia more invisible than others. Other aspects include: a part of Xuejia was under the sea just 200 years ago; it is situated at a crossroads between saltwater and freshwater areas; it was heavily involved in agriculture, rather than fish farming; even if it started to engage with fish farming, milkfish was a latecomer to fishponds in this area, relative to other areas. With reference to ANT, there is no reason to assume an 'ontological consistency' (Law 2010) for Xuejia, milkfish and fish farmers, and consistency between them. Thus, how these 'other' characteristics are interwoven so that an export scheme becomes a requirement for both fish farmers and the viability of milkfish farming in this area should be open to enquiry.

With regard to the 'failure' of the export scheme, it is often suggested that the export scheme was not handled in a 'professional' way, so that milkfish failed to attract local consumers in Shanghai (Chiao 2015; Chiao 2016). Some commentators argue that the export scheme failed because it was never driven by 'market demand' but rather by 'politics' (Lai 2011; Chiao 2015). Things could have been different if politics had been kept out of the equation. In contrast, others (mostly participants of the export scheme) have suggested that the export scheme did support fish farmers' livelihoods too. Thus, whoever criticised the export scheme for compromising the sovereignty of Taiwan was playing politics at the expense of fish farmers' economic interests.

However different they may seem, the differences between the two sides are not as great as a first glance suggests. For both of them, the export scheme failed simply because the implementation of the export scheme was not 'pure' enough and was tainted by politics. The critics blamed the export scheme for starting off with 'politics', while adherents criticised it for being ended by 'politics'. Both use an asymmetric strategy to explain the failure of the export scheme. They are asymmetric, first, because politics is treated as something to do with an explanation of failure (i.e. a failure of marketing and the breakdown of the scheme as well). Similar export schemes for other Taiwanese foodstuffs to China did not always have negative results. If we explain the failure of the export scheme with 'politics', how do we explain 'success'?

Secondly, it is assumed that things would have been better if the content (e.g. processed fillets and the market) had been independent of the context (e.g. the whole-round fish and politics) (Law 2003a; Latour

1999b). However, seen from the viewpoint of ANT, separation between content and context would be a rare achievement and thus deserves explanation, because they are often hybridised with each other in practice (Latour 1993b). Therefore, in response to the appeal for separation of content and context, we need to consider how the shape (whole fish) of the milkfish commodity and the ‘cross-strait relationship’ (politics) were interwoven with the export scheme, rather than unravelling this entanglement prior to analysis. This means to consider how the export scheme was enacted to be a viable option for fish farmers, and whole fish as well. Or, to put it another way, how were the export scheme, fish farmers and whole fish made viable for each other?

This shift in focus from ‘cross-strait politics’ to these components of the export scheme aims to explain cross-strait politics via the implementation of the export scheme, rather than the other way around. This attempt is inspired by Latour’s (2005; 1996) reversing of *explanandum* and *explanans*, foreground and background, content and context, as well as frontstage and backstage (Latour 1999b; Law 1994). All separation is an effect of the erasure of traces of being hybrids. Thus, what are under consideration are certain questions, as follows: how milkfish and other humans and non-humans co-*acted* (Law & Mol 2008b) so that such an export scheme became desirable, and how the export scheme was *enacted* so that a particular shape for the cross-strait relationship was desired as well, rather than presupposing the passivity of non-humans and separation between the export scheme, milkfish, fish farmers and the cross-strait relationship. These traces of being interconnected were erased and simplified into either ‘politics’ or the ‘market’. In other words, although ‘cross-strait politics’ may have played a part in the initiation of the export scheme, it was not present as something independent that acted on the scheme. Rather, it was given shape at the same time as the export scheme was enacted; this is a shift from an ostensive to a *performative* sense (Latour 1986) of 'cross-strait politics'.

However, although drawing on insights of ANT can generate different understandings, a problem can be with 'networks'. That is, how should heterogeneous assemblages take shape—especially for those which fall apart? Latour (2005) emphasises that the notion of constructivism in ANT is meant to remind us that things could have been assembled otherwise. However, it seems that ANT has little to say about 'constructed' (ready-made) technoscience (Latour 1987). The ANT description of the formation of technoscience seems unsatisfactory, as this description becomes a 'justification' of the reality dominated by technoscience. The term 'network' turns out to be not only a tool for description but also a criterion for evaluating assemblages of heterogeneous materials. That is, networks that are consolidated endure and extend, while those that are not fail and thus disappear. In other words, subject to the 'network', ANT performs its own version of asymmetry between networks and other non-network assemblages.

The major problem with this asymmetry for understanding the export scheme is that the hope for another, better-organised, scheme being put in place never fades, even if the one to hand breaks down (Singleton & Law 2013; Law 1994). What we fail to do is *un-think* a scheme. Whether it succeeds or not, the need for such a scheme never retreats. That is to say, if 'networking' is thought of as the shape that heterogeneous assemblages must take, the need for 'schemes' becomes justified. This is the very 'politics' of the export scheme by which some versions of reality are made more feasible than others. Mol (1999) argues that alternative realities are not only possible once in the past, when the reality was under construction, but co-exist with well-constructed ones in different shapes and forms (also refer to Moser 2008). Law (2003b) is concerned that describing how things come into being as ‘networking’ becomes a sort of hegemonic ‘modern episteme’ that excludes other possibilities, whereby both subjects and objects can take shape, heterogeneous collectives are assembled, and orders can be ordered. Accordingly, ‘network’ is seldom neutral and descriptive but more or less ‘normative’.

The novelty of ontological politics (Mol 1999; Law & Mol 2008a; Moser 2008) for this study is that, as the *conditions of possibility* for networks are not a given but constantly debatable and thus open to be shaped and reshaped, those for the export scheme are not a given and thus should be open to discussion. Some conditions are *rendered more visible* than others and thus are more ‘real’ than others as well. Thus, this study will take into account the practices that render some conditions of possibility for the export scheme more visible than others, and viable for fish farmers as well. Therefore, this study aims to explore not only how heterogeneous materials are assembled, but also how some conditions are rendered indispensable while others are excluded, so that the export scheme becomes the most viable option for the export of milkfish to China, and support for fish farmers’ livelihoods as well.

1.4 Interrelation between Consolidation and Fluidification

The case of heterogeneous assemblages of milkfish may be one of the best to explore the tension between consolidation and fluidification. On the one hand, it has lasted for a long time in Taiwan but faced difficulties in traveling farther. On the other hand, it once travelled across the Strait to China, but failed to endure. It is this incomplete performance of durability and mobility that draws my attention. At the end of the first section of this chapter, I raise two questions in order to consider a putative interrelation between the two modes of assemblage. To recap, first, how is the mode of fluidification made invisible in the process of heterogeneous assemblages taking shape? Second, what will happen when efforts at consolidation fail, and relatedly, why do attempts to constitute a consolidated heterogeneous association seldom shrink? In this section, I turn to consider how these two questions can be explored via the case of milkfish.

First, what is *rendered invisible* during the formation of the heterogeneous assemblage of milkfish (i.e. fish farmers, milkfish and other humans and non-humans who/that are involved) so that a version of reality is thought of as the reality itself? My assumption is that without leaving uncertainties and indeterminacy of network-building in the 'background', the reality of heterogeneous assemblages cannot be presented as a natural order in itself. Also, how is this work of invisibility being rendered made possible? I will trace the work of purification (Latour 1993b; Nimmo 2008; Anneberg et al. 2013), deletion (Law 1994) and simplification (Callon 1986b; Callon 1987; Latour 2005). Compared with the work of hybridisation, purification has been under-examined (see Chapter 2). Through purification, respective actors take on their distinct shapes: a version of milkfish is separated from others, the fish harvest is separated from fishponds and fish farmers, original contributors are separated from a mass of actors, and more importantly, the consolidation mode is singularised from fluidification. By tracing the work of purification, the aim is to make visible again, once invisible uncertainties and multiplicities.

Secondly, does milkfish's 'failure' in Shanghai suggest a failure of the export scheme, and even the negation of the network consolidation? This study suggests, to the contrary, that milkfish's failure in Shanghai was enacted to be 'proof' of the necessity for an export scheme, and thus the need for consolidation work rarely ceased. In this regard, I am going to make visible the work of 'hybridization' (Latour 1993b) between consolidation and fluidification. I am going to argue that, on the one hand, it was through this hybridity with fluidification that the export scheme was enacted to be attractive to fish farmers in Xuejia and could be coped with by local facilitators in

Shanghai, where the commodity was unsaleable. On the other hand, this result could not be achieved without the work of purification, whereby one version of milkfish and its heterogeneous assemblage was presented as the only reality for what milkfish are like, how milkfish farming can be done, and how fish farmers can secure livelihood as well.

Overall, what is outlined above shows that the case of milkfish provides an opportunity to explore the putative relationship between two modes of heterogeneous assemblage, as far as how things travel and last is concerned. Also, this study is prepared to explore the political agendas implicit in both modes and their complications vis-à-vis the political agendas involved in empirical worlds.

Chapter 2
Literature Review

This chapter lays the intellectual foundations for ANT notions and concepts and their application to studies of food and fish for the present study. The first section considers the ANT literature on the consolidation of heterogeneous networks. The second section turns to studies leaning more towards the mode of fluidification. The third section concerns the application of ANT notions in a research area called ‘agro-food studies’, in which agricultural food is the subject matter, and ANT is drawn on to explore this issue. However, there are controversies over how to apply ANT notions and to avoid being ‘translated’ by assumptions about non-human agency implied in ANT. The fourth section focuses on studies of heterogeneous assemblages in food and fish.

2.1 **Consolidation of Heterogeneous Networks**

In this section, I am going to examine the literature on ANT that I draw on to construct the mode of consolidation; most of this literature comes from the so-called 1980s version of ANT (Law 2009). The most provocative notion of ANT is probably that ‘objects too have agency’ (Latour 2005; Nimmo 2016). To understand this position, it is first needed to consider the principle of generalised symmetry, and then the position of non-human agency. To clarify the use of the concept of ‘non-human agency’, in the present study I will consider the debate between ANT and SSK (Social Study of Knowledge) in this regard.

2.1.1 Symmetry and Objects Have Agency

When it comes to the separation between studies of Nature (the world of objects) and of Society (the world of subjects), ANT takes a *generalised symmetry* approach to reveal that the formation of either Nature or Society is largely achieved through the same mechanism

(Latour 1993b; Callon 1987; Callon 1986a). The concept of generalised symmetry builds on critical construction of the symmetry tenet within the Strong Programme or SSK. Thus, we start with an account of symmetry in SSK.

SSK takes a critical position towards previous social studies of scientific knowledge being partial and asymmetric (Bloor 1991). The reason for being partial is that knowledge proved to be 'true or successful' needs no explanation, while knowledge proved to be 'false and failed' needs. The reason for being asymmetric is that the resources used to explain truth and falsehood were different. Truth and success resorted to logic, were self-explanatory and thus had no need of causal explanation. In contrast, false knowledge about nature must have causes that prevented falsehood believers from telling the truth. In one word, sociological explanations were invoked to explain false beliefs and deviant behaviours (Bloor 1991). If the social study of science is to explore 'knowledges' about nature, SSK argues that both false beliefs in nature and true knowledge about nature have to be explained in the same sociological terms. Thus, impartiality, symmetry and causality, alongside reflexivity, constitute the tenets of the Strong Programme of SSK. To put this another way, knowledge about science and technology has to be explored in the same way as the social study of people's beliefs in nature.

ANT regards itself as taking up the principle of symmetry and expanding it to the symmetry between humans and non-humans, rather than between groups of people who hold different interests and power (Latour 1992; Latour 1993a; Latour 1993b). The central difference from the symmetry of SSK is that ANT draws on non-humans, such as machines, experimental instruments, texts, numbers, figures and even objects of science and technology as explanatory resources for the closure of scientific and technological controversies. It is fair to say that ANT puts more emphasis on the part that 'objects' play in knowledge formation about an object; the separation between representations of nature (knowledge) and the object itself (nature) is not well clear-cut (Latour 1999b) but entangled. The main reason why Latour (1993a; 1993b) recruited non-humans into the inventory of explanatory resources is that the emergence of such sociological terms and social factors as interests, power and context give little consideration to 'nature'. But developments in science and technology have 'intervened' widely and deeply in the 'social world'. Given that the basis for accounting for nature—'society'—has been intervened in by non-humans, it will be insufficient to draw only on sociological terms that originated by purifying non-humans from intellectual resources to explain nature while leave society aside. Rather, the formation of both society and nature occurs through intricate entanglements between humans and non-humans, and thus both have to be explained by the same process of heterogeneous entanglements. This is how ANT practises the symmetry principle in its objects of study.

In what follows I will first consider the research work that underpins ANT, and later return to the debate about ANT and SSK on the agency of non-humans.

The first study examined here is the case of the French scientist, Louis Pasteur, his laboratory and discoveries in the 19th century (Latour 1983; Latour 1988b). Few people believed in a connection between anthrax and a laboratory through which the disease could be eliminated. Pasteur's laboratory was a place where this connection took shape. The laboratory broke down the differences in scale between microbes and society, between various interest groups, and between farmyards and laboratories, and later drew them together in a connected way. This is how a vaccine against anthrax, which was 'invented' in a laboratory, could worked outside the laboratory. It was only when conditions inside the laboratory could be taken outside, in advance, that vaccination could perform 'seamlessly', whether in one world or another (Latour 1988b).

Moreover, the effects of the vaccine could not be assured without expanding the statistics apparatus in advance so that farmyards and cattle across the regions were included in folded sheets of papers. When an old phenomenon—the death of cattle and citizens—was placed under a new agent—anthrax and other microbes—the laboratory became indispensable for locating diseases; so was Pasteur.

As much as Pasteur attributed the origin of diseases to invisible microbes, hygienists who had longed to rebuild the urban environment resorted to 'Pasteur' to undertake hygienic steps. Therefore, even though hygienists' countermeasures against death from contagious diseases, such as completing sewage systems, failed from time to time and should have been questioned, the public's attention was rather directed towards 'the inertia of the public authorities' (Latour 1988b, p.53) that had not fully followed 'Pasteur' because Pasteur's discovery was lifted to a *pure* and indisputable position. Through the study of Pasteur, Latour shows that the 'context' of French society was not immutable, and that new power (science and scientists) came along with new agents (microbes and laboratories). The build-up of either cannot be separated from the other.

Network-building is never guaranteed to succeed, however. Callon (1986a) uses the case of the recovery of scallops at St. Brieuc Bay to show that the establishment of 'social relationships' goes hand in hand with the relation forged between scientists, knowledge of scallops, academic colleagues, scallops (and their larvae), anchoring devices, scallops' predators in the sea and local fish farmers at St. Brieuc Bay. The list of which elements should be enrolled into a network in the making could be endless as long as heterogeneous relations within networking can hold steady through time and space. In this case, the validity of knowledge about scallops depends on others (e.g. fishermen do not break their promise not to harvest scallops), while others also depend on the validity of knowledge about scallops (i.e. can an anchoring device imported from Japan be used on scallops in St. Brieuc Bay?). This kind of 'social relationship' is a salient point. However, the fact that the 'scallop network' ended up breaking apart reveals that even if a heterogeneous network was once built up, it could be only temporary, lasting as long as the elements in the network remain in place and offer no dissent.

In a study of electric vehicles in France, Callon (1986b) reveals the duality of a single point (a human or non-human element) in a network. The electric vehicle project in prime movers' (system builders) minds sought to assign new roles to existing players in an existing context. For instance, automobile manufacturers, governments and consumers are now aligned with electric vehicles, electrons, fuel cells and so on. However, each element on the list is itself a network, and they are not bound to be simplified into a single point or be juxtaposed with others. For instance, within the project, a city was simplified to become an element of a pollution-causer and represented by a city council that was keen to solve the problem of pollution. What was at stake was the integrity of a city composed of citizen-voters who could be simplified into a city council's attempt to reduce pollution. However, if the city council rejected staying in the place that the project assigned, because citizen-voters said so, the result would be as destroying as fuel cells, electrons and other non-human elements reject keeping in place for the running of electric vehicles. The car would not move and the project could not go on.

In another context, Callon and Law (1997) stress the tension in the duality between 'actor' and 'network'. They argue that there is no difference between a single entity and a network of entities which acts through a single entity. For instance, the design of the TSR-2 aircraft did not only reflect the demands from industry, national defence, technology and society, but the 'object' in the making also shaped the industry, national defence, technology and society by demanding that these sectors align with the object in the making. Thus, the 'object' in the making is also an 'actor' that acts upon the entire network. Both actors and networks are co-extensive.

In a study of the Portuguese Empire, Law (Law 1986; Law 1987a) shows how non-human materials like vessels, winds and currents were enrolled into the formation of a long-distance and durable empire. This long-distance expansion was made possible by enrolling and assimilating a series of human and non-human actors into a heterogeneous system; the process of systems building is also called 'heterogeneous engineering'. This system is difficult to achieve because humans and non-humans may be hostile to each other; it is never easy to hold them in place. It relies on a skilled crew, wind power and ample space for cargo and cannons if a vessel is to remain independent of the hostile environment it travels through (Law 1987a)—otherwise, winds, currents and even enemies could tear the vessels and thus the empire apart. As long as each element is held in place within the network, vessels are capable of circulating back and forth, and an empire's control over its colonies works as if there is no distance and as if there was a fundamental difference between the centre and the periphery beforehand, rather than an effect of system-building. Through this case, Law (1987b) suggests, first, it is never easy for large-scale systems to be built up and held steady. Secondly, 'actors' are those that system-builders have to *deal with*—especially when they resist enrolment—whether humans or non-humans; and 'actors' cease to be actors if they make no difference to the system. In other words, the 'actorship' of an element is not a 'natural' capacity excusive to humans but is enacted in a relation of networks in which the element is placed. An element can be an actor acting on others, while it is also an actor because others act on it.

Let me summarise the insights from ANT studies mentioned above.[3] First, there are no neat boundaries between science, technology and society; rather, they co-shape and are co-shaped by other each within the same process. Or, they are interwoven. Pasteur was an effect of the same network as public hygienist movements that developed and reached a peak; the Portuguese Empire was an effect of the same network as vessels that circulated back and forth; aquaculture scientists' reputation was an effect of the same network as the local fishermen's community at St. Brieuc Bay was cemented. ANT work exposes a similarity between technoscience and politics. In both realms, whether a mass of 'actors' can be represented by any one of them that stands for and speaks for the others is a matter of concern and a place where controversies about the representative may arise.

However, my concern regarding this 'mutual formation of humans and non-humans' is that it implies that both humans and non-humans come to 'de-formation' in the same process as well, particularly when—in Latour's (1993a) terms—humans and non-humans stop exchanging their capabilities, and stop sustaining a network. What I am concerned with is whether there is a clear boundary between mutual formation and de-formation in practice. It is understandable that the principle of (generalised) symmetry explains the successes and failures of science and technology in the same way. However, when this principle is applied to more mundane objects other than science and technology, is the boundary between the success and failure of objects'/ subjects' formation still clear?

Secondly, 'objects' can be 'actors' with an agency-like capacity that contributes to the mutual formation of 'nature' and 'society'. We may understand this positon through the criticisms of ANT by the SSK/ Strong Programme. Bloor (1999) argues that, in the Programme, nature is never in opposition to society, but rather society is included in nature,

[3] There are more studies than are named here that contribute to the formation of ANT, e.g. Akrich's (1992) studies on the transnational transferability of technology.

as are scientists and science. It is not that sociological terms are mobilised to explain 'nature'. Rather, false and true systems of 'beliefs in nature' are both explained by the same social process. Moreover, the Programme never overlooks the *agency of objects*. Rather, objects are recognised as having *causal agency* in the sense that 'things have the power to stimulate our sense organs' (Bloor 1991, p.91). Non-humans' agency commonly works upon people, but different groups of people draw different conclusions from the same non-human agency, and thus what causes this difference cannot be explained by the same non-human agency. Besides, attributing explanations to 'non-humans' is exactly what the Programme objects to and aims to explain, because that way would hand over the power of interpretation to people who can dominate causal agency, like scientists and engineers (Bloor 1999; Collins & Yearley 1992).

Thus, endowing 'agency' to non-humans seems to overstress a sort of determinism compelled by Nature. However, the agency of 'objects' in terms of ANT is a resulting effect, rather than a cause or an inherent characteristic, as much as humans are not necessarily born to be 'actors'. The agency of non-humans involves another notion of ANT—the work of translation. Translation can be simply understood as a process in which respective entities exchange their capabilities and interests (Latour 1993a)—like the temporary association of scallops, fishermen and scientists (Callon 1986a)—and perform tasks they are asked to do. For instance, a 'door-closer' can be either a human or a non-human entity in charge of the same task—closing the door (Latour 1988a). Surely, non-humans do not have the capacity of reflexivity or intentionality like humans (Pickering 1995), but neither can humans calculate and reflect upon the outcomes of their acts without the assistance of inscription devices like figures and sheets of paper (Law 1994; Latour 1987; Sturm & Latour 1987). Humans' acts will be limited without the involvement of non-humans. So-called 'social action' has had non-humans involved or mediated for a long time (Latour 2005); sometimes, humans' actions are modified or constrained by non-humans' intervention, regardless of human intentions (Latour 2002). The point is that a 'society' figured as made of humans would not be durable or expandable without the intervention of non-humans (Latour 1991).

One way to consider the 'agency of objects' is to consider what a 'society' would be like without 'objects'; does the absence of those 'objects' make a difference? (Latour 2005). On the other hand, figuring 'objects' with agency is to make them noticeable, even though they 'act' silently most of the time. The concept of 'non-humans' agency' reminds us that the silence and passivity of objects are not an order in nature. How 'objects' are made passive and silent is open to question. In fact, ANT theorists emphasise the *agency of non-humans* so as to *demote* or *deflate* the status of humans, rather than promote non-humans to a special status (Law 1987b; Latour 2005; Nimmo 2016).

With Bloor's (1999) argument in mind, the role of non-humans in this study should not be taken as 'deterministic actors'. Rather, the agency of both humans and non-humans is only *afforded* (Mol 2010) or *enabled* (Nimmo 2016) by other humans and non-humans that are related to. For instance, fish in ponds do have a 'causal agency' that fish farmers have to respond to; otherwise, the fish may die, and fish farmers will make a loss. But this causal agency is only one level of the 'material agency' (Pickering 1995) of milkfish. In order to meet the requirements for milkfish' survival and growth, the whole setting of fishponds along with fish farmers would need to be adjusted, and adjusting the latter may adjust the agency of milkfish in ponds so that the fish react in one way or another and fish farmers perceive and act accordingly. In other words, causal agency has been mediated or translated as well as humans' agency. If milkfish contribute to shaping the milkfish assemblage, that is only because they are afforded or enabled by others in the network, as are humans.

Concerning Collins and Yearly's (1992) argument about handing over interpretive authority to experts, Callon and Latour (1992; see also: Latour 1996) respond that non-human agency is only *semiotic,* thus how non-humans change their forms and shapes can be made visible at every point. However, this semiotic move seems to be a retreat to science-as-representation (Pickering 1993, p.564). Instead, Pickering (1995; 1993) suggests that science would be better viewed as practices bundled with machines and devices, and that researchers of science can have a *real-time* understanding of material agency as scientists 'discover' it by considering how scientists' retrospective, technical account of *material agency* is produced. In this way, he argues that scientists' (human) agency (the source of interpretative power) can be understood as it emerges through interaction with scientific devices and machines. That is, scientists shape non-human agency while being shaped by it at the same time. Therefore, how those retrospective, technical accounts are produced will be an object of analysis.

In this study, part of my attention is given to how both technical accounts of what milkfish need for growth and what the industry of milkfish farming requires for development as well—with reference to the case of the formation of TSR-2 (Callon & Law 1997)— are produced, rather than taking these technical accounts for granted. Furthermore, I will consider how these two accounts are made in relation to each other in the case of milkfish for export to China (Chapters 6 and 7). Besides, I find that the ANT concept of 'purification' that separates humans and non-humans and attributes 'agency' exclusively to humans (Latour 1993b) is relatively underemphasized, compared to 'translation' (exceptions include Latour 1988 and Law 1994). In the present study, the work of purification will be made salient so that the ontological singularity of milkfish, fish farmers and spokespeople for the industry of milkfish farming can be analysed.

Overall, the *agency of objects* in this study is taken as an analytical tool so that I can explore the social-material arrangements that are resorted to so as to address any problems that are encountered at the time.

2.1.2 Distributive Agency and Centres of Calculation

One reason to bring objects to the fore is to distribute the ‘agency’ of any single entity across a wide area, a wide variety of others, and multiple times. In this regard, ‘actor-network’ is an oxymoronic term (Law & Hassard 1999; Mol 2010). An ‘actor’ is an effect of *network-building* (Latour 1996), and networks are an effect of drawing together ‘actors’ from heterogeneous realms. For instance, Pasteur was a great scientist only because other heterogeneous actors aligned with Pasteur; had they refused, Pasteur could have been one of many scientists. As such, the formation of ‘Pasture’, paradoxically, depends upon a mass of others. It would be the same if we extended this observation to the formation of institutions like governments and organisations. Let us review relevant studies in this regard.

Law (1994) explores multiple modes of *ordering* a scientific institute and argues that there is no such thing as a single order; if there were one, it would be an effect of the interaction between these multiples modes of ordering. Within an organisation, there may be modes of ordering like enterprise, administration, vocation and vision that co-exist. Each mode has its own version of understanding of the status of affairs and requirements for the organisation’s development in the future. However different these modes may seem, they share a common approach to generating reflection and control via a ‘return’ to a centre of translation, so that the organisation can have self-reflexivity. In other words, these modes of ordering ‘aspire to’ the formation of a centre of translation (Law 2003b). In order to return to the centre, affairs have to take on a recordable form, be put on sheets of paper, delivered, collected and recompiled; in other words, those affairs will be translated and centralised in a place we call centres of calculation/ translation. A resulting effect of this centre of translation is a ranking system between top and bottom within the same organisation. Some are the shepherd that leads the organisation, while others are followers or sheep under dominance.

A similar case is Callon's (2002)[4] *re-writing* devices. The case he studies is products of the service industry, which are intangible, promoted by advertising and written in the form of contracts. The quality of a service product cannot emerge from scratch but rather from previous consumers' feedback forms being written, mobilised, analysed, compiled and fed into a centre of calculation. Through this case, what Callon suggests is that we can neither say that consumers' demands are manipulated, nor that service providers are manipulators. Rather, they are both distributive and intricately interwoven with each other. Both can be centralised and de-centralised at the same time. In fact, if a service provider breaks away from the mass of others, the quality of their products will rarely meet consumers' demands. In this sense, consumers change their shape into figures on feedback forms, while service providers change their shape into the object of consumers' evaluation.

Despite being distributed among others, actor-networks of scientific, technical and social entities do not therefore fall apart. Rather, Latour (1993a) suggests that they only fall apart when heterogeneous actors stop exchanging capabilities, i.e. when consumers stop filling in feedback forms, and when the lower ranks of an organisation fail to

[4] This study is often subsumed into work on 'ANT and After' (Alcadipani & Hassard 2010). That is, although it pays attention to the formation of the centre of calculation, it puts more emphasis on the distributive agency of this centre. Despite this, I would tend to consider this piece of work more as a complementary explanation of the '1980s' version of ANT'. This is because, as de Laet and Mol (2000, n.1) comment on Latour's studies (Latour 1988b) of Pasteur, Latour distributes the agency of Pasteur among others, but there is still a 'Pasteur'. No matter how distributive Callon aims to dilute the 'centre' in the case of service industry, there is still a centre that monitors and collects information.

report issues, or reported issues fail to keep their form all the way up to the higher ranks.

Studies of interaction between distributive agencies and centres of calculation also suggest the character of *performativity* between knowledge and objects of knowledge. Knowledge usually means a 'true' representation of the physical world from which knowledge separates. The simplest way to illustrate performativity is that saying something does more than describe but also performs it into being, intervening in the reality rather than separating from it. In the context of science and technology studies, Performativity means that the relation between the world(s) and representations of the world is not separate, but the world is intervened in by those representations. The study of scallop recovery (Callon 1986a) shows this relation between knowledge and the world, so does the reflexivity of an organisation (Law 1994). In another context, Latour (1999b) details how scientists place points of reference in the world of the Amazon forest, bring back 're-arranged' samples of the world, and later become figures on paper circulating around the world. 'Truth' itself is not the reason why controversies about nature can be settled (Latour 1993a; Latour 1987). The validity of knowledge depends not upon the correspondence between representations and the world, but upon the durability and solidity of the relations.

The concept of performativity later becomes an approach to the interaction between knowledge and the 'reality' that it is supposed to represent (see for instance: Mackenzie et al. 2007). Here I consider Didier's (2007) study of agricultural statistics from the early 20th century in the U.S. He argues that statistics did not *perform* crop farming because most of the production work had been done before the work of statistics; neither could the work of statistics intervene in factors that affect crop yields. Rather, the *effects* of agricultural statistics are to *characterize* or *express* the properties of the object being reported. These properties existed already, instead of being created out of nothing, and agricultural statistics drew them together and presented them in a clear-cut way (MacKenzie et al. 2007). What Didier argues is that statistics do transform the world (the object they report) but not by the figures they present. I will consider this strand of thought in the role that statistics play in the section on aquaculture in Chapters 4 and 5.

The formation of centres of calculation is critical because people who stand for the rest of heterogeneous actors are an effect of these centres of calculation. By means of these centres, non-humans are pacified into passive objects and the mass of humans is silenced so that they can be spoken for by a few humans who stand at the top of centres, such as Pasteur, aquaculture scientists and the emperor of the Portuguese Empire. If the translation of heterogeneous actors into a network is crucial, Law (1994) notices that the work of *deletion* is also important to efface traces that indicate that power has an 'impure' origin, i.e. deleting traces so that whoever is at the top of a ranking system seems to be as a result of the natural order. A hero is a hero because there is no other way one can become one. It is clear that deletion is another expression of purification (Latour 1993b) and simplification (Callon 1986b; Callon 1987), in contrast with hybridisation/ translation and complication.

It seems that the formation of centres of calculation is a step that makes heterogeneous networks stable and durable despite the tension between decentralised and centralised agency. However, ANT takes an ambivalent stance on the formation of centres of calculation. On the one hand, Latour's (1987) distinction between science 'in the making' and that which is 'ready-made' suggests that researchers of science and technology studies act as relativists and question everything from a claim of facts in a text (research papers or textbook) to a fact emerging in the laboratory (the locus of the centre of calculation/ translation). However, as soon as the same challengers find it costly to build a counter-laboratory to dispute with scientists, relativists would do better to convert to 'realists'. This position is another reason why ANT is criticised for handing over interpretative authority to scientific regimes (MacKenzie 1996; Collins & Yearley 1992).

On the other hand, it is also suggested that the purpose of ANT analysis is to show that the formation of centres of calculation, the closure of controversies and the stabilisation and duration of actor-networks are uncertain, arduous and costly achievements (Law 2003c; Law & Singleton 2004). Actors that are taken as heroic *initiators* of actor-networks could be as 'weak' as all the others. When engineers conceive a technical project, they are 'forced' to make all kinds of simplifications of reality as real as they appear because, otherwise, complicated realities can rarely be juxtaposed with each other on a two-dimensional plane. Thus, actor-networks should be always negotiable. If they are stable, they need explanation. However, even if this is the case, it seems to suggest that ANT analysis stops at the stabilisation or breakdown of centres of calculation.

My concern is with how ANT analysis deals with the network at stake. Is the difference so clear-cut between success and failure in the building-up of centres of calculation? Does heroism disappear along with crumbling of the network building and centres of calculation? In Law's (1994) analysis of modes of organising, the attitude that the mode of enterprise takes towards failure is that 'there is not absolute failure but only strategic setbacks and withdrawals, and failure is a practical matter, something to be put right by trying again' (Law 1994, p.75). What I wonder is how this attitude takes shape and becomes solid, even if attempts to build centres of calculation face difficulties. I will relate this concern to the ending of the export scheme in Chapter 7, and suggest that this was due to result of the construction of milkfish as a bulk commodity (Chapter 6).

In this section, I review the work that underpins ANT, most of which can be labelled as a 1980s version of ANT (Law 2009). These studies also underpin one mode of assemblage that this study aims to explore—*consolidation* (Law 1992; Callon 1987). By consolidation, what I mean is the consolidation of heterogeneous actors into singular, coordinated networks so that heterogeneous actors—which originate from different worlds, have different orientations and present in different times—are transformed into facilitators to spread and continue the networks that they are involved in. Consequently, some actors will acquire the ontological status of 'objects', while others will be 'subjects'. Moreover, some are enacted to be initiators, while others are followers at the end of network-building. Emphasised by Latour (1996) is that the task of ANT analysis is to expose pure forms of 'power' or 'truth' originating from hybridisation.

Apart from this, I will also pay attention to the work of purification, deletion and simplification. On the one hand, it is through this work that the results of network-building are regarded as concentrated, pure and unified. On the other hand, it is feasible that work of purification also intervenes in the formation of 'reality' and thus cannot be left aside. More important is the mode of consolidation, which is an effect of purification as well, by which other possibilities for things to travel and endure are clouded by the mode of consolidation. Law (2003b) reflects on his study of organizing modernity and suggests that ANT approaches may overlook the fact that what is considered, such as modes of organising, is modes that are 'articulatable'. But what is excluded from the analysis are those non-strategic modes that do not have their own voices. In the next section, I will move on to the ANT literature that considers how to include multiplicity in the analysis.

2.2 Fluidification between Networks and Non-networks

In the previous section, I mentioned the criticism of ANT for leaving 'politics' aside by handing over interpretive power to scientists and engineers. Here, I want to consider another strand of criticism of ANT, that of being Machiavellian, managerialist and heroic (Law & Hassard 1999; Latour 1999a; Law 2009; Law 2003c). This time, it is not that ANT gives up interpretative authority, but rather it is 'too political' and cares less about whatever exists outside network-building. In what follows, I will review the literature—labelled as ANT and After (Alcadipani & Hassard 2010) or Post-ANT (Law & Singleton 2004)—that underpins the mode of fluidification.

2.2.1 Fluids instead of Networks

In contrast with the network type of relations, there are other ways in which heterogeneous actors can be assembled. Actor-networks may only be one of many of these assemblages.

de Laet and Mol (2000, n.1) argue that although Latour (1988b) separates the agency of Pasteur into numerous and heterogeneous others, there is still only one actor—Pasteur—to whom is attributed being the prime mover of eradicating diseases. Although acting in the name of 'Pasteur' was not perhaps in Pasteur's own mind, the consolidation of heterogeneous actors into a single force to eradicate diseases relies upon the ascription of this achievement only to Pasteur. The purer Pasteur's achievements were considered to be, the more thorough the steps for eradicating diseases would be enforced, and the more significant 'the inertia of the public authorities' may seem in contrast (Latour 1988b). However, the study of the bush pump spreading across Zimbabwean rural regions shows another case where heterogeneous actors have no need to be consolidated into singular networks or to modify themselves according to the 'object'; and the achievement of the bush pump cannot be attributed to any single 'initiator' of this mundane technology because the pump is modified wherever it goes. de Laet and Mol (2000) call this kind of technology 'fluid technology', which means that it takes its form and its shape by adapting to its surroundings, rather than being decided upon by 'an engineer who masters the situation and subtly subdues everyone and everything involved' (de Laet & Mol 2000, p.227).

The bush pump is fluid, first, because it is designed to be flexible, reduces the number of components to as few as possible and allows these to be replaced by non-original ones (de Laet & Mol 2000). A contrasting case is lighting kits transferred from Paris to Africa (Akrich 1992), where users could only find spare parts in the capital area, and maintenance work could only be done by contractors. While different uses and 'abuses' are included in the design of the former technology, they are excluded from the latter one. Across different villages in Zimbabwe, the pump is *enacted* differently so as to conform to local needs and variances. The only common ground connecting them is that they supply water.

Second, fluidity does not only mean the object but also the surroundings around the technology, which means that the surroundings that the technology is placed in are meanwhile fluidified. For instance, the bush pump is part of a government-funded project. It was expected to help nation-building by extending government-funded water technology to rural regions of Zimbabwe. But this goal cannot be said to be achieved, despite the spread and adoption of the bush pump. The Zimbabwean authorities prefer 'villages' as operation and maintenance units, while in practice it is 'extended families' that operate and maintain the facilities. Thus, 'communities' centred around the bush pump become more fragmented than the projected ones.

Moreover, the criterion for evaluating the quality of water delivered by the pump was enacted to be flexible as well, even though there was a universal standard for evaluating water quality already. A practical difficulty in implementing this standard was in monitoring the quality of water across scattered regions at the same time. A practical criterion for water quality is whether it is drinkable or not to local villagers. Thus, the criterion for drinkable water is fluid. Thirdly, the ‘originator’ of the bush pump was enacted to be fluid. The supposed originator attributes the successful spread of the bush pump to collective action. In fact, the once monopolised manufacture of bush pumps could be the most fragile element of the spread of this technology. In this case, the monopoly of a single version of technology, water quality, and the originator could have been an obstacle to spreading it.

The case of the bush pump has an overarching implication for ANT. That is, is it the case that there was an inclination in favour of a network type of heterogeneous assemblage and a neat boundary set for distinguishing the ‘success’ and ‘failure’ of science and technology? Undomesticated local variances may not be the weakest points in a chain of networks. Quite the contrary, being overtaken by ‘contexts’ or local variances does not mean the breakdown of heterogeneous networks. In the case of the bush pump, if water drawn by the pump did not allow villagers to drink it because it failed to meet a hygiene standard, then an immediate problem was a shortage of water; this would be exactly where this technology failed. A compromise between universally and locally drinkable water may not always be a problem, and a solution to resolve the dilemma between ‘solid’ or ‘soft’ science and technology (Latour 1987) has no need of a well-combined network. A well-combined network could be costly in terms of moving bits and pieces of the networks across regions, and even more effort is required to hold in place a heterogeneous assemblage of networks (Mol & Law 1994; Law & Mol 2001). These requirements may ‘fail’ a network performed in another place.

Likewise, Singleton and Michael’s (1993) study of the UK Cervical Screening Programme (CSP) revealed that, despite the existence of ambivalence towards the CSP actor-network, the whole network was not broken apart. Rather, this network was reinforced, simply because of the existence of these multiple networks. In the implementation of CSP, General Practitioners (GP) were appointed to be a crucial 'actor' in this programme—enrolling resources, technicians and women. But in practice, they 'played' this appointed role in different ways. For instance, GPs drew on governmental CSP as a resource to deal with their own patients, or they had their own definition of what 'kinds' of women were more urgent than others to have a medical examination. In other words, these GPs were actor-networks in themselves. CSP actor-networks may be downplayed in their practices. But it was also these 'deviant' practices that contributed to the operation of CSP. Besides, even if, in some cases, where the operation of medical examinations failed to acquire proper specimens, GPs may interpret these failures as them needing to polish their skills, and in this way they maintained the operation of the whole programme. What we learnt from this study is that, first, ambivalence and indeterminacy do not point towards the breakdown of the actor-network but rather strengthen it. Second, ANT explanations for 'success' may 'over-focus' on the work of network-building.

According to Latour (1996), ANT is a method for tracing activities that make connections between 'worlds'. It does not pay much attention to activities outside network-building; in his own words, 'there is nothing but networks, there is nothing in between them' (Latour 1996, p.4). In this sense, however, the ANT project may seem like 'modernists' who efface traces of objects or subjects that are 'hybrids' as soon as controversies about what Society or Nature is, come to an end (Latour 1993b). Law (2011a) reflects on his study of the Portuguese Empire by suggesting that the network description of vessels and the formation of the empire was far from enough for the stability and durability of the empire. After all, it is hard to imagine that a vessel at sea for over a year could be kept intact all the way.

Latour (2005) explains that the ‘political relevancy’ of ANT resides in describing the assemblage of power rather than assuming the existence of a societal institution in advance that exercises power; it is obvious that if power can be exercised and reach far, it is only because a network of ‘power’ has been built and extended already (Callon & Latour 1981). Also, if the power assemblage can be opened up and located in places, there might be a chance to reassemble it. However, this stance on power or politics has long been criticised. By describing ‘power’ rather than criticising it, ANT is criticised for justifying the status quo of reality. ANT becomes part of the establishment of power or of whatever reality is.

In the case of the fluidity, however, worlds outside network-building have to be seriously considered, not because they could fail network-building, but because fluidity opens a door to consider possible alternatives to the present, dominant reality of science, technology and society. Despite this, one thing that must be noted is Latour’s (2005) stance on ‘fluidity’. He notes the duality of actor-networks, having formidable inertia and incredible flexibility at the same time, and it is this latter characteristic that ‘allows the former to circulate’ (Latour 2005, p.245). We may understand this account as the self-ambivalence of network-building. On the one hand, networks need to keep their form as networks. On the other, they need to remain fluid to accommodate others wishing to take part in the process of network-building. There can be a constant tug of war between these two sides in network-building.

Nevertheless, there is one thing in need of reconsideration regarding the fluidity of objects, and the mode of fluidification as well. That is, how do we understand heterogeneous assemblages (networks or fluids) when breaking up? The consolidation mode of ANT, though narrowing down its focus to network- building, provides a straightforward explanation that a failing network is not strong enough to withstand all kinds of trials of strength (Latour 1987). How can the mode of fluidification account for 'failed' scientific and technology projects? It cannot be that a project fails because what the project asks for is too rigid to achieve. If that were the case, then the explanation would be asymmetric because we explain success by fluidification while failure by consolidation. This is why the present study calls on a putative inter-relatedness between the two modes of assemblage. We need to make our focus wide enough to contain these two modes, consider the possibility that they could co-exist, but if one is excluded from or overshadowed by the other, then this needs explanation.

2.2.2 Multiplicity and Ontological Politics

One thing noted from the fluidity of objects is *various practices* of doing objects, and this turns the focus to multiplicities of objects. By attending to medical practices of lower-limb atherosclerosis in the medical environment, Mol (2002) argues that single objects are enacted multiply (also refer to: Law & Mol 2008b). It is argued that, rather than bracketing the medical practices by which objects of medicine such as human bodies and diseases are diagnosed and treated, foregrounding these practices together foregrounds the process that both human bodies and diseases are 'manipulated' and come into being. In the same process, manipulated diseases enact human bodies while manipulated human bodies enact diseases. And since the practices of doing objects differ from one site and situation to another, like the bush pump is used differently between villages, the reality of any single object is enacted to be multiple.

But note that this does not suggest that multiple realities are enacted as fragments, isolated from each other. Rather, in her book, Mol (2002) traces different ways in which multiple realities enacted by practices are partially related even though the connections made between them are an achievement that is at stake. Since how multiple realities are held together is an object of study, it is questionable to maintain a neat boundary between so-called science and technology in the making and ready-made (Latour 1987). An overarching concern of the ‘reality multiple’ is to emphasise that ‘reality is not the destiny’ (Law 2011b; Law & Singleton 2014; Law 2009) for analysts, since ‘reality doesn’t precede practices but is a part of them’ (Mol 2002, p.6) and one further step is required to consider how realities can be done ‘well’, rather than simply taking the status quo as it appears.

This turn to practice and multiplicities of reality opens an enquiry into ‘ontological politics’ (Mol 1999; Woolgar & Lezaun 2013; Law 2002). Ontology is about conditions of possibility (Mol 1999). Latour (1993) uses ‘variable ontology’ to describe how reality comes into being, while ‘ontological politics’ puts more emphasis on the complex presence of objects than on history. Combining ‘ontology’ with ‘politics’ is to suggest that the conditions of possibility for reality are still contested and open-ended (Mol 1999). Mundane socio-material practices could sustain or bring about some conditions of possibilities for some versions of reality while excluding other versions at other times (Mol 2002).

Take Mol’s (1999) anaemia study for instance, anaemia has a clear definition in the textbooks and there are two main ways to diagnose it: clinical and lab practices. At first glance, they *exclude* one another because one deals with speaking patients, while the other deals with non-speaking samples of blood. Sometimes, clinical diagnoses of diseases can be confirmed by the lab, while at other times clinical diagnosis-free cases may be over-enacted by the lab and become a patient because individual bodies react differently. Thus, these two practices may not *collaborate* all the time. Besides, in order to establish an anaemia norm for a particular population, statistical data have to be collected. And data collection is usually done by clinical practices. Thus, clinical practices may be said to be *included* in lab practices. After the establishment of a norm, conversely, lab practices can be said to be *included* in clinical diagnoses.

Note here that the establishment of an anaemia norm is not politically irrelevant. Categorical differences in anaemia between 'sex', 'ethnicity' and 'age' are enacted at the same time. Therefore, what is enacted in this medical practice is not only the object of medicine but also many others. It seems reasonable to posit that the 'knowledge' about sex, ethnicity and age will be *included* in socio-material practices when dealing with people who are subsumed into these categories. This is what Mol (1999) calls *interference,* i.e. that there are more objects than medicine that are involved and these will be affected too.

Moser (2008) argues against taking the biomedical and pharmaceutical version of Alzheimer's disease as the absolute, singular reality. The research explores the ontological politics of Alzheimer's, wherein some versions of reality and practices such as 'care' in treating the disease and patients are excluded, while the biomedical and pharmaceutical version forms the only real and dominant reality. Likewise, enquiry into ontological politics can be practised by exploring the 'ontological monopoly' (Law 2010) or 'singular ontology' (Woolgar & Lezaun 2013) of more mundane objects than science and technology. For instance, Woolgar and Lezaun (2013) argue that the reason why there are 'wrong' ways of using mundane objects like bin bags is that the presence of a singular ontology regarding bin-bag use denies other versions of how bin bags can be used.

An enquiry into the politics of ontologies is pivotal, mainly because what is involved in the constitution of objects also include others (outside the network building) that will be interfered with. By digging into ontological politics, a crucial point is not to drown in the dominant, present reality, which tends to present itself as the only possible reality that we can live with. One thing to be made clear is that even If realities are multiple, that does not mean there are 'choices' among them (Mol 1999). As the concept of 'interference' suggests, most of us tend to be involved rather than taking part. The crucial point is rather when exploring multiplicities of reality is to think through some of those which may be preferable for us to live with (Law & Singleton 2014; Mol 2002). An insight from ontological politics is that what humans are is, inevitably, involved in the shaping of objects.

There are several lessons we can draw from this strand of perspectives on the present study of milkfish. First, how can we explain the 'success' of the development of milkfish farming industry in Taiwan? There is a body of literature which explains the uniqueness of the development of milkfish farming in Taiwan where the major residents are Han people whose ancestors immigrated from China but developed a different seafood culture. Most studies attribute this development to the notion that humans adapted to a severe environment, and therefore this adaptation became a unique culture (for both the production and consumption of milkfish). For instance, a historical study states that milkfish farming was a way to optimise land use; and on this basis, milkfish farming in Taiwan developed a commercial and capitalist way of organising milkfish farming—the joint-stock company (Tseng 2012). However, the mass of milkfish has been unexamined in this strand of thinking. If humans adapted to the environment, how about the milkfish? I will consider this question in Chapter 4. Without milkfish being considered, the explanation of milkfish farming in Taiwan would be a result of purification.

The second issue concerns the ontological politics of fluid objects. The study of the Zimbabwe bush pump shows that the pump includes different identities, ranging from a mechanical object to community participation, health promoters, a nation-building apparatus and so on. Even if any of these identities fails to achieve the goals originally intended, the bush pump works, which suggests that each identity of the bush pump is not bound by the original goals and intentions but adapts to local variances. However, what is marginally concerned is both the inter-connection and interference between those identities, which may be in conflict. Elsewhere, the inter-connection between multiplicities of a single object is described as *partial connectedness* (e.g. Law & Mol 2011b). For the present study, it is both the inter-connection and interference between milkfish enacted on the market side and those enacted on the production side that should be considered (Chapters 6 and 7). That is, the enactments of a single object between these two sides do not necessarily hold together. Besides, the sharpest conflict between these two sides could be located in milkfish enacted across the Taiwan Strait (Chapter 7). Through an examination of the inter-connected realities of milkfish across the Strait, we can consider the good and bad points that are revealed in the implementation of the export scheme. The aim is to rethink the ontological politics of the milkfish assemblage, rather than to think about it in the 'context' of cross-strait politics.

Finally, this study of the milkfish also aims to reassess the politics of so-called 'initiators'. There are two instances in this study concerning the enactment of initiators. One is the spread and adoption of deep-water milkfish farming (Chapter 5), the other is implementation of the export scheme (Chapter 7). A critical pair of questions is who can speak for the others, and how this status of a spokesperson can be acquired. These questions are asked to consider under what circumstances fluids are purified into a consolidation of networks, while networks are hybridised into fluids.

2.3 Agro-food Studies and the Conventionalisation Thesis

Agro-food studies are an umbrella name under which social scientists from multiple disciplines like rural geography and sociology share subject matter involving agricultural produce. However, except for this commonality, the research approaches in this area are divergent. ANT is brought into this research area as an intellectual resource and as a complementary method for approaches like political-economics and social-network analysis. In this section, I will detail some agro-food studies that utilise ANT notions in the study of food. Further, I will examine critics of ANT's application to this research area.

2.3.1 Calling on Networks

Busch and his fellows (Busch & Juska 1994; Busch & Juska 1997; Tanaka & Busch 2003; Busch 2007) call into question the institutionalisation of transforming knowledge into a commodity in the agricultural food sector. They argue that analyses of the agricultural food sector are preoccupied by institutional, macro-level politics but pay little attention to the interaction between macro and micro (f)actors. Therefore, they call upon 'network' approaches by making reference to ANT for the analysis of rapeseed technoscience. Rapeseed was a minor crop for industrial use but later become a common crop as an ingredient of an edible oil, namely canola. It is argued that the technoscience of rapeseed is effective only because it 'succeeds in building networks that extend beyond' (Busch & Juska 1994, p.583) laboratories, farmers, governments, retailers and consumers. In the process of extending networks, knowledge of edible rapeseed oil is produced; and the quality of rapeseed and pre-existing actors in the network are modified at the same time.

The study of rapeseed technoscience and the economy produces fruitful outcomes, including a comparison of the development of the rapeseed industry in China and Canada (Tanaka & Busch 2003), the 'performativity' of rapeseed knowledge and international commodity exchanges (Busch 2007; Busch & Tanaka 1996), and ethical issues of rapeseed and related human actors in respective stages from production and exchange to processing, retailing and consumption (Busch &

Tanaka 1996). Regarding the ethical issues involved, rapeseed at each stage has a different criterion to determine a 'good' quality and a corresponding criterion for identifying respective human actors as 'good' farmers, processers, retailers and consumers.

Busch et al.'s study employs ANT concepts like 'translation'—through which an inedible object acquires new properties and becomes an edible ingredient by enrolling new agents and being enrolled as well—to explain the formation of food networks that are taken as a political-economic complex. There are two points that can be considered here. First, the non-human actors in their study—rapeseed and canola—appear to be relatively passive, and so not much ink is used to describe how they are 'made' passive or how they resist being enrolled and pacified into the food network. Secondly, most attention is paid to 'institutional actors' who are in themselves actor-networks. That is to say that whether they can be simplified and juxtaposed with each other in a relation of networks is an object of ANT study.

2.3.2 Bringing Nature back

Further scholarship in agro-food studies calling on ANT brings nature into analyses of food industry. Goodman (1999) calls on ANT approaches to bring the once 'punctualised' (Law 1992) nature of agricultural food into being (see also: Goodman 2001). The reason for calling on ANT is the complex re-occurrences of food scares, such as outbreaks of bovine spongiform encephalophy, the emergence of agro-biotechnologies and business, rising public concerns about food safety and quality, and the role of organic food which caters for the agro-business version of organic food farming (Goodman 1999). It seems that these challenges cannot be contained within existing political-economic approaches based on the modernist dualism of Nature and Society (Latour 1993b). In this modernist dualism, the approaches involved in ecological and biophysical analyses are often excluded from studies of agro-food networks. Thus, ‘agricultural nature appears simply as an external, inorganic medium, acted upon and manipulated by human artifice’ (Goodman 1999, p.20).

It is argued that analysts of food provision systems based on the political economy fail to analyse ‘the materiality of nature in interaction with social forces’ (Goodman 1999, p.22), due to being afraid of succumbing to a charge of ‘natural determinism’. It is argued that the food scares may cause the public to turn to organic food and interrogate the system of industrialised food provision, but the difficulty is that rulings about organic farming could ‘enrol the organic agro-food network into the punctualized conventional agro-food networks of corporate agribusiness capitals’ (Goodman 1999, p.32). Note here that the organic food is considered to be fundamentally different from industrialised food.

Another strand of applying ANT in agro-food studies is that of Murdoch and his fellows (Murdoch & Miele 1999; Murdoch et al. 2000). They draw on ANT notions to develop theoretical insights into the analysis of different types of food networks. Here the term ‘network’ mostly denotes the production and supply systems of agricultural food. Marsden (2000) argues that it is far from enough to advocate bringing nature back by drawing on the symmetry of ANT, because both industrial food production and supply corporations and alternative producers/ suppliers employ the same nature but achieve different social and ecological results. This stance shares the same perspective on the role of nature as does SSK. Thus Murdoch and others (2000) draw on ANT to develop a theoretical model to distinguish ‘different types of embeddedness’ of economic processes in nature. What is suggested is examining *what kinds of nature* are resorted to in the sector of food production, rather than taking nature as an abstract factor.

2.3.3 Turn to Consumption

Lockie and Kitto (2000) argue that Busch and his fellows (see for instance: Busch & Juska 1997) still prioritise ‘institutional actors’ as key actors within networks, thus not very different from political economic approaches. Likewise, although Goodman (1999) brings ‘nature’ into the analysis of food production and underscores the difference from industrialised food, ‘consumption’ is overlooked. Also, in Whatmore and Thorne’s (1997) study, consumers’ meanings behind purchasing fair-trade coffee are spoken about by fair-trade coffee organisers. In short, Lockie and Kitto (2000) call upon agro-food studies grounded in political-economic approaches to pay more attention to consumption.

However, this turn to consumption may diverge from the position of ANT. First, if the ‘actor’ in terms of ANT does not necessarily mean ‘human’, then ‘consumers’ do not have to be corporeal actors either. Thus, Busch and others (Busch & Juska 1997; Busch & Juska 1994) refer to an archive of information on rapeseed and canola corporations to talk about ‘consumers’, and Whatmore and Throne (1997) use fair-trade coffee suppliers’ words to talk about ‘consumers’. Even though ‘consumers’ do not act corporeally or speak up by themselves, that does not mean that they are not involved in alternative food networks. Second, what is meant by ‘consumers’ in Lockie and Kitto’s (2000) suggestion confuses what is meant by ‘network’ in terms of actor-networks and ‘social networks’. For the latter type of networks, consumers may have to be corporeal human actors, while for the former, as mentioned above, there is no need to be so.

In another context, Lockie (2002) develops an approach to the production and consumption of organic food. Here, ‘consumers’ in the discussion are in an incarnation of ‘consumption behaviour’ registered and analysed by market survey technology as used by mass-retailers of food, and corporeal consumers in focus groups as well. He argues that market survey technology assumes high income earners to be consumers of organics, but excludes other flesh consumers from focus groups and recognises organics as valued-added commodities. Thus, mass retailers tend to distribute organics among middle-class areas according to this knowledge about consumers. From this, we can see a resemblance to the performative effect of ‘consumers’ behaviour’ and Callon’s (2002) re-writing devices.

2.3.4 Conventionalisation

That organics are integrated into some value-added commodities for mass food suppliers and food provision systems later becomes the ’conventionalisation’ thesis. Conventionalisation means ‘a process through which organic agriculture comes increasingly, as it grows, to resemble, in structure and ideology, the mainstream food sector it was established in opposition to’ (Lockie & Halpin 2005, p.285; Mansfield 2004; Stassart & Jamar 2008; Le Velly & Dufeu 2016). The cause of conventionalisation is multiple. Stassart and Jamar (2008) argue for a ‘lock-in’ effect of conventional food standards on the whole food chain, so that organics cannot compete with conventional food in the same market, while Mansfield (2004) suggests that the certification of organic farming raises costs for organic producers, while conventional, large-scale producers do not care much about this.

What is noticed is that the differences between conventional and alternative food and food production are almost treated as profound in agro-food studies (Miele & Murdoch 2004; Marsden 2000). As Whatmore and Throne’s (1997) study of fair-trade coffee suggests, although alternative food networks operate via mixed modes of market and connectivity, it is the connectivity mode that supports farmers on one side and communication with consumers on the other that distinguishes them from conventional food networks.

My concern with this fundamental difference is that while ANT notions are utilised to 'overcome' dualisms between nature and society, production and consumption, and to bring back multiple 'values' into a world of food production dominated by economic value, the 'hybrid' of conventional and alternative food and food production seems to be in need of 'purification' in this strand of thought. But as Le Velly and Dufeu (2016) argue, alternative and conventional food networks are not fundamentally different but rather 'hybridized' with each other. In their view, it is through this hybridity that alternative food networks survive, rather than fundamental differences between one another in terms of the physical characteristics of food.

However, ANT notions do not amount to much in the 'conventionalisation' thesis. To understand what the absence of ANT has to do with the position of ANT in agro-food studies, first, Friedland (2001) suggests that ANT approaches are more appropriate for exploring food networks that are still in development, thus including 'alternative food networks'. As long as food networks are 'stabilised', politico-economic and other approaches can take on the task of analysis. it is hardly surprising to see such division. In fact, it resonates with Latour's (1987; also noted by MacKenzie 1996) account of the shift from relativists to realists as soon as one can no longer debate a 'fact'. Secondly, Fine (2002; 2005) criticises both ANT and the application of ANT to agro-food studies for glossing over inequalities in power by merely describing them. What matters is how 'inequalities' are 'tied to the *homogeneous* and homogenizing categories of money and capital' (Fine 2005, p.102). Obviously, talking about homogenising inequalities into capital cannot skip the theory of capital, but ANT questions almost all the foundation that social sciences are based upon. In this vein, an ANT-based agro-food study seems to be a 'politics-irrelevant' approach (Fine 2002; 2005).

One thing relatively unexamined in agro-food studies is the physical characteristics of food and the ‘agency’ of food issues. It appears that there is some confusion between the ‘network’ of food production and consumption and the ‘actor-network’. Metaphorically, the former type of network in agro-food studies mainly denotes a ‘machine’ by which every form of produce put into it is transformed into commodities, while the latter type of ANT network mostly means the formation of that machine. The physical characteristics of food matter marginally to the former type of network, but matter a great deal to the latter. This is because the shaping and maintenance of the machine can never overlook the physical characteristics of food materials that will interact with that machine. Lien’s (1997; Lien & Jacobsen 2013) study on marketing projects in supermarkets in Norway shows that although market professionals attempt to scale up sales of poultry and to formulate a plan for marketing poultry meat in supermarkets, it is, however, not all varieties of poultry that can co-operate with and have their qualities physically adjusted by injecting saltwater. In other words, ‘resistance’ from food matters when being enrolled occupies a critical place in the outcome of a marketing plan and the whole machinery of food networks as well.

Overall, the combination of ANT and agro-food studies yields fruitful results. However, a key difference between the approach of this study and that of agro-food studies is that even conventional, industrial food networks deserve the same ANT analysis as alternative food networks. Mansfield (2003b) argues that the quality of food in agro-food studies is concentrated in a discussion about alternative food but industrial food networks care little about the quality of food products. My position is that we should not ‘black-box’ conventional networks. Neither should we take the distinction between a food network in the making and ready-made for granted; to proceed in that way would indeed give interpretative authority to people who can speak for ready-made systems of food. In the present study of milkfish, quality producers share some common modes of practice with conventional producers and suppliers; despite this, how they see themselves and the ‘object’ they are dealing with are different; how these different modes of practices rub up against and cooperate with each other is a matter of concern (Chapter 6). Moreover, even though the export scheme was an innovation that supported fish farmers’ livelihoods, I argue that it was just another means by which the given milkfish assemblage that fish farmers felt was unequal could continue (Chapter 7). In practice, the distinction between so-called conventional and alternative is not always clear-cut. Even if that were the case, the distinction between the alternative and conventional networks should be a focus of analysis, rather than a point of departure.

2.4 **Food and Fish as Heterogeneous Assemblages**

In this section, the focus shifts to studies of food and fish as heterogeneous assemblages. Different from agro-food studies is that the sense of heterogenous assemblages of food and fish networks is retained in this strand of study. Non-humans may be enrolled into the formation of food networks, but this is not bound to succeed, and even if it works out, that does not mean it will last long. Moreover, if the translation of humans and non-humans into a coordinated network succeeds, we may consider at what expense this is achieved.

2.4.1 Spatiotemporal Arrangements

The spatiotemporal arrangement of food and fish production is an example of how heterogeneous actors are interwoven with each into assemblages. It is more important to note that it is not always feasible for such an assemblage to be consolidated into a coherent network.

Bestor’s (2001; 2000) studies on sushi and the tuna industry show a reconfiguration of markets and cities globally dispersed in time and space. The main demand for tuna (the blue fin tuna) was from Japan, and thus the international division of labour involved other countries like the U.S. fishing for tuna and selling it to Japan. But as sushi went global, which means tuna could be consumed in countries like the U.S., fishing for tuna became a work of coordination between domestic and overseas demand on a global scale by middlemen. Bestor's studies show how the network of tuna production and trading is globally connected. What interests me is his description of the coordination of multiple timescapes—natural, fishing, regular and market times— 'into a seemingly coherent and seamless master narrative of supply and demand' (Bestor 2001, p.92). These irreconcilable clocks are, incredibly, woven together.

Likewise, Lien's (2015) study of Norwegian salmon farming pays attention to a series of spatiotemporal arrangements. She suggests that the life-cycle of salmon is redistributed by an industrial life-form among manual practices and husbandry devices. By controlling the length of daylight, a salmon's life is *detached* from the natural timescape of salmon in Norway and the fish timescape of salmon—in terms of Bestor (2000)—while being *realigned* with consumers' all year demand around the world. Besides, salmon feed is made from other fish caught or harvested elsewhere at a distance, so that a large number of salmon's needs can be met all year round. In order to travel far, so-called forage fish must be dried out first—another technique of detachment— so as to prevent decay and become an ingredient of feed pellets. These spatiotemporal arrangements are crucial as the salmon farming industry expands spatially.

I will use the concept of the *coordination of multiple timescapes* and *detachment/ realignment* of temporal-spatiality in an analysis of organising milkfish farming in Chapter 4. However, one thing to emphasise is whether there is any point where the coordination or detachment /realignment of multiple timescapes encounters friction. Lien (2015) suggests that the concept of the centre of calculation—

when drawn into the description of salmon farming management—often overlooks the *partial connectedness* between multiple versions of salmon—from figures to flesh; sometimes, production falls behind schedule because salmon resist cooperating with management practice, or the figures and flesh just do not add up. In Chapter 6 of this study, I thus consider some occasions when milkfish farming cannot be engaged *on time*, and how this uncertainty 'contributes' to the formation of milkfish farming.

One reason for my concern with temporal arrangements is the seasonality of milkfish production. In peak season, the price can rocket sky high, while it is quite different in the off season. The concern with the seasonality of fish and market demand is part of the reason why Bestor (2001) focuses on middlemen's trading practices. They are the people who connect and regulate the supply and demand of tuna all over the world. Hébert's (2010; as noted in: Lien 2015) study on Alaskan salmon fishing shows that the seasonality of wild salmon makes it even harder for this local industry, characterised as it is by 'volume-oriented' moving towards 'quality-oriented'. Simply speaking, fishermen are paid or even rewarded with premiums according to the amount of fish they catch. Thus, in peak season, they tend to catch as much salmon as possible, and their fishing and processing practices have no concern for the corporeal characteristics of fish. However, appearance and corporeal characteristics matter to quality salmon suppliers, and consumers care too.

In the present day of milkfish farming, fish farmers' practices are associated with similar seasonality in milkfish production/ growth, and this seasonality becomes a threat to fish farmers' livelihoods. Thus, I will pay attention to how this situation evolves (Chapter 5) and how fish farmers live with this difficulty (Chapters 6 and 7). Among fish farmers, there are some who veer towards 'quality milkfish production'. I will consider how quality fish and fish farmers are interwoven, and how different they are from the rest in Chapter 6.

2.4.2 Paradox of Singularization

The concept of singularization was proposed by Callon and others (2002) to trace dynamic changes between products and goods. The former denotes an object in the making, while the latter denotes an object circulated in the market. The term singularization aims to capture the dynamics of the interaction between these two statuses.

Callon and others (2002) show the circulating character of products in market professionals' research. They suggest that the formation of products can be described as the constant circulation of *qualification-requalification* so as to stress the dynamic of quality rather than a static quality. The distinction between supply and demand, in their view, hides the mass of work that market professionals invest in market research and the involvement of consumers in tests of products on shelves (see also re-writing devices). Two concepts are employed to describe the (re)qualification of products: *singularization* and *attachment/ detachment*. The former designates that differences between products perceived by consumers are established by comparing them with similar products. Thus, an appealing product does in fact involve more 'actors', including market professionals and consumers, in (re)qualification. On the other hand, detachment/ attachment is about redirecting consumers' attention from others and drawing it to a particular product, which also involves singularization, such as changing the ingredients (materiality) or packaging (presentation) of a similar product.

Hébert's (2010; 2014) study of Alaskan salmon fishing elucidates the paradox of singularization mentioned above. The Alaskan salmon fishing community suffers from decreasing profits because it faces competition from high quality, farmed salmon. Local fishermen are provided with an opportunity to improve their income by supplying ‘quality’ wild-caught salmon to the market, fish which are characterised by their bodily characteristics as single fish. However, as mentioned earlier, fishermen are paid by local cold-storage or processing plants according to the amount of fish catch they catch. Even if cold-storage plants encourage fishermen to embrace quality and offer a preferential price for fish which correspond to the quality standard, some fishermen choose to take this discriminatory pay as an excuse to lower the price. More importantly, what is referred to as quality salmon in the market does in fact refer to the bodily characteristics of farmed salmon. If wild-caught salmon can look like quality, farmed salmon, the harvesting process has to treat the fish gently and ‘care’ for single fish, one by one, and fishermen have to abandon existing ways of making money from batches of fish based upon the sheer volume of catch. In this way, Hébert (2010; 2014) argues that the more the quality standard refers to farmed salmon, the less difference will be enacted between wild-caught and farmed counterparts.

The paradox is that the more efforts are made to single out Alaskan wild-caught salmon, the more similarities there will be between those two variants of salmon. What is more important is that Alaskan fishermen cannot compete with salmon farmers and entrepreneurs because the latter two are more likely to produce quality salmon in a controlled environment (Hébert 2014; as noted by: Mansfield 2004).

Asdal (2015, p.4) brings up the concept of *co-modification* to explore the ‘practices and work involved in *modifying* […] both market and biological entities’. The case she studies is cod and the cod industry in Norway. It was believed that both life science and market research—the former refers to salmon farming, while the latter is built upon the existing need for wild-caught cod—could contribute to commercialisation of the cod-farming industry. However, it is not only life science that finds it difficult to *time* and *re-time* (controlling their reproduction according to market rhythm) the life cycle of farmed cod, unlike farmed salmon, also, market research finds that farmed cod have a relatively poor image in consumers' minds. Thus, several strategies are used to redirect consumers' perceptions towards a 'neutralised' cod which shares the same high value as wild cod in terms of being *fresh*. Note here that the strategy is not to distinguish from but to link to wild cod, unlike the singularization of Alaskan salmon (Hébert 2010). What co-modification suggests is a mutual process in which the 'market' (the shape of consumers' preferences) is written into the body of the farmed cod, while the product is written into the market in terms of the same, fresh cod.

The studies mentioned above reveal the dynamic formation of seafood quality. Sometimes, the formation of quality resorts to similarity to other products, but to difference at other times. In the present study of milkfish, I will touch on the transition of saltwater farmed milkfish into freshwater ones. I will consider how the connection between these two variants of milkfish is made, and how one is preferred over the other (Chapter 5). Then, I will focus on how fish farmers integrate this preference into their milkfish farming practices (Chapter 6). In Chapter 7, I will move onto a discussion about how this preferred variant of milkfish in Taiwan was enacted differently in Shanghai, and how 'co-modification' (Asdal 2015) between market and production sites did not happen.

2.4.3 Qualities of Food

There has, to date, been a gap in the discussion about the quality of (sea)food, i.e. to what extent can we count the quality of any kind of food-fish, such as Norwegian farmed salmon or Alaskan wild salmon, in its entirety? I would suggest 'not much' as far as the case of milkfish is concerned. This is simply because the milkfish circulating in domestic and overseas markets are an assemblage of fish drawn from various fishponds bound up with different practices and conditions in which milkfish grow. There is no reason to assume in advance that they have the same qualities, ranging from texture and flesh to flavour. Lien's (2015) study of Norwegian farmed salmon suggests that salmon are enacted as a bulk commodity, unlike other value-added food items such as wine and cheese. The milkfish farming industry shares this resemblance to a bulk commodity with Norwegian salmon, but my concern is with how this status of a bulk commodity is achievable in the case of milkfish.

Although Garcia-Parpet's (2007) study on the enactment of the strawberry auction in France is an example of the *performativity of perfect market in economics* in the social world, we can still pay attention to what efforts are made so that the formation of such a market can occur from scratch. Garcia-Parpet argues that the requirements for a perfect market are not naturally out there but need the physical rearrangement of trading space, sellers, buyers, producers and varieties of crops as well. For instance, encounters between sellers and buyers are organised in a separate way, mediated by the showcasing of produce, rather than meeting each other and negotiating a price at the farm gate. More important to the present study is that varieties of strawberries must be simplified into just a few to facilitate the procedures of an auction; without homogeneity in strawberry varieties, auction procedures could become more complex or 'inefficient'. What strikes me in this study is that the *homogeneity* of food produce which can count as a bulk commodity is an achievement of heterogeneous assemblage, rather than a natural status.

Mansfield (2003a; 2003b) argues that the quality of a processed seafood product—*surimi*—is an assemblage of fishing technology, processing facilities, the physical characteristics of fish and consumption markets. Surimi is a seafood paste, of Japanese origin, which can be made from certain varieties of fish. Despite this, the 'best' quality surimi, as defined in Japan, is made from Alaskan pollock because of the elasticity of the flesh. However, this characteristic of fish and the corresponding quality of surimi are not required elsewhere as they are in Japan. In the U.S. or EU markets, surimi mainly targets cheap mass products. Thus, elasticity is less important than the cost of fish. Consequently, different quality definitions shape different surimi commodity chains, as surimi products go global. What interests me is that multiple definitions of quality described as a heterogeneous assemblage are both a cause of differentiated surimi commodity chains and an effect of this differentiation. In the case of milkfish, what can be examined is how the quality of milkfish is defined, and how these definitions of quality shape the milkfish assemblage.

In response to the separation between evaluation and valorising, Heuts and Mol (2013) argue that both activities *intervene* in the object, rather than one distancing from it while the other intervenes in it. Thus, they stick to one term, 'valuing', which includes the work of evaluation and valorising as well. They indicate five *registers for valuing* tomatoes, each of which singles out an individual concern with what is a *good* tomato, and they point out that the good quality that each register designates and enacts may be in conflict or compromised by others under some circumstances. For instance, the good *look* tomato with solid skin may conflict with the good *taste*. There is no singular scheme that can include all registers at the same time. However, being in conflict with each other is not always the result when different registers for valuing meet or are drawn together. This study shows me that fish farming practices include not only valorising but also evaluating fish, both of which are interwoven in the same object. But this interweaving of different 'good' qualities may involve conflict. Moreover, the work of valuing can be distributed among a long chain composed of fish farmers, processors, middlemen, fishmongers and consumers, and milkfish's response as well. Thus, how valuing works is coordinated between these actors in an empirical matter.

In response to the claim that ‘there is no such thing as terroir’, suggested by scientific experiments, Teil (2012) argues that terroir exists only in a regime composed of vinters, farming practices, grapes, tasters, critics, wine lovers and the retailers involved, and thus it is a result of collective evaluation, which does not exist in blind tests wherein tasters only have a glass of wine. There are controversies about the existence of terroir as an objective reality or a social construction. Terroir can be understood as ‘a combination of natural local agro-climactic elements and viticulture and wine-making practices skilfully combined by a vintner, giving a wine its distinctive gustative quality and publicly sanctioned reputation’ (Teil 2012, p.481). On the one hand, AOC (*Appellation d’Origine Contrôlée*) makes efforts to protect any typical terroir from changes; sometimes, AOC will refuse to certify AOC labels for a certain wine due to its changed taste, although it is from an ‘appellation’ region. On the other hand, it is argued that terroir is just a social construction or an artificial barrier that reflects the structure of French society. When it comes to wine from the U.S, there is no such thing as terroir, and customers do not buy it (Fourcade 2012). Teil (2012) distinguishes the ‘product-object’ to which terroir belongs from a ‘thing-object’, which can be detected by scientific experiments. The product-object can be sensed only by engaging in it collectively, while the thing-object must be detected by distancing from the object separately.

The studies of wine terroir inspire the present study in that the so-called taste or flavour of a food can be mutable. It does not change only because of a great deal of effort taken to keep it from changing. What cannot be overlook is the role played by AOC in maintaining the reference link between terroir and place of origin. Teil (2012) indicates that the taste of wine changes yearly so that the benchmark for terroir must be adjusted accordingly. From this we can tell, first, that terroir in the professionals’ view is not intact despite the establishment of AOC rules, but neither is it subjective due to its distributive existence among others. Second, changes in terroir are not recognised as 'changes' if these changes stay in a 'network' of relations composed of tasters of all kinds, which is almost impossible. It strikes me as important to explore how far the 'network' of milkfish taste extends, how many kinds of 'network' exist, and how they interact. I will discuss these issues in Chapter 6.

2.4.4 Food-making and Place-making

Another issue regarding heterogeneous assemblages of food (fish) is the interaction between place-making and food-making. It is apparent that the production and consumption of food transform the local landscape. Sheller's (2013) study on Caribbean bananas shows that immigrants were introduced to this region to work on banana plantations so as to meet the enormous demand for bananas from, mostly, Western countries. Thus, places, food and immigrants are drawn from all directions together so that the assemblage of bananas takes shape.

Paxson (2012) explores how American artisanal cheesemakers translate the French term 'terroir' into practices of cheese-making rather than the effects of land, soil and agro-climatic characteristics. Unlike France where terroir usually denotes a wide range of regions, in the U.S., the range of terroir is scaled down to the level of individual farmsteads (Paxson 2010). Rather than associating terroir with 'natural' territory, U.S. cheesemakers use the concept of terroir to build up the 'taste of a place'. There is a difference between the taste of a place and of its proximity. While the former emphasises the typical taste of food originating from a place, the latter simply means that the source of food is fresh and locally sourced. In her study (Paxson 2012; Paxson & Helmreich 2013), an organisation of artisanal cheesemakers resorted to a scientific laboratory to identify microbes with their own distinctive taste. However, the more they dug on a microscopic scale, the more they found that, on this level, similarity applies much more than difference among cheeses because microbes are *everywhere*. What Paxson argues, through the case of terroir, is for the work of placemaking through the practice of food-making. By resorting to materials as physical as microbes or concepts as flexible as terroir, these cheesemakers seek to 'anchor their cultural projects, whether these are to valorize or stabilize local and artisanal foodmaking' (Paxson & Helmreich 2013, p.183).

The interaction between food-making and place-making reminds us of the fact that there may be trajectories so that a production site for milkfish becomes the way it is. I will trace the process whereby Xuejia, where the export scheme for milkfish contract farming occurred, became a home for milkfish separately in Chapters 4 and 5.

In a study of salmon heads, Coles and Hallett IV (2013) notice that salmon heads are enacted to be food in one set of marketplaces but waste in others. They suggest that this difference is because salmon heads in one context are displayed openly to be negotiated, while those in another are only displayed to 'produce some kind of geographical knowledge and imagination of 'fishing'' (Coles & Hallett IV 2013, p.164). In other words, fish heads are only enacted as 'waste' in specific market settings, rather than being waste in themselves. This market setting obscures other possibilities that heads can be consumed otherwise. In the study of salmon heads, it strikes me that a fish can count as food because of the 'context' that a fish is put in. In light of ANT, however, do the fish themselves make any difference to this context, even though the fish that arrive in markets have died? I will consider this issue in the present study of milkfish.

2.4.5 Ontological Politics of Foods, Fish and Humans

When the production and consumption of food unfold is on a far-reaching scale, it is inevitable that the worlds involved in the production and consumption of food will be re-assembled. What is incorporated in this process of re-assemblage includes not only human worlds, like countries, regions and places, but also non-humans. When efforts are made to interweave these entities, some ‘matters’ are *made more invisible* and thus do not matter, while others are *made more visible* and thus do matter. This is where the ontological politics of food is situated.

Sheller (2013) argues that the current form of bananas is an effect of the assemblage of a wide range of global systems ranging from transport and science to governance. Meanwhile, the banana is also an agent for re-connecting dispersed social and more-than-human worlds. In order to be transportable and counter lethal viruses, a particular variety of bananas is selected. In order to plant bananas, labour was introduced to the Caribbean and Central America along with bananas. The worldwide demand for banana strengthens the monoculture of bananas in this region and thus changes the local environment and ecology. The EU preference for Caribbean small growers over other bananas grown by American corporations in Central America eventually led to a ‘banana war’ across the Atlantic in the late 1990s. Finally, the EU withdrew its trade barrier, and thus fair-trade certification became the most viable way out for those small growers producing for export to EU markets. Despite these changes in human worlds, however, the threat from diseases to bananas still lingers, and this threat can only be raised along with the increasing global mobility of bananas. Sheller suggests two possible results: first is the re-localisation of fragile varieties of bananas and reducing transport miles. Second is the hyper-globalization of a genetically-modified banana held by private corporations, which is allowed to spread widely.

Loconto (2014) explored the ontological politics of standards of ‘sustainable’ teas in practice. Although standards are made to organise both producers and production and construct markets, they also make some aspects more visible while others invisible at the same time. In the case of sustainable teas, standards of sustainability are usually made (by players usually concentrated in the North) with little concern for the economic sustainability of tea production and tea producers (in the South). However, on production sites, sustainability for producers mostly means economic success. Thus, only sustainability requirements that ensure producers' survival and sustain enterprise are enacted more visible than other standards, while social and environmental aspects of sustainability are enacted invisible in practice. This study reminds us that it is not enough to talk about discrepancies between planning and implementing an export scheme. Rather, it is more important to talk about what concerns are made visible while others are made invisible in the implementation of an export scheme.

Lien's (2007) study of Tasmania salmon farming implies the same degree of ontological politics as does Loconto (2014) between the centre of salmon knowledge and practices and the periphery where knowledge practices are mobilised. Salmon farming in Tasmania can be done in the same way as it is in the centre. This mobility of salmon farming is not only because of the dissemination of knowledge and technology from the centre, but also because local components like the coastal environment on the periphery and any differences in salmon's behaviour are *made invisible* in practising the knowledge and technology of salmon farming. The ontological continuity, or ontological singularity and monopoly, of salmon between these two locations is only *rendered* so in practice, rather than being an assumption at the point of departure (Law & Lien 2012).

As mentioned earlier, maintaining the development of Norwegian salmon farming requires that forage fish caught elsewhere are extracted from water, pelleted and shipped to meet the demand from Norwegian salmon and salmon farming (Lien 2015). Moreover, in order to facilitate the transport of fish-feed ingredients, trade agreements are made between countries where ingredients of feed-fish are sourced and Norway where salmon farming is a high-value industry (Lien 2015).

Thus, a relation between the centre and the periphery is enacted. But the problem is that so-called 'forage fish' sourced from countries in the global south, like Peru, have their own multi-species entanglements underwater. The more that Norwegian salmon farming thrives, the more those invisible, unrecognisable species are at stake. What this approach inspires in the present study is thinking about *what and who are enacted as necessary* for maintaining the development of milkfish farming, the bodily shape of milkfish, and the export scheme. I will consider these issues in Chapter 7.

One way to consider the ontological politics of food or animal sourced food is to pay attention to the 'modernist' paradox between hybridisation and purification (Latour 1993). Anneberg et al.'s (2013) study of Danish pig-farming points out that farmed pigs are 'hybridised' with technology, financial loans and government policies, while both popular and official discourses deny the existence of this hybrid, instead they highlight the 'power of nature' constantly. However, it seems to me that this study of farmed pigs only considers half of the double process of purification and mediation (hybridisation). That is, the authors 'trace those animal-numerical, human-animal and technological-human hybrids that emerge out of the paradoxes of modern farming' (Anneberg et al. 2013, p.556) but put aside the work of purification. I therefore suggest that how the modernist paradox can be exposed includes not only revealing the work of hybridisation but also casting light on how the work of purification is conducted.

Regarding my theoretical concern with the paradox of ANT, if both modes of assemblage—consolidation and fluidification—are hybridised with each other in practice, how is one mode made more visible than the other? How is this work of purification achieved?

Chapter 3
Methodology

The methodology is designed to explore the three issues mentioned in Chapter 1. First is issues centring around the problems associated with the overproduction of milkfish, including: official statistics, technical changes in milkfish farming and the homogeneity of the stock of milkfish. Second is the set of issues revolving around the symmetry between humans and non-humans in the milkfish assemblage in Taiwan—i.e. how can non-humans like milkfish play a part in the formation of the milkfish assemblage? The third issue is the ‘successful’ enactment of milkfish in Taiwan and the ‘failed’ performance of the milkfish export scheme in China. In what follows, I will first present an overview of my fieldwork, and then I will detail and explain the main methodological approaches that this study adopts—a multi-sited, more-than-human ethnography and interviewing, plus document analysis as well.

3.1 An Overview of Fieldwork

For data collection, fieldwork was conducted twice, in both 2014 and 2015. The 2014 fieldwork targeted implementation of the export scheme, while the 2015 fieldwork sought an extensive understanding of the construction of the milkfish assemblage. Data collection in the 2014 fieldwork was carried out mostly in Xuejia (and neighbouring areas), a production site for milkfish in Taiwan where contract fish farming was conducted, and partly in Shanghai where the export scheme aimed to connect with Xuejia. During this time, I spent four months in Xuejia and neighbouring areas and two weeks in Shanghai. The 2015 fieldwork focused on technical changes to milkfish farming and the place-making of Xuejia and neighbouring areas, and therefore the types of data collected included historical records, in addition to interviews and observations.

The 2014 fieldwork focused on implementation of the export scheme, building trust with interviewees, and paying attention to practices and activities undertaken in the areas of fish farms, processing plants, fish stalls, supermarkets and so on. Although I had read some literature on milkfish farming and media reports on the export scheme, my understanding was still rough. Thus, I tried to record events that took place in the field so as to ensure that I would not miss clues that mattered to the analysis in this study. After some time spent digesting the data collected in the first phase of fieldwork, I came to realise that a thorough understanding of the export scheme could not skip understanding the history and technology of milkfish farming. The history and technology include questions of why and how places like Xuejia are associated with milkfish farming. The history of Xuejia and the technology of milkfish farming have played a part in shaping fish farmers' understandings of the present difficulties and future opportunities but have been underexamined. Thus, during the 2015 fieldwork, I paid more attention to these historical and technical details and tried to understand today's practices of milkfish farming in a broader 'context'. The present thesis is a study inspired by ANT approaches, and therefore I do not use 'context' as an explanation for today's 'content' of milkfish farming. Rather, attention is drawn to how they are interwoven yet separated from each other at the same time. This is how I explore the constant tension between consolidation and fluidification of heterogeneous assemblages.

In the 2014 fieldwork in Xuejia and neighbouring areas, the number of interviewees was 27, and in Shanghai it was 16. In the 2015 fieldwork, the number of newly added interviewees was 19, whist I also kept in contact with the respondents whom I interviewed in 2014. Therefore, the total number of interviewees was 62. Note that many respondents are not included in this number, although they were aware of my presence to collect research data. For instance, at harvest sites, there were tens of harvest workers whom I asked questions to about their activities, but I did not count them as formal interviewees.

The selection of participants for this study was by snowball sampling, I started contacting fish farmers through a connection with Shinejai Co.—the exporter responsible for the milkfish export scheme based in Xuejia. But I soon realised that there could be a risk of overdependence on a single source of connections, and the research area covered by this thesis is wider than just the implementation of the export scheme, so I then ceased to rely on the Shinejai Co. connection and instead contacted potential participants by asking the first few participants to introduce me to their work contacts (fish farmers, middle buyers or feed providers) or neighbours in the vicinity. Snowball sampling was also adopted in recruiting aquaculture scientists and technologists: I first contacted and interviewed people who were in post at a fishery research institute, and then reached others through them. The same method was also used to recruit people who were involved in implementation of the milkfish export scheme in Shanghai.

The interviewees of this study can be subsumed into different groups. They include: feed company, fish farmers, processing plants, cold-storage plants, bulk buyers, exporters, wholesalers, fishmongers, chain restaurants, milkfish restaurants, retail food stores, consumers, aquaculturalists, aquaculture scientists and a semi-official fish farmers' association. Some interviewees can be subsumed into more than one group. For instance, the owner of a feed company had his own fishponds, and thus he could be subsumed under the identity of fish farmers as well. Besides, any single group could be too simple for the people in it. For instance, there were different kinds of fish farmers, such as breeders, fingerling growers and adult fish growers, plus emerging quality-oriented fish farmers as well.

Most of the interviewees' names mentioned in this study are pseudonyms. This is to protect their identities. Specifically, when I use photos to illustrate my respondents' activities, their faces are pixelated, and the focus is on their practices, interactions with milkfish, and related practices and activities. An exception to this rule of anonymity is when respondents are public figures. For instance, an organiser of the export scheme is an ex-local politician who still represents and speaks for fish farmers in the media. Another exception to this rule is aquaculture scientists. Unless they have special concerns about publicity, they are mentioned with their real names, just like the researchers mentioned in the form of citations in this study.

Although interviewing was an effective way of collecting data, many productive interviews were done in ethnographic scenes where actors were going about their daily practices. Thus, part of the data collection for this study was dependent upon ethnographic observation. With the assistance of cameras and sound recorders, I noted down activities that took place at scenes, such as replenishing, feeding, harvesting, selecting, filleting fish, selling and so on. Most of the time, observation was not intrusive. On some occasions, however, I interacted with actors at scenes by asking questions about what they were doing and why; at the other times, observation data was 'generated' by preparing dishes of milkfish for myself and others, especially when the naturalistic observation of milkfish in Shanghai was impossible. In 2014, milkfish were no longer exported in bulk to Shanghai, and there were only a few sites where milkfish were for sale at that time, and thus most of the interviews were question-guided and conversational instead.

Other data that underpin this study are drawn from documents, including official, technical and historical ones. During the 2014 fieldwork, I did not pay much attention to these kinds of data sources, although I was aware that there had been technical changes in the sector of milkfish farming, because the focus was exclusively on implementation of the export scheme. But technical and historical issues came into view, as my fieldwork was extending to quality-oriented milkfish farmers who differentiated the quality of their own fish from others' by resorting to the 'original' taste of milkfish. One of these fish farmers dropped out of the export scheme and started his own business of selling processed milkfish products. This difference reminded me that things could be organised differently for the benefit of fish farmers. Thus, I turned to historical, technical and official literature to see how the current difficulties in milkfish farming and aspirations for the export scheme were related to what milkfish farming was like in the past.

The focus of the methodology of this study was put on how people in each of the groups mentioned above interacted with milkfish, or were interwoven with milkfish and other humans and non-humans. Not only the current state of affairs but also the past drew my attention. This was to see what matters of affairs regarding milkfish (e.g. size, shape, cost and seasonality of supply) were rendered visible in their practices and thus mattered, while others were made invisible and thus did not matter to them. Moreover, how these practices of different groups of people inter-connected or disconnected with each other was also a focus of this study. Next, I will detail how respective ways of data collection were conducted and why.

3.2 Interview Method

Major fieldwork began in Xuejia in Tainan, Taiwan. When this study was in the design stage, I intended to treat Shinejai Food Co. as a 'critical group' in the present study. That means, I was hoping I could establish connections with fish farmers in this area through my connection with Shinejai, as there were over 100 fish farmers who had contracts with this company every year between 2011 and 2015. However, the cooperation did not go like that. On the one hand, I noticed there was a risk of bias due to overdependence on a single source for making connections. On the other hand, the staff of the company were occupied by their own business already. Despite this, I was permitted to visit the company in working hours, and most of the events held by the company were notified to me, such as welcome activities for groups of Chinese (semi-)officials, the 2014 annual meeting for contract farming and related activities involving fish farmers. These kinds of 'social' activities were a point of departure for making connections with fish farmers and built trust with them.

In the first place, most of the interviews were question-guided and conversational with fish farmers. By a question-guided interview, I mean that interviews were conducted using a list of questions on sheets of paper, and the interviews were held in an indoor environment. I noticed the potential risk that the listed questions might be too rigid and thus simultaneously employed conversational interviewing to keep the dialogue going beyond the listed questions. However, although this method was efficient in generating a great deal of narrative data, the quality of this data was inferior at first. This was partly because people in this area spoke a language called 'Taiwanese', a dialect derived from Chinese 'Hokkein' mixed with Japanese, especially the terminology for milkfish farming. Even when interviewees responded to my questions, I could not immediately understand on the spot. Even though I also spoke this language, the terminology of milkfish farming was still a barrier for me to understand. It took me months to become familiar with the terminology and this language.

Secondly, the location of these interviews was too distant from the locations of practices. Sometimes, my list of questions was not translated to suit a situation they were familiar with. A contrasting example is an interview with a chef (boss) of a milkfish restaurant. That first-time interview was carried out in the kitchen while he was preparing fish and ingredients, he spoke Taiwanese Hokkein all along to explain what he was doing, but by making references to saying and doing I could have a relatively deeper understanding than those interviews conducted away from the 'context' we were talking about.

The main lesson I drew from interviews conducted early on was that it would be better for me to conduct them in an ethnographic setting, which means an ordinary setting in which people are engaging in their regular activities. Moreover, it would be even better to develop long-term collaborative relationships with a few fish farmers to conduct follow-up interviews, and the problems of my unfamiliarity with the language and terminology could be reduced. Therefore, I turned to the method of the ethnographic interview to collect interviewing data. As long as it was feasible, I would be doing interviews in the field while my interviewees were doing their daily, routine work.

I intended to enlist a couple of fish farmers who had signed up to contract farming as my collaborative informants, because I had conducted question-guided and conversational interviews with them before, and they had invited me to observe the practice of fingerlings distribution. However, their fishponds were scattered around different places in Xuejia, and thus they had to move to and fro between those fishponds several times a day. For them, my presence could sometimes become a burden. At the time when I worked with those two fish farmers, I got acquainted with the Li family in the vicinity (a family of five of whom four were directly engaged in fish farming) whose fishponds were concentrated at one site and there was a warehouse nearby where neighbours stopped by from time to time. After several short ethnographic interview sessions, we established trust, and they naturally became my critical group of fish farmers in this area.

Despite this, the methods of question-guided and conversational interviews were still required under some circumstances. First was when I started getting familiar with Taiwanese Hokkein, terminology in all realms related to milkfish, and the topics I intended to deal with. In the 2015 fieldwork, most of the data collection was via question-guided and conversational interviews. Second was when arranging an ethnographic interview in the field was infeasible. For instance, in Shanghai, most of my interviewees made time for my interviewing and it was impossible to interrupt their daily jobs for too long. Besides, there were two interviewees who were not available for face-to-face interviews with me, and thus we engaged in interviews via phone and Skype separately. Despite this, ethnographic interviewing was still carried out on some occasions in Shanghai, like my interviews with Fishmonger Cheung (Chapter 7). Third was when my attention was drawn to technical changes and historical issues around milkfish farming. Question-guided and conversational interviews could partially retrieve the past activities of milkfish aquaculture.

The interview data were recorded in various forms. In question-guided and conversation interviews, with interviewees' permission, conversational data were recorded with recording devices. However, during ethnographic interviews, recording was not feasible. First, there were too many people on the scene. For instance, the Lis' warehouse was like a rest stop where neighbours, fish farmers and people would stop by. It would be 'unnatural' to ask to record their conversations, although they knew my presence was for a study of milkfish farming. Besides, what they were talking about included private matters. Thus, I chose to jot down topics during my research at the scene and compiled field notes after I left. Second, much of the information was 'voiceless', such as my observation of fish farmers' interaction with fish in ponds and fishmongers' acts of filleting fish. I thus recorded these acts with a camera, raised questions at the scene and compiled field notes from these clips of activities.

Law (1994, p.19) mentions the importance of stories that people tell because these stories are 'clues to patterns that may be imputed to recursive sociotechnical networks'. I also took this stance towards narrative data collected from my interviewees. That is, from what they said, I identified the nets of relations that these actors worked hard to weave, and the heterogeneous materials that held them together. But I also noticed the possibility that valuable information was not that mentioned by people but left unmentioned. This does not mean secrets but rather ‘the elephant in the room’—milkfish. On many occasions, my interviewees talked more about weight, feed, price and bodily characteristics than about the fish. On occasions when they talked about fish, that usually meant something had gone wrong: the fish did not ingest the feed or the fish tasted bad. My focus was on how translation from fish to other aspects was made possible. Or to put this another way, how the absence (Law 2004) of milkfish was made possible, and thus facilitated the nets that those actors tried to weave.

3.3 Observation Method

Another method of data collection for this study was observation. This method was not conducted independently of ethnographic interviews and document analysis. Rather, observation was a reflexive process from reading documents and doing interviews. That is, my observation was affected by both of these methods. My observation of events that took place at the scene, such as the practice of fish farming, was on the one hand expanded to different times and places. For instance, I was comparing the practice of current ways of milkfish farming with those in the past when I was observing fish farmers’ practices in one field. Also, I was comparing fish that fish farmers cared about with those that fishmongers, processors and consumers cared about. There might have been some overlap between each group’s care, but this was not bound to happen. On the other hand, my observation was narrowed down as the actors narrowed down their focus. Not all aspects of fish and fish farming mattered equally to fish farmers and their customers. I learnt from these actors about how work of purification (Latour 1993b) was also interwoven with work of hybridisation in the making of milkfish.

One aspect of my observation that differed from much ethnographic research is that it was extended to so-called non-human ‘objects’, including milkfish and other elements bound up with the fish. Most of the time, these non-humans were closely interwoven with a lot of other humans and non-humans, so that they were regarded as passive objects. In my fieldwork, however, it was more than occasional that the milkfish in stock behaved unexpectedly, the water was turned off or the production yield fell below expectations. My observation covered how milkfish were enacted under circumstances that were meant to build them up as well as how fish farmers and other human actors were enacted by responses from milkfish and other non-humans to the circumstances built for them.

The fieldwork for this study was carried out at multiple sites, and thus the observation was multi-sited. Bestor (2001, p.78) suggests that the risk of multi-sited fieldwork is that it is ‘drive-by’ ethnography, but the ‘pay-off is to grapple productively with the local in the global and the global in the local’. The risk of multi-sited observation seems to me that observation of the process of assemblage becomes one of ‘networking’. As noticed in Chapters 1 and 2, a ‘network’ is only one way of assemblage. If we assume that what happens in different sites to the same object is bound to be drawn together, we would presume that a network is the way of how things are about to develop. The goal I expected to reach through multi-sited observation was to understand how milkfish were enacted to be interconnected while disconnected at the same time between multiple sites for ‘practising’ them. The means to achieve this goal was by paying attention to irreductions of the same concern between different sites. For instance, Chapter 6 notices that although both fish farmers and fishmongers preferred a similar shape of milkfish, the seasonality of milkfish production does not allow fishmongers to insist on their own preference. Thus, fishmongers adapt their own practices to this seasonality. This way of engaging with milkfish can be understood as more like fluids than networks in this study.

My position of an observer was more prone to being an onlooker than a participant. I did try to volunteer for a position at Shinejai Co., because the export scheme, compared with other parts of the milkfish assemblage, was too mysterious for me, but this request was ignored. Despite losing an opportunity to access some unofficial sources of data, the advantage of being an 'outsider' from the export scheme was that I could talk to fish farmers and Shinejai's outsourcing collaborators freely because I did not represent any kind of stakeholders. In most situations in the field, I did not intervene in what happened in front of my eyes. In the field of fish farms, I acted like an onlooker. Indeed, I asked questions to people at the scene and provided some handy assistance, such as handing tools to fish farmers and others. Most of the time, I noted down events, with notebook, pen and camera, that occurred in the field and had conversations. Like the field notes of interviews, I compiled field notes of observation from these clips of events.

However, there were some occasions when I acted like a participant so as to generate observation data, rather than an onlooker of a natural setting. One scene was when I was told the difference between saltwater- and freshwater-farmed milkfish. I tried to follow an informant's guidance to make a different milkfish dish (see Chapter 6). Another was when I was in Shanghai for fieldwork in 2014 and traces of milkfish were few. My request for an interview with a Shanghai collaborator with Shinejai Co. was turned down. And, it was hard to recruit local informants in Shanghai who had experience with the consumption of milkfish—in fact, I met only two Chinese citizens who had experience of consuming milkfish. Under this circumstance, I prepared a milkfish dish and treated two Chinese citizens who lived in

Shanghai to have a taste of it (Chapter 7). This way of observation does not count as the observation of a natural setting. Rather, I arranged an artificial setting to which participants were invited, and I also participated in this setting and observed their interaction with the fish meal and each other. This method was inspired by Mann et al. (2011) who arranged a dinner in which every participant ate with their fingers. The purpose was to explore what the term ‘tasting’ could relate to, other than cultural or natural behaviour. In the same vein, the purpose of my arrangement was to observe what milkfish might mean in a different situation, rather than accept either a cultural explanation (e.g. people on the two sides of the Strait have different tastes) or a natural one (e.g. milkfish are bony and taste muddy) in advance.

3.4 Document Analysis

The other source of data that this study relies upon is official and technical documents about milkfish farming, and research in Xuejia and neighbouring areas. This kind of data constitutes most of the content of Chapters 4 and 5 of this study.

As mentioned in Chapter 1, the sector and practice of milkfish farming have undergone significant technical changes, so that the status of milkfish is changing from a luxury commodity to ordinary one, or even to low-class seafood, and the whole sector has problems with excess production. In order to explore issues with technical changes, the technical accounts of milkfish farming and official statistics left by the Japanese colonial government of Taiwan (1895–1945) were explored to understand how milkfish farming was conducted in the past, and what the sociotechnical characteristics of milkfish farming were then (Chapter 4).

Apart from documents left by the colonial government, documents published by the officially funded fishery research institute and statistics released by the current government of Taiwan were used to shed light on the impact of technical changes to milkfish farming (Chapter 5). In this regard, Xuejia was an ideal case for exploring the sociotechnical changes to milkfish farming because, as is shown in Chapters 4 and 5, it was not a production site of milkfish farming until the mid-1980s onwards. Therefore, literature on the place-making of Xuejia is included in this study as well.

However, the documents mentioned above were not treated as a mere representation of the reality of milkfish farming in the past or now. My attention was also drawn to the purposes that those documents were prepared for at that time. It was important to consider, for instance, why the increase in production yield of milkfish per unit of area mattered, and what effects were brought about by the circulation of those official statistics, reports and technical accounts as well. In other words, documents were not only treated as carriers of content but as putative 'actors' that acted upon the reality that they were supposed to describe and represent.

Overall, there are three kinds of documents that this study draws upon. First is official statistics and reports, which provide figures and overviews of the sector of milkfish farming and related economic activities. Second is technical accounts of milkfish farming, which provide records of milkfish, fish farmers, production conditions and the practice of milkfish farming. Third is sociocultural literature on Xuejia and neighbouring areas, which provides a historical account of early residents' livelihoods and activities in this area. These three kinds of literature are drawn together to form an understanding of how the sector of milkfish farming developed so that it could aspire to an export scheme to solve the difficulties it faced at a particular time.

Chapter 4
Xuejia and its Incompatibility with Shallow-water Milkfish Farming

4.1 **Home of Milkfish: An Introduction**

On the external wall of the building of the Shinejai Food Company in the township of Xuejia, there are painted the lines of a commercial slogan 'healthy, tasty, and the whole world' at the top and ‘the home of milkfish’ underneath. The slogan appears to express an imagery that connects the locale of Xuejia and the whole world through milkfish. At present, the Shinejai Co. is known for its involvement with the milkfish export scheme since 2011. In regard to the export scheme, ‘Xuejia’ can be said to be paired with ‘milkfish’, as if there was a close connection from the very beginning of history.

On 21 March 2014, I was at a briefing on details of farming contract for the export scheme that year. The host was Chairperson Wang Wen-tzong, who is an ex-speaker of the old Xuejia Township Council and chairperson of the Shinejai Co. The contract price in 2014 had gone down to the lowest in the three years since 2011. After the contract price was announced, the fish farmers were disgruntled, and so Chairperson Wang tried to curb their disappointed emotions by conceding some buyers’ privileges to the fish farmers. Towards the end of the briefing, Chairperson Wang tried to cheer the fish farmers up by highlighting the historical significance of milkfish contract farming, saying that fish farmers were part of it, and that ‘the three words of milkfish [*Sat-bat-hi* in Taiwanese Hokkein; 虱目魚 in Han characters] are a signboard for our home left behind by our ancestors. [...]. Let's keep sight of the future and display the signboard again’ (2014 annual meeting, 2014-03-21). In Chairperson Wang’s view, the historical relatedness between Xuejia and milkfish is an undoubted matter of fact.

However, in the historical records of both aquaculture and chronicles that mention Xuejia, there is very little evidence of such a relation. An official book on Taiwan from the late 17th century shows that the earliest milkfish farms on record were in Anding (Jiang 1695). Indeed, both Anding and Xuejia are under today's Tainan administration and only tens of kilometres away from each other. But it makes little sense to acknowledge that Xuejia was involved in milkfish farming back in the old days, like Anding, just because they are not far from each other and under the same administration today. If Xuejia is now a major site for milkfish production, how was it excluded from milkfish farming?

This chapter will first go through the place-making of Xuejia, when milkfish farming was not closely related to this place. I will indicate that fish farming was rarely in the vision of Xuejia in the first place; and milkfish farming was even contrary to the social-material assemblage of Xuejia. Secondly, this chapter will turn to exploring a particular version of milkfish farming—*shallow-water farming*—which was prevalent in Taiwan in the past for over a century, but which has withered away since the mid-1980s. I will indicate that this social-material assemblage of milkfish farming was, on the one hand, organised according to the 'agency' of milkfish (e.g. how it acts, what it needs to grow etc.) and defined what milkfish was like, on the other hand. Finally, I will suggest that Xuejia and milkfish farming seldom crossed each other's paths. This divide, I argue, was not only a result of the consolidation of either or both assemblages, but also, in the case of shallow-water milkfish farming, a result of mutual adaptation between humans and non-humans.

4.2 Caught up in Typhoon Incidents

Typhoons are very normal to Taiwanese people during summer and autumn every year. News of floods caused by typhoons cannot be called real 'news'. The news usually informs that torrential rain brought by typhoons has caused low-lying regions to flood and cut off transport. I used to suppose that a low-land area meant the coastal region close to the seashore. Given that I grew up in a harbour city in southern Taiwan (less than 10 km to the sea), and if where I resided was not flooded, then how could more inland areas be so? The fact that land that people walk on today was once under or near the sea is one that few current residents are aware of but they are affected by it from time to time. Let me start with a typhoon incident that my fish-farmer interviewees experienced and another one that caught me out during my 2015 fieldwork.

It was not until a recent incident caused by Typhoon Morakot, on 8 August 2009, that people were reminded of the fact that where they were walking that day was once a lowland or under the sea. Due to the typhoon, a large part of Xuejia was badly flooded, including the house and fishponds of the Li family in Xuejia. In this part of Xuejia, there is wide flat land in mixed use for agriculture and aquaculture. A small parcel of rice fields can be seen adjacent to a small group of fishponds. This is what would be seen at the Li family fish farms today. I asked the Li brothers how high the flooding caused by Morakot reached. They pointed to the external wall of the house, still with marks on it. From that, I could tell it was about a metre high. At that time, in the Li family's ponds were Wuguo fish.[5] The fish farmed in the Li ponds escaped. Afterwards, many people came to the canals nearby to catch the fish for free; the Li brothers said 'maybe the small Wuguo fish you ate at [Taiwanese style] fast-food restaurants were ours' (field note, the Lis, 2015-1007). The floods affected them and other fish farmers badly. When the Li family started fish farming again, they chose milkfish this time, from 2010 onwards. For them milkfish could mean a new start.

During my fieldwork in Xuejia, I heard several fish farmer's

[5] Wuguo fish's vernacular name in Taiwanese Hokkein, Lam-iunn-dai-a [南洋代魚 in Han characters], does in fact mean carp from Sothern Asia; it is not actually a kind of carp but the tilapia introduced them, from Africa via Singapore, to Taiwan in the 1940s, and decades later interbred them to produce a hybrid.

personal stories about how they started again with milkfish farming; but the stories were not straightforward as they took over land and business from older generations. Another family of fish farmers, the Shi family, first returned to Xuejia to grow crops in 1969, then turned to tilapia (Wuguo fish), and finally settled in milkfish in the 1990s (Interview note, Shi, 2015-0730). Another couple— Mr and Mrs Chiou— experienced similar damage from Morakot to that experience by the Li family, but larger in scale due to the scale of their tilapia farming, and they rebuilt their business with milkfish afterwards (Interview, Chu, 2014-0220). Another fish farmer, Kevin, commented that, wherever there are relics of pig pens set up by nearby ponds, there are fishponds once stocked with tilapia (Interview, Kevin, 2014-0425). However differently these fish farmers' stories were articulated, they did mention a similar trajectory that took them from tilapia farming (mixed with pig farming) to milkfish farming. There was little mention of the centuries-long 'signboard' of milkfish here. This gave me the impression that milkfish are relative latecomers to Xuejia. It may be more accurate to say that Xuejia was 'home to tilapia', but is now home to milkfish.

Let me now consider some historical records. At the end of January in 1999, a local newspaper based in Tainan reported that a newly installed feature composed of three statues, including a pigeon, a bulb of garlic and a milkfish, had appeared in public, at the start of the main road into Xuejia. Each statue represented a specific local specialty. Among them, milkfish represented the best-known local aquaculture (Li 1999). A local chronicle of Xuejia Township, printed in 1983, recorded some freshwater fish as major local farmed fish, while in this record milkfish was not mentioned (Unknown 1983). In addition, another local chronicle, published in 1962 (Hsieh 1962), even skipped recording the aquaculture of Xuejia. A chronicle from 1926 on Xuejia, when Taiwan was under Japanese rule, said that 'fishponds were not few before, but ever since the first stage of the irrigation canals was completed, aquaculture has declined' (Tsuchimochi et al. 1926, p.39). In other words, the local aquaculture had not yet revived when the book was compiled, but the authors clarified that 'fishponds are mainly for freshwater fish' (ibid.). These historical records suggest that, historically, there were very few traces of milkfish in Xuejia.

On 8 August 2015, coincidently, another typhoon struck this region. Fortunately, it was not like Morakot that brought severe floods with it. It was reported that some fishponds incurred damage, while those of my interviewees were safe. Despite this, my residence in Jiali [佳里] had trees blown down, power cut, and water obstructed at the yard. Mr. Wen, a staff member of the research institute that sponsored me the residence, came to check the damage and then gave me a ride to the highway bus station some distance away. On the way, he mentioned, 'you know, the area flooded by the '88 typhoon disaster [Typhoon Morakot] corresponds closely with descriptions on record of where the Duofeng Inner Sea used to be' (personal communication, Wen, 2015-0809). Again, I was led in another direction by this clue. This time, it was that part of the area I was studying was under the sea not long ago.

If Xuejia is indeed now a home for milkfish—in the sense of a major production site for milkfish—how were milkfish excluded from, or never included in, the making of this place at the very beginning? The next section is about the 'natural' formation of Xuejia and regions in the vicinity, and how this natural formation was 'washed away' to facilitate crop-farming.

4.3 Formation and Utilisation of Marginal Land

4.3.1 Formation of Salty Land

Taiwan is an island located in East Asia, at the intersection between Northeast and Southeast Asia, separated from mainland China by the Taiwan Strait (Figure 4-1). Tainan is in the southwest of Taiwan

(Figure 4-2), and the whole region of Tainan, including Xuejia, is situated south of the Tropic of Cancer. The weather in southern Taiwan features an uneven distribution of rainfall, i.e. most rain falls in summer while winter is a drought season. The current western coast of Tainan is formed by long-term deposition of pre-mudflats (wetlands), and even today there are still wetlands between offshore sandbanks and the coastline. In other words, today's coastline could have been offshore sandbanks in the past.

Figure 4-1
The Relative Location of Taiwan in Asia

The figure is drawn from the website of Google Map.

Figure 4-2
The Location of Greater Tainan

The figure is drawn from the website of Google Map. The area outlined in red is Greater Tainan.

In the Greater Tainan area, there are four major rivers that flow westwards from inland mountains to the sea (Figure 4-3) and co-constitute the wetlands or estuaries with tidal waves. Among these rivers, Zenwun River was the one in the locals' mouths as a 'snake' whose channels changed course and flooded the land frequently and acutely. In fact, the four rivers changed their flow channels from time to time before the 20th century, until they were dammed.

Figure 4-3
Locations of the Four Rivers, No.17 Highway, Xuejia, and Surrounding Townships

The original figure is drawn from the website of Google Map. The area of Xuejia is featured by red lines. No.17 highway is the line emphasized by yellow line.

Xuejia is located in the northwest of Tainan's inland area (Figure 4-3). Its northern border is separated from Chiayi by Bajhang Rive. To the west of Xuejia is the Beimen District of Tainan, separated by Highway 17 (the yellow line with a blue signpost in Figure 4-3). Highway 17 is described by the locals as a tangible line that separates saltwater from freshwater ponds; to the west is saltwater, to the east is freshwater. Xuejia has three of the four major rivers that flow by, i.e. not the Zenwun River.

Today, Xuejia is seen as a totally inland area, while in the past a large part of its current territory was below sea level (the area within the blue line in Figure 4-4 below). Part of Xuejia was in the so-called Duofeng Inner Sea [倒風內海], below the water (see the two red zones within the blue line in Figure 4-4). The land of Xuejia, as well as the whole coastal region of Tainan, takes its form from mud deposition resulting from recurrent movements of rivers and tides for hundreds of years.

Figure 4-4

The Possible Location of Duofeng Inner Sea

1. The original figure is drawn from *the historical and geographical report of Tainan County's Duofeng Area* (Culture Bureau of Tainan Prefecture Government [台南縣政府文化局] 2005, p.1).
2. The area of Duofeng inner sea is within the coastal lines featured by the blue line. The part of Xuejia under the sea level is featured by the area filled by red. Underlined with red is part of today's Chiayi Prefecture.

In northern Tainan, the inner sea was the Duofeng Inner Sea, which stretched for dozens of kilometres inland to the southern part of current Chiayi. The inner sea in the south was the Taijiang Inner Sea [台江內海]. Both inner seas turned into land, because the Zenwun River changed direction, with an almost 90º turn, and displaced 23 kilometres southwards due to floods caused by rainstorms in 1823. Consequently, a large amount of mud was brought southwards into the Taijiang inner sea, which led to the estuary of Taijiang being deposited. Also, the Duofeng started to be deposited since the other three main rivers were no longer filled by the upper courses of the Zenwun River. Afterwards, the Duofeng estuary lost its function as channels for boats, and new mudflats, emerged, in turn, from the water.

An inevitable outcome of this mud deposition was the formation of salty land in the whole of ex-Duofeng area, including Xuejia area. These areas feature outspread salty land, extending to the current Yanshui, Xiayin and Madou, all of which are to the east of Xuejia (see Figure 4-4 above). Lacking in irrigation and drainage canals, it was difficult to improve the salty land. The shallow groundwater was salty in this region as well.[6] In dry winters, salt would seep out from underground, along with groundwater, by water evaporation. Eventually, only water evaporates into the air, leaving salt on the ground. Few crops could grow under such conditions. Consequently, the area of salty land was low in productivity.

4.3.2 Washing away Salt

Although land in Duofeng area was infertile and short of irrigation water, this did not mean that early residents turned to embrace fish farming automatically. Particularly, fish farming also required a constant supply of water. Most of the time, crops farming was far more appealing to earlier settlers. As long as a water source was secured, it would be first be seen as useful for crop irrigation rather than fish farming. Thus, early settlers' activities in this region were characterised by 'washing away' the natural condition of the land so as to achieve what they had in mind—rice fields in this case—rather than submit to or compromise with 'nature'.

Early residents in the current Xuejia area started to establish the first four natural villages in the late 17th century. These four villages existed in parallel with other natural villages scattered around Duofeng area, under a common administrative village called Jailixing Bao [佳里興堡] (Chen 2010, p.357). Later, a total of 13 natural villages made up Xuejia Bao [學甲堡]—in parallel with Jialixing—which covered the current Xuejia and Beimen areas. Among these villages, nine were in today's Xuejia area, and five in today's eastern part of Beimen.

These early settlers tended to cultivate marginal land on the basis of the initial natural villages, but gradually established new villages (Chen 2002; Chen 2010). Their movement towards marginal land could be driven by over-extended kinships or overloaded populations.

[6] Farther underground, there is more likelihood of finding freshwater in this area.

Although there were discrete, wide area of waters that remained available for fishing or fish farming, both means of making a living were mainly used for supplementing people's livelihoods. As Mei-Lin Chen (2010) points out, that those clans migrating towards riversides were not seeking to fish but rather to cultivate newly emerged mudflats due to overpopulation. That is to say that fish farming in this area may not have seemed viable for early residents, even though there were already naturally formed waters that could have been used for fishing or fish farming.

During the period of Japanese rule (1895–1945), the cultivation of marginal land went on in the Duofeng area and was intensified with support and investment from the colonial administration. An official investigation into the land use was deliberately conducted and left us many traceable records. Thus, we are able to compare the development of a pair of adjacent areas between Xuejia (today's inland area) and Beimen (today's coastal region).

According to an official report under the Japanese authority (Temporary Bureau of Taiwan Land Census [臨時臺灣土地調查局] 1904), Beimen area had different land uses from Xuejia. By 1904, the area of cultivatable land in Xuejia amounted to 2,112 hectares, while Beimen had 787 hectares. Given the fact that the total area of Xuejia (about 54 km^2) was larger than Beimen (44 km^2), the average cultivatable land area in Xuejia was about 39 hectares per km,[2] larger than Beimen with 17.82 hectares.

A more significant comparison is of paddy fields. The best and most water-consuming one was registered as a 'field' [*田/ Tien*]. Xuejia had 51 hectares, whilst Beimen had none. Most of the arable land in both areas fell into the secondary category of fields, called 'drought fields' [*畑/ Tien*] (Chen 2010, p.369), on which only drought-tolerant crops such as sweet potatoes could be grown. What made the difference the farmland comprising ‘fields’ and ‘drought fields’ was the source of freshwater.

On salty land, freshwater was important for washing out salt. Before seeding, the fields had to be soaked with freshwater so that the salt would follow the water and sink deeper into the ground, and away from the roots of crops. Taiwanese historical scholarship suggests that early residents adopted a composite way of fish and crop farming so that freshwater ponds could be used as reservoirs in fallow seasons and provide irrigation water in spring and summer (Tseng 2012; Chen 2002). However, this temporal arrangement may also suggest that fish farming could not be engaged in on an intensive, commercial scale and in an independent way. The winters were usually dry, and when the season for seeding came, there would have been little water left for stocking fish. In other words, even if there were fishponds in this area, they must have been at the mercy of crop farming (Tseng 2012).

This section suggests that although the natural conditions of Duofeng region, including Xuejia, may have suited fish farming over agriculture, early settlers on this land would have been more likely to think of and practise it the other way round, by turning it into cultivable land for crops. Thus, agriculture came to the fore, while a great deal of effort was put into ‘washing away’ the possibility of aquaculture, just like washing away the salt in the topsoil in this area.

4.4 **Divide between Aquaculture and Agriculture**

4.4.1 Networks for Registering, Measuring, Classifying and Taxing

Most descriptions of early settlers’ lives and activities are based on official reports and records left by the Japanese colonial government of Taiwan (Tseng 2012; Chen 2002). In terms of ANT, however, these descriptions cannot just be treated as a representation of what existed or happened in the past, but also as involvement in the making of the reality in the past and today. In this section, we may start by thinking about how those reports were collected and then transformed the reality that they were supposed to 'represent' by taking part in shaping the reality and holding it together.

Taxation was probably the major incentive for both the governments of Qing's (before 1895) and Japan's Taiwan (1895–1945) to conduct several censuses of land, land taxes and ground investigations (Ka 1989). In the first place, when Japan took over Taiwan, the tax on fishponds had only seven ranks, but the rank system had expanded to nineteen grades by 1944 (Temporary Bureau of Taiwan Land Census [臨時臺灣土地調查局] 1905; Hu 1996). In the middle of this period, there was a lot of ongoing work involving registering, classifying and measuring the use of land. For instance, the rank system was based on the productivity of farmland and fishponds. But in order to determine productivity, many kinds of numbers, from land areas to production yields, had to be collected in advance. Also, parcels of land had to be *detached* from neighbouring ones and *attached* to a single owner (or taxpayer) under the taxing system of the colonial government. All of these achievements would not have been possible without much measurement work being done in advance.

The colonial government conducted a series of land censuses and ground investigations within the purview of the whole island, apart from mountain areas. Colonial officials worked with Taiwanese personnel with the aid of over 1,000 metrological trig points all over the islands to register, measure and classify crop production, and land use as well (Temporary Bureau of Taiwan Land Census [臨時臺灣土地調查局] 1904; 1900). Then, the complicated activities under investigation were simplified into and represented by combinable numbers, forms and figures, and became reports and maps. It is suggested that a 'successful' land census also included the deployment of a civil co-supervision system, and armed forces as well. It was believed that rebellions against authority during Qing Taiwan were due to the work of land censuses that were believed to be in preparation for raising taxes (Ka 1989).

Although deploying numerous heterogeneous actors all over the island, some information still relied on people's self-reports, particularly with regard to the investigation of fishponds. Fish were hidden from human sight—in the case of milkfish: they shunned humans—so their traces could hardly be seized. Therefore, information about what there was and how many were in a pond heavily relied on fish farmers' self-reports. In order to avoid tax, a Japanese aquaculture expert estimated, 30 to 40 percent of production was under-reported (Miyagami 1918). Thus, we may say that the 'agency' of fish farmers—by which I mean the capability to hide from colonial officials' sight—depended on the invisibility of fish. By hiding from human sight, information about the fish in ponds had to rely on fish farmers' self-reports. We can never overlook this self-reporting. What was recorded by investigators in the field would then be put onto forms, added up, combined, compiled, put on paper and delivered, and later became a series of statistical record books in the governor's office of Taiwan. Later, this data collection would become 'a reference point for future decisions' (Lien 2015, p.72) by the colonial government. In this way, what was once said in words became 'real'.

Any single period of census and investigation work involved weaving together previous outcomes of censuses and investigations. Previous numbers, maps and classifications became a point of reference for this period, and a census period was also a time to maintain reference links between representations (ranks on record) and reality (productivity in the field). This was how the ranking system for fields and ponds evolved from seven grades to nineteen. Moreover, a time of census and investigation could be more elaborate than the last time. For instance, the market prices of respective crops (fish, rice and others) were drawn into the work of land tax censuses as a standard, so that the revenue of each piece of land could be calculated, compared and used to address the 'bias' of self-reports from fish farmers (Bureau of Finance of Taiwan Governor-General's Office [臺灣總督府財務局] 1920). This price information was also a simplification of multiple prices in different periods and marketplaces, but this simplification was to assist in the comparability and ranking of different land.

The work of registering, measuring, classifying and taxing had several overarching effects. First, different villages could be 'characterised by' (Didier 2007) their speciality of production, whether it was fish or crops. Second was the commensurability between different villages for the same crop production. Separate sites were also translated into an interconnected situation—under the heading of milkfish or rice farming. Then, probably, these crops produced by different villages might have formed 'sameness' as well, at least in the eyes of the colonial government. Third was the setting of reference points for 'productivity'. With long-term, traceable records, the colonial government could tell whether or not the production of a village in any year was better or worse than in another year, and what should be done so as to increase productivity. Fourth, by introducing the measure of market prices, different crops could be compared with each other, even if the objects for comparison were heterogeneous, e.g. fish and rice. For instance, a semi-official organisation, Chianan Irrigation Association, made a proposal for 'cultivation of the fishpond land of Beimen County' (Operation Division of Chianan Irrigation Association [嘉南大圳組合事業課] 1927); at that time, Beimen County included today's Xuejia and Beimen. This proposal compared the revenue and cost of milkfish farming with farming rice and drought-tolerant crops and concluded that land cultivation had a relative advantage over milkfish farming. In sum, the achievement of weaving together work of measuring, registering, classifying and taxing was that it made possible the comparison of *numerous kinds* on the same plain.

For instance, the original date of Table 4-1 below, is drawn from multiple volumes of the *Report on the Achievement of Correcting Taiwan Land Tax* (Bureau of Finance of Taiwan Governor-General's Office [臺灣總督府財務局] 1920). In this table, I can easily compare the land use of 'Xuejia' and 'Beimen' in the late 1910s. This table shows that 'Xuejia' had only one hectare of saltwater ponds, while 'Beimen' had 359. Conversely, 'Xuejia' had 347 hectares of paddy fields, while 'Beimen' had zero on record.

Table 4-1
The Land Use of Xuejia and Beimen in the Late 1910s

	Freshwater	Saltwater	Total pond area	Fields	Drought	Total field area
Xuejia	1,132	1	1,133	347	2,253	2,600
Beimen	1,041	359	1,400	-	1,100	1,100
Totals	2,173	360	2,533	347	3,353	3,700

1. Original data is drawn from *The Report of the Achievement Correcting Taiwan Land Tax* (Bureau of Finance of Taiwan Governor-General's Office [臺灣總督府財務局] 1920).
2. The measure of area is *Jia* [甲], (equal to the Dutch 'Akkar', approximately equivalent to hectare).

I put both Xuejia and Beimen in inverted commas because they were separate from the administrative Xuejia Bao and became respective administrative villages (*Zhuang*; [庄]) under a new administration, Beimen County (along with two other administrative villages) only after 1920's new administrative divisions. This comparison is still possible because 'Xuejia' in Table 4-1 is composed of natural villages in the purview of Xuejia Bao, located on the side of today's Xuejia (inland area), while 'Beimen' is on the side of today's Beimen (coastal region). Thus, we may conclude that the region closer to the shore had a greater area of saltwater ponds (Beimen), and conversely, the region farther from the shore had a greater area of cultivation (Xuejia). I am not suggesting that there was a natural tendency that determined the division of land use between Xuejia and

Beimem. Rather, this division was an effect of weaving together a number of land censuses, land tax censuses, self-reports and ground investigations.

Similarly, the administration that published reports on land tax censuses—Bureau of Finance of the Taiwan Governor-General's Office—was an effect of the same network of registering, measuring, classifying and taxing. In the first place, the colonial government knew very little about the land under their 'control'—probably, a lot of tax was avoided—but then it knew more about it and had better information with extension and expansion of the network of land censuses, land tax censuses and taxing.

4.4.2 Entrenching the Divide between Fishponds and Rice Fields

In the first section, earlier in this chapter, I quoted Tsuchimochi Takeo and others' (1926, p.39) words on the development of Xuejia in the 1920s. They mentioned that fishponds—we now know that most of them were freshwater ponds—were not as numerous as before, ever since the operation of irrigation canals in the mid-1920s. The irrigation canals were the Chianan Irrigation System [嘉南大圳], literally meaning an irrigation system for Chianan Plain in southern Taiwan (including today's Tainan, Chiayi and other prefectures), on which construction started in 1920, with completion in 1930. The water source for the irrigation system was drawn from the mountain area, and the system included a gigantic dam and numerous water-supply canals, sub-canals and sewage canals stretching for over 16,000 kilometres, all over Chianan Plain.

Before these canals operated, most of the land in Xuejia area was for drought-tolerant crops. Since the 1930s, the biggest difference for the whole of Beimen County (including Xuejia and Beimen areas) has been a gradual increase in the area of paddy fields and drought-fields. As Table 4-2 below reveals, the total area of cultivatable land for both kinds of fields increased. In Xuejia, it was not only the total area of arable land but especially the area of paddy fields that expanded. In Beimen, where no paddy fields existed before (Table 4-2), farmers started to engage in rice farming in 1933.

Table 4-2
Area of Cultivatable Land in Xuejia and Beimen between 1930 and 1940

Year	Field	Drought Field	Total	Field	Drought field	Total
1930	458.00	2818.79	3276.79	0.00	838.38	838.38
1933	2191.00	2945.77	5136.77	188.50	924.02	1112.52
1936	3434.33	1092.64	4526.97	543.72	816.20	1359.92
1938	3506.41	1062.27	4568.68	512.05	928.79	1440.84
1940	3498.61	1062.27	4560.88	509.77	943.25	1453.02

1. The census data are retrieved from a series of *Statistical Reports of Tainan State* (Tainan State Government [臺南州] 1942; Tainan State Government [臺南州] 1940; Tainan State Government [臺南州] 1938; Tainan State Government [臺南州] 1935; Tainan State Government [臺南州] 1932).
2. The measure of area is jia [甲], equal to akkar in Dutch, almost the same as hectare.

From Table 4-2, we also note that the area of arable land in both Beimen and Xuejia has seen no further increase since 1938. This standstill could be first because the coverage of the irrigation system was limited. Even in Xuejia (more inland than Beimen), villages located at the very ends of the irrigation system were still short of water (Cheng 1995). Accordingly, demands for the irrigation of paddy fields were huge and thus could not all be met at the same time. Thus, most fields required enforcing crop rotation between drought-tolerant crops, rice and fallow crops in a three-year cycle. In this way, the proportions of fields and drought-fields scarcely changed in both areas.

As far as fishponds are concerned, Table 4-3 below shows a downward tendency for the area of fishponds in the whole purview of Beimen County since 1930, when the irrigation system was put into use. Comparing saltwater ponds with freshwater in Table 4-3, saltwater ponds can be characterised by a small area with large yields and high productivity, while freshwater ponds cover a large area with small yields and low productivity.

Table 4-3

The Area and Yield of Ponds in whole Beimen County between 1930 and 1940

Year	Saltwater Ponds			Freshwater Ponds		
	Area	Yield	Productivity	Area	Yield	Productivity
1930	1,988.76	2,700,905	1,358	6,706.15	830,815	123
1933	2,054.63	3,699,837	1,801	4,565.50	862,583	188
1936	1,929.78	3,236,227	1,677	5,544.98	2,011,206	362
1938	1,758.73	3,242,225	1,844	2,235.68	1,443,888	646
1940	300.70	736,021	2,453	558.05	193,781	347
	8,032.60	13,615,215	1,695	19,610.36	5,342,273	272

1. The census data are retrieved from a series of *Statistical Reports of Tainan State* (Tainan State Government [臺南州] 1942; Tainan State Government [臺南州] 1940; Tainan State Government [臺南州] 1938; Tainan State Government [臺南州] 1935; Tainan State Government [臺南州] 1932).
2. Area is measured by Jia [甲] (almost equal to 'hectare').
3. Yield is measured by catty (600 grams per catty).
4. Productivity is measured by dividing yield over area.

The data in Table 4-3 published by Tainan State do not separate individual administrative villages like Beimen and Xuejia but include them in Beimen County. It is assured that there was a system of information layers called a 'hierarchy'. At the top, one could see all the simplified sums distilled from the bottom because, on the level of state government, there was no need to see things in great detail. At the bottom, one could be swamped by this level of detail. We know that the collection of data was undertaken by doing measurement work in the field and gathering personal self-reports, along with civil co-supervision systems (Ka 1989). Simplified sums could equal the 'reality', or the reference link between area, crops and yield could be maintained, and thus the top-bottom hierarchy hold together, only if measurement work did not go wrong, self-reports were reliable, and rebellions were pacified, and data were not deleted but purified.

The original date of Table 4-4 below is drawn from two census books published by Beimen County Office in 1936 and 1937. In these books, the fish and crop produce of Beimen, Xuejia and other two administrative villages are reported separately, and thus we can make a comparison of milkfish yields between Beimen and Xuejia. The former was located in a coastal region away from the irrigation system, while the latter was located inland and served by the irrigation system. This table indicates that there were no *freshwater milkfish* in Beimen, while there were no *saltwater milkfish* in Xuejia. What is intriguing is that, first, the dominant type of milkfish ponds—saltwater ponds—show no signs of any presence in Xuejia. Second, although milkfish are capable of tolerating a wide range of salinity and supposed to be able to cross the boundary between saltwater and freshwater fishponds, their presence was nevertheless concentrated in saltwater fishponds.

Table 4-4
The Annual Yield of milkfish in Beimen and Xuejia between 1935 and 1936

	Beimen		Xuejia	
	Saltwater	Freshwater	Saltwater	Freshwater
1935	179,000	2,550	-	200
1936	416,800	-	-	200

1. The data is drawn from *The Overview of Beimen County* (Beimen County Office [北門郡役所] 1936; Beimen County Office [北門郡役所] 1937).
2. Yield is measured by catty (600 grams per catty).

Consider of all the records mentioned above about Xuejia's early economic activities. First, early settlers aimed to improve marginal land and make it cultivable for rice and other crops. Even if there had been fish farming, it would have been done as a sideline, and the fishponds had to be freshwater so as to coordinate with crop farming. Secondly, there was a small proportion of milkfish in Xuejia, but they were from freshwater ponds. At that time, the majority of milkfish produce was from saltwater ponds which were few in Xuejia. Third, after full operation of the irrigation system, there was little chance that Xuejia would move towards saltwater milkfish farming. In particular, fourth, the price of Taiwan's rice produce in Japan was high enough for rice farmers to make a proper living from 1920 onwards (Ka 2003). In fact, the colonial government would have been more likely to advocate the conversion of fishponds to paddy fields—comparing revenue and profit between milkfish and rice to attract fish farmers—rather than the other way round (Yamamoto 1934; Operation Division of Chianan Irrigation Association [嘉南大圳組合事業課] 1927).

Figure 4-5, below, is drawn from a map of Taiwan made by the colonial government after 1930, it shows only a portion of Tainan. The literal caption ‘fish farms’ [養魚場] (underlined by me in yellow in Figure 4-5) was marked directly on the original map. These fish farms were distributed north-south and concentrated in coastal regions (Tseng 2012). The boundary line between Xuejia and Beimen and other areas in the west is marked by a red line. Though there were several ‘waters’ (marked in blue with irregular shapes on the original map) scattered over Xuejia, around them were fields and drought fields. From the original map, it is hard to tell what these waters were. But according to Table 4-4, above, they were unlikely to have been saltwater ponds. Comparing Table 4-4 and 4-1 earlier in this section, only one hectare of saltwater ponds in Xuejia disappeared from the official record.

Figure 4-5

Locations of Fish Farms in Tainan in 1932

The original map is 1932's *Map of 1/200,000 Empire: The Part of Taiwan* [二十萬分一帝國圖：臺灣部分], retrieved from the website of Centre for Geography Information System, RCHSS, Academia Sinica [中研院人文社會科學研究中心地理資訊科學研究專題中心] http://gissrv4.sinica.edu.tw/gis/twhgis.aspx#

This study suggests that the disappearance of saltwater fishponds was as a result of so-called 'network building' for paddy fields by weaving together land censuses, land tax censuses, ground investigations, irrigation canals, early settlers' livelihoods and Japan's domestic market. For the development of paddy fields or crop farming, the saltwater pond was a threat and needed to be contained to an extent. Under this circumstance, the association between milkfish farming and saltwater ponds (explained in the next section) may be seen as something that needed to be excluded. Consequently, the divide between the association of rice-crops-fields-freshwater ponds and that of milkfish-saltwater ponds was further entrenched.

4.5 **Shallow-water Farming in a Milkfish Assemblage**

The previous sections suggest that the place-making of Xuejia was a heterogeneous assemblage of early settlers, salty land, paddy fields, water, fish, water canals, all kinds of censuses for the colonial government and the rice market in Japan. Here I move the focus to consider another heterogeneous assemblage, milkfish. Milkfish are able to live in a wide range of salinities (euryhaline), from brine water to freshwater, and some freshwater ponds stocked milkfish along with other freshwater fish (Table 4-4). In its ‘natural’ state, the distribution of milkfish ponds should not have been so clear-cut as milkfish ponds on one side and the rest on the other side. However, if the reality presented itself as if there had been a single order, we may need to think of how it was constructed so that other ways of presence were made impossible.

According to post-war aquaculturalists’ calculations, the normal productivity of milkfish in Taiwan was about 2,000 kg/ha, 3,000 for the best and 1,500 for the worst. Compared to other countries’ milkfish production, like the Philippines and Indonesia where 600 kg/ha was a normal number (Ling 1977), the figure of 2,000 was already outstanding. Aquaculturalists attribute this ‘outstanding’ performance to the practice of shallow-water farming, used for centuries until the early 1980s (Interview, Ting-Lang Huang, 2015-0829). Shallow-water farming designated a set of practices for saltwater fishponds, including: keeping the depth of pond water below 40 cm so that sunlight could penetrate and reach pond bottoms to facilitate the growth of seaweed to be food for milkfish (Figure 4-6). This way of fish farming was not commonly seen elsewhere (Ling 1977; Lin 1968), even in countries like the Philippines and Indonesia with longer histories of milkfish farming, or China where there is the longest history of aquaculture (Bardach 2000).

Figure 4-6
Shallow Milkfish Ponds

The depth of the water is knee height. Source: Joint Commission on Rural Reconstruction [中國農村復興聯合委員會]. (1961) <Milkfish Ponds> [虱目魚池]. Retrieved from the National Culture Database of the Ministry of Culture [文化部國家文化資料庫]. Retrieved: 2 Dec. 2015.

Comparing the milkfish yields of saltwater ponds with freshwater ponds in Japanese controlled Taiwan, the yield of freshwater ponds (3,936 catty/ha, approximately 2,361 kg/ha) was far more than saltwater ponds (2,296 catty/ha, approximately 1,378 kg/ha) (Tainan State Government [臺南州] 1942). Despite this, the total area of freshwater milkfish ponds was minimal, only 200+ hectares, less than 4% of the milkfish pond area in Tainan State. However, if milkfish farming was more 'efficient' in freshwater ponds by standard of per unit of production area, how was milkfish farming mostly associated with saltwater ponds in the first place? The following sections will consider this question by looking into the socio-material assemblage of shallow-water milkfish farming.

4.5.1 Milkfish Farms: Layout

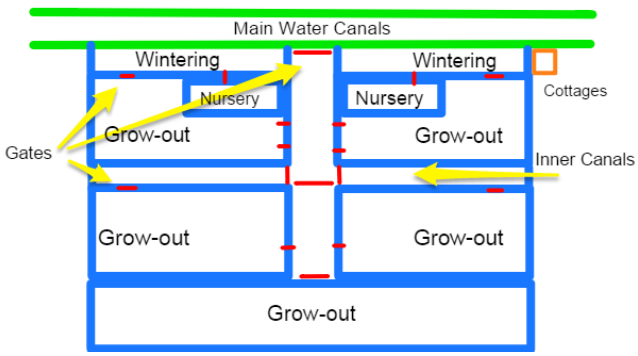
The distribution of milkfish ponds was concentrated in low-land areas only a few metres above sea level, within the range that seawater could reach inland at high tides, twice a day. Highway 17 (Figure 4-3) is seen as a tangible line that seawater could reach. Seawater flowed in and off fish farms through major water canals 12 to 15 metres wide (Lin

1968), which were invested in by fish farmers as communal property (Ding 1980, p.2274), and then the seawater flowed to individual fish farms through subsystems of water canals. But the availability of source water was also a threat to the sustainability of fish farms during high tides, storm rain, typhoons and any combination of these forces. Accordingly, dikes were built to separate seawater floods from seawater ponds (Figure 4-7). In the official records of Japan controlled Taiwan, a fee called 'dike fixing' was registered as a fixed cost of fish farms (Bureau of Finance of Taiwan Governor-General's Office [臺灣總督府財務局] 1920).

Figure 4-7
Outer Dikes

This photo was taken by the author of this study in Chigu, Tainan on 18 Aug. 2015. The dike is now a common infrastructure maintained by the government of Taiwan.

Figure 4-8
Layout of Shallow-water Milkfish Farm

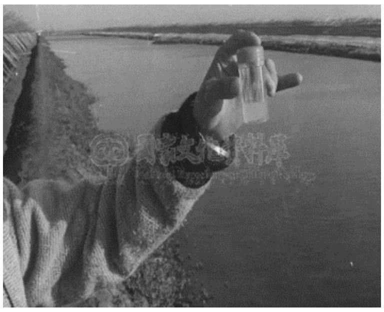


This sketch is adapted from Lin, Shu-Yen (1968).

The layout of milkfish farms can be sketched out, as shown in

Figure 4-8, above. When seawater passed the outer sluice gate that controlled the entry and exit of water through the main water canal (Figure 4-9), it was in the purview of a fish farm. Note here that I deliberatively distinguish the usage of ‘fish farms’ from ‘fishponds’. A milkfish farm was composed of fishponds of all sizes and shapes, with different functions. In Figure 4-8, there are five major fishponds within it, called ‘grow-out ponds’. Each one was about four hectares in area. This pond was where milkfish spent most of their time until harvesting. In the two grow-out ponds at the top of the same figure, there are two ‘nursery ponds’ in each one. These were where milkfish fry were first stocked to get used to their new environment. Between the ‘main water canals’ and the ‘nursery ponds’ are two ‘wintering ponds’ (Figure 4-10). With a water depth of over 1 metre, this pond was where immature milkfish spent ‘fatal’ winters. Fatal winters means a temperature below 10ºC, which is fatal to milkfish; and under 20ºC, their activity is already weakened. Such a depth was expected to retain heat in the lower layers of water. Above and adjacent to wintering ponds were arrays of bamboo braces to carry covers of hay or plastic sheets as shelter from the cold north wind.

Figure 4-9
Main Water Canals



A water canal is the backdrop to a bottle held in a hand. Photo taken by Ma, Shi-Ping [馬西屏], 26 Jan. 1986. <milkfish caught by the Red Spot Disease [虱目魚紅斑病重]>, The Central Daily [中央日報]. the National Culture Database of the Ministry of Culture [國家文化資料庫] Retrieved from: http://nrch.culture.tw/view.aspx?keyword=%E9%AD%9A%E5%A1%AD&s=2402724&id=0000746028&proj=MOC_IMD_001#. Retrieved: 22 Feb. 2016.

Figure 4-10
Wintering Ponds

Photo taken by Zi-min [子敏], Sept. 1979. <Milkfish Culture in Taiwan [盛夏炎炎虱目魚肥]>, Sinorama Magazine & Wordpedia.com [光華雜誌智慧藏]. Retrieved from http://140.109.8.58/sinorama/content/ChEnIm.asp?chptnumber=40908. Retrieved: 2 Dec. 2015.

The formation of milkfish farms and respective fishponds within them was the result of interweaving heterogeneous materials together in an attempt to keep milkfish live for as long as it took them to grow. The layout of milkfish farms had to take into account what milkfish and fish farmers needed, so as to ‘make a living’ for both. For instance, the cool wind in winter was strong and fatal, it could rip apart windproof shelters and cause the death of milkfish. The wind could not be fully mastered but it could be mediated with shelters at an angle. In this way, wintering ponds would not be directly affronted by the wind and windproof shelters could remain standing. Moreover, in order to moderate the turbulence caused by wind-generated waves, all fishponds were rectangular, with long sides in an east-west direction and short sides in a north-south direction, because the wind blows mainly came from the south in summer and from the north in winter (Figure 4-8). Wind-generated waves moving over ponds as large as four hectares could wash away mud-built embankments.

Besides, wintering and nursery ponds were a pair of facilities to ensure whole-year running for milkfish farming. Artificial breeding of milkfish on a commercial scale was fully achieved after the mid-1980s.[7] Before then, the supply of fish fry relied totally upon wild catches, and thus the level of supply and prices were highly volatile. Even if fish fry stocked in nursey ponds were not necessarily harvested in the same year, they could still be a source of fingerlings for the following year. They would be stocked along with other immature fingerlings in wintering ponds. For the purpose of rearing fish from fry to mature, this was why a milkfish farm had to include multiple functions of fishponds within it.

4.5.2 Life in Fishponds, Life 'on' Fish Farms

It is obvious that milkfish live in fishponds, but this does not mean that the fish are a mere result of the environment that fish farmers build for them. Here let us also consider the other effects that milkfish exerted on the ponds and the part they played in the shaping of milkfish assemblages for shallow-water farming.

As mentioned earlier, grow-out ponds had to maintain a depth of around 40 cm of water so that sunlight could penetrate; benthic algae (seaweed) grew, milkfish fed on the seaweed, and thus fish farmers could make a living. This metabolic interdependency was embodied in milkfish farms that were built by interweaving together heterogeneous materials. Grow-out ponds were around 4 hectares in area, mostly because there was a need to cultivate seaweed pasture with a thickness of 5 cm to provide food for 40,000 fingerlings across the 4 ha area. However, even this large area of seaweed was not sufficient for meeting the demand from milkfish to grow to the market size, and thus supplemental feed was required. According to Lin (1968), it was not

[7] Artificial breeding on a commercial scale was first achieved by a civil aquaculture expert, Lieh-Tang Lin [林烈堂], in 1983. But note that the cultivation of broodstock needed time, and the early broodstock took years to achieve sexual maturity and be able to spawn.

‘economically worthwhile’ for a grow-out pond to be smaller than 3 hectares, because the number of milkfish that it could be stocked with had a limit, due to the corresponding limit in area for seaweed pasture; otherwise, growth of the fish would have been restrained in competing for feed with each other. From Lin’s and other aquaculturalists’ calculations, the limit on milkfish production was also the limit on seaweed production during the period of shallow-water milkfish farming.

Therefore, the first and foremost concern was food for the milkfish. In order to cultivate abundant seaweed, fish farmers had to do pond preparation work during the fallow season, between December and early April. Pond preparation was pivotal to annual profit since if it was not done, supplemental feed such as rice bran and peanuts would have been required earlier, and thus raised the cost of milkfish production.

Pond preparation was a laborious process. First, after the harvest and draining grow-out ponds, the bottom soil of ponds would be dug over with simple tools such as hoes. Then, trolleys or oxcarts were used to level the pond bottoms to make them as flat as possible (Figure 4-11). An uneven pond bottom would hinder fish farmers watching over the depth of pond water. Besides, some raised areas would lose space for stocking fish, while low areas down would not let sunlight penetrate and thus hinder the growth of benthic algae. Second, dug-over bottoms were left to dry out under long sunlit days during the dry season in winter, until they cracked and became solid to the extent that ‘people could play football on top’ (interview, Ting-Lang Huang, 2015-0829). This drying out took two to three weeks. Then, manure (human and non-human) would be poured onto the bottoms, evenly spread, and filled with seawater to about 10 cm high until it evaporated. Both steps facilitated the decomposition of organisms and toxic materials and kept nutrients on the bottoms for benthic algae. It was also important to use pesticides or tea-seed cake to kill ‘forage fish fry’, which slipped into ponds along with the inlet of seawater and could ‘undermine’ benthic algae. As long as a bit of ‘green’ was seen on the bottoms, algae had attached and started growing. Third was refilling with seawater to just above the green bottoms and repeating the whole process until there was a pasture 5 cm thick of algal beds. Then, it would be time to stock with overwintered fingerlings.

Figure 4-11
Levelling Ponds

The photo was taken by Jiang, Yun-long [姜雲龍], 19 Sept. 1981. <Fish Farmers> [漁民], The Central Daily [中央日報]. National Culture Database of Ministry of Culture [文化部國家文化資料庫]. Retrieved from: http://nrch.culture.tw/view.aspx?keyword=%E9%AD%9A%E5%A1%AD&s=2402754&id=0000746058&proj=MOC_IMD_001# Retrieved: 22 Feb. 2016

Since the production of seaweed was critical to milkfish growth, every inch of the pond bottoms mattered. Fishpond embankments were mostly made of dirt and mud excavated from pond bottoms, so they could easily break apart. Therefore, the sides of the embankments adjacent to the inner canals had a slight gradient to avoid breaking up, while the other sides adjacent to fishponds were steeper to make more space to cultivate more seaweed. But this trade-off did not work out very well, especially during typhoons or storm rain. Fish farmers spent time repairing the embankments; otherwise, the whole network previously interweaved would have been wasted when the fish in stock slipped away from fish farms through water canals. At the end of strength contests with the brutal force of ‘nature’, it was usually the fish farmers conceded a slight gradient of embankments, which occupied space and restrained productivity.

At the age of 80, Toshi was a fish farmer born towards the end of Japanese rule of Taiwan. In our interview, he was proud of each of his innovations in milkfish farming (interview, Toshi, 2015-0910). Since 1969, Toshi had rebuilt the embankments with bricks. This innovation physically concreted the material setting of shallow fishponds. To a certain extent, brick-made embankments at a vertical angle to fishponds liberated the space around the edges of dirt-made embankments. Thus, his fishponds could last longer than others' and cultivate more seaweed and milkfish. But note that the durability of brick-made embankments came not from the 'physicality' of the brick itself but was enacted in a web of relations (Law 2010). No more did the whole embankment collapse from wind-blown waves, but it nevertheless broke apart bit by bit, and Toshi had 'hired hands' to deal with this problem. The brick-made embankments held as long as the hired hands held, and thus more space was emptied out for both benthic algae and milkfish.

In grow-out ponds, there were bamboo sticks in pond bottoms on which were measures so that fish farmers could check and calibrate the level of pond-water. A 40 cm depth of water was about the limit for sunlight to reach benthic algae on the bottoms. This depth had to be maintained during the growing season from April to November, so that milkfish's excretion could be broken down by sunlight and turned to nutrients for benthic algae. However, this metabolic relation may have been hijacked. For it was not only milkfish and benthic algae in ponds but also other species, invisible to the naked eye, that capitalised on the oxygen produced by photosynthesis by seaweed. These uninvited guests were phytoplankton and zooplankton. The former though produced oxygen but had no attachment to the bottoms, and thus floated on the water. They were not regarded as food for milkfish at that time, and their blossom would turn the clear water murky and block sunlight from reaching pond bottoms. The shade they created under the water surface also created an opportunity for zooplankton to grow on phytoplankton. Zooplankton was a 'pure' consumer of oxygen. By contrast, in other fishponds, the presence of plankton and zooplankton provided an ideal habitat where fish would feel 'safe' and feed, as an aquaculturalist suggests (interview, Ting-Lang Huang, 2015-0829). However, in shallow milkfish ponds, both species were regarded as inedible for milkfish, and more importantly, they were seen as a 'threat' to milkfish and fish farmers by being in 'metabolic competition' (Probyn 2012; Law & Mol 2008a) with milkfish in ponds.

Therefore, both the depth and clarity of pond water mattered. They had to be maintained for the benefit of milkfish and fish farmers. However, there was a dilemma in shallow-water farming. The limit on water depth restricted the number of fish that could be kept in stock due to the limit on water volume in shallow ponds. That is, living space in shallow water was an issue for those wanting to have more milkfish in stock.

Not long after taking over the business of milkfish farming from his father (in 1966 or '67), Toshi sometimes defied the rules of water depth and clarity behind his father's back.

> 'Back in the time under my father's charge, the depth of water had been kept under [Taiwanese] 1 feet 2 inches [metric 36 cm]. But since the second year I took over, I raised the pond-water up to about 1 feet 5 inches [45 cm] in depth so that I could stock up with more fish and harvest more produce. […]. There were iron sticks in pond bottoms; otherwise, how could you know the depth of pond water? My father occasionally stopped by, looked around and soon went back. Usually, I pulled up the whole stick a few inches from the pond bottom. From his angle, it was still [36 cm]. But I put more fertilizer

> [rice bran] into the ponds. […]. For example, in the same 4 ha of fishponds, the fish harvested there [another fish farm of his father's] was 3,000 catty [1,800 kg of market size fish (300g per fish)], while those harvested here were 5,000 catty [3,000 kg]' (interview, Toshi, 2015-0910).

This 9 cm difference in depth made a difference to milkfish production. That is, more fish reached market size in a given time, and more revenue was earned from a harvest. The productivity of a shallow fishpond was expanded under Toshi's manipulation. It seems to me that, in order to stock more fish and earn more, a milkfish farm(er) either had to have more fishponds at his disposal, or put more water in the ponds at the expense of water clarity and the cost of artificial feed. Toshi chose the latter.

However, Toshi's manipulation could be deadly to milkfish because of the risk of over-fertilisation along with deeper water and the loss of clarity. Fertilisation also meant plankton could flourish. In the daytime, it was fine, but, at night, fish farmers had to keep an eye on milkfish in grow-out ponds. At midnight, the fish quite often encountered a shortage of oxygen because all the species in the ponds, from milkfish to invisible others, were consuming oxygen and releasing carbon dioxide. Fish farmers usually stayed overnight in cottages on fish farms. Sometimes they would hear the sound of 'bubbling', signalling that the fish were putting their heads above the water, struggling for oxygen (Interview, Toshi, 2015-0910). If not immediately tackled, the fish could suffocate by dawn when the oxygen was almost used up and the sun had not yet risen. Sluice gates would be opened to let the fish out to inner water canals in which the water was still 'fresh'. Suffocation usually happened in summer when areas of low pressure (including typhoons) came over. It was said that oxygen leaked out of the water because of the low pressure outside the ponds.

Here we also notice the ‘back-up’ role that the sluice gates and water canals played in balancing the system inside and outside the fishpond. Inside the pond, fertility was maintained by the sluice gates for the benefit of the harvest. When this use of ‘over-fertilisation’ caused problems, water in the canal in which fresh seawater was stored would be drawn in to rectify the situation. Had there not been a clear divide between the ponds and inner water canals maintained by sluice gates, the lack of oxygen would have permeated the whole system, and there would not have been the premium of milkfish harvest. An aquaculturalist suggests that ‘there is an old saying that rearing fish cannot make money until [fish’s] heads [are] surfacing’ (interview, Min-Nam Lim, 2015-1019). Successful scientific and technical projects are usually ‘heterogeneous’ enough to draw on versatile resources and all kinds of difficulties and uncertainties. In this regard, there is no difference in milkfish farming.

However, the interlude of suffocation also suggests that shallow-water milkfish farming needed constant exchanges of fresh, oxygenated water. Even in a 4 ha pond the amount of water that a 40 cm depth of water could contain was limited; so was the amount of oxygen. Besides, the oxygen maker in the pond, algae, was the main food for milkfish. As soon as the milkfish grew big, the algae would be exhausted, and thus they suffered from suffocation more often. In this regard, milkfish depended on algae to live and grow, but they also put their own lives at stake because of this dependency. Therefore, there was still a limit to Toshi’s ‘innovation’. If fish farmers wanted to have far better performance in milkfish production, they had to acquire more fishponds.

This complex relation between milkfish and algae also shaped the way in which fingerlings should be stocked and how the harvest should be conducted. To protect algal beds from being exhausted too soon, milkfish farmers stocked fingerlings of different sizes at the same time, harvested marketable fish multiple times, and replenished fingerlings many times a year. We may understand this set of practices in terms of capital and the interest on a bank account (Ling 1977). Pond preparation during the fallow season was about building a fund of annual capital which, it was hoped, would not be exhausted until the end of the year. As long as there was still capital in the bank, there would be interest generated. So it was with an algal bed. The later was it exhausted, the less was the cost of artificial feed. Therefore, having different sizes of fingerlings would keep the algal bed healthy longer than the same number of fingerlings of the same size. This was because, putatively, small fish ate correspondingly small amounts of algae, and there would be more capital left to generate interest. When the big fish reached market size, they would soon be harvested. Simultaneously, previously small ones would become the big, and the ponds would be replenished with 'new' small fish.

In this section, I have drawn on both aquaculturalists' and fish farmers' accounts of the practices of shallow-water milkfish farming. However, both sets of accounts tend to be so rational that both humans (fish farmers and aquaculturalists) and non-humans (milkfish, benthic algae and others) have a machine-like accuracy. The fish farmers controlled the sluice gates and prepared the ponds for the forthcoming growing seasons. The milkfish ate a fixed proportion of feed according to their body weight, around 5 per cent, regardless of their 'stomach' or other characteristics; the algae grew according to natural resilience. If there was anything unexpected, there were mitigation measures. Even if it was also acknowledged that there were differences within humans and non-humans, respectively, these differences can be counted as deviations from the norm that do not affect the whole picture. For fish farmers, a yearly 20 per cent loss was an acceptable deviation (Fishery Research Institute of Taiwan Province [臺灣省水產試驗所] 1956).

By figuring non-human entities as containable, what I notice from this is that milkfish were thought of as something that could be organised according to humans' intent. Specifically, the 'timescapes' (Bestor 2001) or 'temporal detachment and attachment' (Lien 2015) of milkfish production were separated from those of milkfish growth, which was little known at that time, and redistributed all over milkfish farms. For instance, when fish-fry had just arrived, they had to stay in nursery ponds for a few days to weeks to alleviate the environmental shock. Similarly, the fingerlings in wintering ponds were not those that were small in age but in size. In grow-out ponds, first-year fingerlings could be captured with gill nets with a fixed mesh size earlier than in the second year, just because they had reached market size. What was (im)mature was the size, not the age. Also, what milkfish ate, what they needed and what difficulties they might encounter were included in the practice of shallow-water farming and then distributed across a fully functional and well-managed fish farm. In other words, different timescapes were first *detached* from events or a series of events and then rearranged into the shape of, or *reattached* to the practices and techniques of, milkfish farming. In other words, the division of a temporal frame was embodied in spatial organisation. In this way, milkfish production became so 'manageable' that fish farming in the field had to catch up with it.

Note that even if I use concepts like timescapes and temporal frames for milkfish production, this does not mean that they were entirely artificial and had nothing to do with milkfish in the 'real' world. What I emphasise is that, by distributing or being distributed themselves at different times, these multiple timescapes had substantial effects on organising the practices and techniques of milkfish farming, even though they were in themselves the products of milkfish farming.

4.5.3 Work of Deletion and Purification

I use the concepts of timescapes and temporal attachment/ detachment to describe shallow-water milkfish farming in an effort to separate milkfish farming into multiple temporal units and reconnect them together. To clarify, timescapes have ‘actor-network’ characteristics. Each timescape, say stocking with fingerlings for instance, is a representative of a heterogeneous network consisting of algal beds, fingerlings, wintering ponds, grow-out ponds, water and so on. The formation of a single timescape depends on the hybridization, translation and mediation of heterogeneous materials into a coherent network. Paradoxically, the singularity of each timescape comes into shape by ‘purifying’ or ‘deleting’ traces of being hybrid. What if the moving of stocking fingerlings had involved endless questions about when to stock, when to harvest, who does the stocking and so on? Stocking with fingerlings becomes a difficult decision implicating with a chain of effects. Technical and retrospective accounts tend to generate well-coordinated accounts because they delete and purify those difficult considerations. Here I want to reconsider the uncertainties that have been deleted and purified into a series of timescapes of practices and techniques.

Toshi was not only a fish farmer. He was also a chairperson of a joint-stock company for milkfish farming. Most of the laborious work from pond preparation to overnight watching did not bother him. A 20 hectare fish farm required five to six people to maintain it. At Toshi’s disposal were four fish farms with over one hundred hectares in total, including one of around 40 ha. Each fish farm had a different account book and different stockholders, and thus profits were also shared separately. The chairperson was the one at the top of these joint fish farms. Joint stock companies for milkfish farming had existed since at least Qing’s Taiwan (1684-1895), based on civil contracts left behind (Taiwan Historica of Academia Historica [國史館臺灣文獻館] 1994). This way of organising milkfish farming was ordinary until milkfish deep-water farming in the late 1970s. A common characteristic of those joint-stock companies was that the area of fishponds at their disposal was huge. One hundred hectares in total was common, and those over 200 ha were not few. In my fieldwork, I met another ex-chairperson in Dugia village [篤加], where milkfish farms amounted to around 500 ha under the same kinship's joint-stock company (interview, Hideo, 2015-0904).

The chairperson had to make two critical decisions with regard to milkfish yields at the end of a production year. First was to decide when to draw seawater into ponds as the cultivation of algal beds was coming to the end. In technical terms, the purpose of pond preparation was to keep nutrients on the ground for the growth of benthic algae. Fish farmers would gradually increase the depth of water to ensure that most of the nutrients could be used by varieties of benthic algae that attached to the ground, rather than floating plankton. The chairperson made decisions about the speed of filling ponds with water. In order to make such decisions, the chairperson had to forecast the weather. The official weather forecast was not as accurate as it is today (interview, Ting-Lang Huang, 2015-0829). Sometimes, storm rain suddenly came and raised the water level over an afternoon. Then, benthic algae withered away and plankton flourished. The procedures of pond preparation had to be repeated, and the production plan thus fell behind schedule.

Secondly, another critical decision was the time to stock with wintered fingerlings. The regular stocking time was mid- or late April when the temperature rose and the weather became stable. After the successful cultivation of algal beds, fish farmers would count fingerlings so as to divide them into different grow-out ponds, and then shepherd the wintered fingerlings through inner water canals to their destination. However, cold fronts could still come in April. If that happened, the fingerlings in shallow ponds might freeze to death, and algal beds might shrink. Wintered fingerlings that were estimated to make up 30 per cent of annual stocks could be destroyed in one day;

then the cost of production would be raised and the whole production plan would fall behind. The inter-connection between multiple timescapes thus depended on neatly addressing the entanglements and uncertainties within each timescape. An aquaculturalist indicated that the chairperson had to be able to forecast weather two weeks ahead (interview, Ting-Lang Huang, 2015-0829). This ability might be why the chairperson was rewarded with 50 per cent of the net earnings of fish farms.

I am not suggesting that the chairperson actually had the capability to make accurate weather forecasts. Rather, their 'ability to forecast the weather' was a result of purification. They were the ones whose weather forecasts with regard to algal beds and stocking fingerlings would be followed and acted upon. Others might forecast as well, but only the chairperson's forecast counted, and he shouldered the responsibility for the annual performance of fish farms. Whether it was accurate or not, it was the only forecast that would be followed. Hence the chairperson became the only one who was recognised as having the ability to forecast the weather. While someone forecasted the weather, it was others who followed that made the ability to forecast the weather real.

So, were milkfish and saltwater ponds a result of purification? Technically, the milkfish shallow pond was subsumed under the 'saltwater pond'. But, in fact, the salinity of these ponds changed all the time. Diluted by afternoon storm rain, the salinity dropped so low that algae suitable for a saltwater environment withered, while it became far saltier than seawater (33–35 parts per thousand (PPT)) after two days of evaporation since the water volume in shallow ponds was small; in this latter condition, algae withered, milkfish would become lethargic and any small wound in such a salty environment could be deadly. Fish farmers had to adjust the salinity by controlling sluice gates, these were in two pieces, made of waterproof wood at the top and the bottom. When the salinity rose, the bottom gate would be raised to let 'saltwater out because saltwater was ‘heavy’ (high density)’, and vice versa, the top gate would be raised to let ‘freshwater’ out (interview, Toshi, 2015-0910). So, was the clarity of pond water an effect of purification? Still water would only get murky, which was not good for shallow-water farming. Ponds had to be drained and refilled from time to time. As a result, the saltwater, shallow pond needed much effort to maintain it.

The life and growth of milkfish in ponds were also an effect of purification. Aquaculturalists worked hard to identify the main ingredients of algal beds and were dedicated to figuring out ways to improve their productivity under the given circumstance of saltwater, shallow ponds (Tasato 1926; Chen 1976; Chen 1951; Chen 1971; Lin 1966). In a series of milkfish aquaculture studies, milkfish were described as herbivorous and thus fed on algae and not plankton; therefore, the key to increase the productivity of milkfish was effective fertilisation. In this way, what was cultivable in saltwater, shallow ponds—salt-tolerant algae—became what milkfish ‘really’ fed on. Any species that might have threatened the growth of algal beds, and thus the production of milkfish, such as pests, wild fish and crab, had to be eradicated by pesticides and isolated from fish farms by nets placed in sluice gates; and fish farmers would have to deal with those slipping through the nets. So, were the characteristics of milkfish purified? They swam over the ponds as groups of fish and did not bother fish farmers. Neither would fish farmers bother the fish. One said ‘they [milkfish] escaped once they had “seen” humans 50 metres away!’ (interview, Mose Liu, 2015-1205). As a result of a series of purification steps, milkfish became herbivorous fish, fed on seaweed composed of blue-green algae etc., and suitable for rearing in a saltwater environment. Aquaculturalists along with fish farmers singled out this version of reality and strengthened its realness.

Was it that milkfish grew in an environment arranged by humans? Not exactly. Not many farmed aquatic species could live in such a severe environment that typified shallow-water farming: no shelter because of the concern with water clarity, volatile salinity, and scorching water due to the shallow water level. Under these circumstances, what milkfish showed was remarkable *tolerance*. By materialising the timescapes of milkfish production on fish farms, milkfish farming was indeed a unique landscape on the coastline of southwest Taiwan, along with the expansion of this version of milkfish farming and fish farms; at best, 12,000 hectares of saltwater, shallow milkfish ponds lasted a long time all over this region (interview, Ting-Lang Huang, 2015-0829). It may be correct to say that this unique landscape was a result of humans utilising marginal land by adapting to this difficult environment. However, we can never deny that it was also the adaptability of milkfish to the difficult environment that humans singled out and arranged for them. When ponds were built and stocked with fish, which grew and were harvested, as witnessed by aquaculturalists and official records, the relation between milkfish and saltwater, shallow-water farming became self-evident.

4.6 Incompatibility between Shallow-water Farming and Xuejia

In this final section, I want to consider the 'compatibility' between Xuejia and shallow-water milkfish farming, as we know that milkfish can be reared in both saltwater and freshwater environments.

Operating milkfish farming as a joint-stock company was mostly because shallow-water farming required vast tracts of land to cultivate algal beds, but at the same time excluded potential intervention by many landowners in the operation. Toshi said that 'management belonged to management, while owners had no right to come and intervene in any affairs' (interview, Toshi, 2015-1108). If every landowner had had their own weather forecast, there would have been as many, separate milkfish farms as there were weather forecasts. The separation of ownership and management was an effect of the social-material assemblage of shallow-water farming. This separation would not be affected by property inheritance or division. More importantly, this separation was partly driven by milkfish because they ‘required’ such a large area to live and grow, and this requirement was spoken about and embodied by fish farmers.

Shallow-water farming required a large area of land and a stable source of water. In some parts of Xuejia on the riverside (there were three rivers crossing Xuejia), the source of water might not be an issue if there were water storage ponds in use, which cost extra land though. Despite this, however, setting aside a large area of land for milkfish farming might be an issue in Xuejia. Place-making of Xuejia was entwined with crop fields (paddy fields especially) and family property division. It would be difficult to steer Xuejia in another direction. This incompatibility between Xuejia and shallow-water milkfish farming also suggests that the heterogeneous association of milkfish shallow pond farming may be good for temporal duration but face difficulty with spatial expansion, if increases in the production yield were a matter of concern.

Chapter 5
Milkfish Adapting to Deep-water Ponds

In Chapter 4, I explored how Xuejia was excluded from milkfish farming in the past. In this chapter, I aim to explore how it was included in milkfish farming—how the two parallel paths cross each other. Here, 'Xuejia' is a representative of other places where cultivable land has been converted into fishponds for milkfish farming. In order to explore this conversion, I will take a technical turn to the invention and application of milkfish deep-pond farming, a set of practices and techniques different from the previous shallow water. We also go back to a time when deep-water farming was unimaginable, when it was *Technique X,* which was expected to increase the milkfish yield per unit of area beyond the best number of 3,000 kg/ha.

The reason why deep-water farming deserves attention is that it essentially changed the way of milkfish farming, reshaped what milkfish are and what milkfish farming is like, and it has far-reaching effects on what problems are encountered today. Milkfish are now fed with pelleted feed—note that milkfish 'fed on' algae before, while milkfish 'get fed' now—and raised in small-area ponds of 3 to 4 metres depth. The components of deep-water farming fell into place in the mid-1970s. By the mid-1990s, deep-water farming of milkfish had virtually supplanted shallow-water farming. We can recall that Xuejia erected a statue to milkfish in attempt to represent this hometown in the late 1990s (Chapter 4). This chapter will focus on how the various components of deep-water farming came together, reshaped 'milkfish farming' and led to a series of unforeseen consequences.

Also, I will name the effects brought about by the widespread use of deep-water milkfish farming, including an enormous increase in annual production, the landward movement of milkfish farming and the coastward movement of freshwater ponds as well, de-organising and re-organising joint-stock companies, the rise of small milkfish farmers, and the changed standard for qualified milkfish. But there is a limitation on this chapter though, which is that it pays little attention to the development of artificial breeding of milkfish. By detaching from the natural supply of fish fry, artificial breeding has no less importance than deep-water farming. I set it aside here because this technique has a similar effect to deep-water practices and techniques on the *subdivision* of milkfish farming. Fingerlings and adult-fish farming were undertaken on the same fish farm, while now they are separate. This difference results from the de-organisation of former milkfish farms. Accordingly, I will target deep-water farming that contributes to this de-organisation

Let us pose the essential questions of this chapter as follows: how is the singularity of milkfish reshaped whilst deep-water farming appears, and how does this changed singularity 'reshape' a given milkfish assemblage? I will argue that although the set of practices and techniques of deep-water farming consolidate different sites and conditions by giving previous milkfish farming techniques a common set of language, like feed conversion rate (FCR), to connect each other, this achievement is partly the result of fluidification, by which I mean the same set of practices and techniques being adapted to different locations and conditions, and further changes to 'deep-water farming'.

5.1 Targeting Production per Unit of Area

Increasing the yield per unit area was a dominant thought in post-war Taiwan. Fish was regarded as a source of animal protein to meet the demand from the growing population in 'the third world'. As a major food-fish in South Asia, it was expected that breakthroughs in aquaculture studies of milkfish could be expanded to other food fish and feed this growing population (Chen 1976; Hsuch 2013). A more mundane reason for caring about the yield per unit area for Taiwan was that the cultivable land was limited, let alone making a space for fishponds. In particular, increasing the yield of milkfish would require vast tracts of land, which could otherwise have been used for other fish or crops. Under these circumstances, Taiwan's aquaculture sourced overseas funding bodies to support the development of aquaculture studies, one of the funding sources was the Rockefeller Foundation. Part of the funding was distributed to the study of milkfish carried out by today's Tainan Branch of the Taiwan Fisheries Research Institute (TFRI), which was called the Fisheries Research Institute of Taiwan Province back then, initiated since colonial Japan. In this section, I am going to review a series of studies aimed at increasing the milkfish yield per unit of production area, a series of studies which were carried out between 1962 and 1964.

5.1.1 Chemical Fertilisers

The first and foremost object of experiments was chemical fertilisers. As has been revealed, milkfish yield largely depended on the growth of algal beds, which were both the oxygen maker and food for milkfish. At TFRI Tainan, in 1962, a one-year-long experiment was set up to compare the fertilised effect of chemical compounds versus organic fertilisers (rice bran and peanuts) (Tang & Huang 1966). The experiment comprised four rounds of fertilisation on three groups of fishponds. An experimental group was fertilised with urea fertiliser (chemical compound), another group with ammonium sulphate (chemical compound) and a control group was with rice bran and peanuts (organic fertiliser). The results showed that the two experimental groups generally performed better than the control group. However, a fishpond in the control group produced more than most fishponds in the experimental group, even though it was only fertilised twice among the supposed four rounds.

In another experiment in 1964, an experiment was run to compare the effect of fertilisation between chemical compounds and manure (Tang & Huang 1966). There was a total of five ponds in this experiment, of which four were fertilised with a chemical and one with manure. It was found out that three of the four with the chemical grew more algae than the one with manure. However, the only one fertilised with manure still grew more algae than one pond with the chemical. Why the chemically fertilised one did not flourish while others did was an issue. Moreover, the devisers of this experiment also noted that the ponds fertilised with the chemical saw benthic algae grow explosively in a short period of time, but it could not last over 10 days, while the fertility of the pond with manure remained steady and lasted longer. This 'explosion' may not have suited fish farmers' needs because they did not want the food for fish withering by itself and thus contaminating the water. Neither did it suit the fish's putative foraging and living behaviour. They could not feed on algae in the short term and store energy as they went along. Rather, they exhausted their energy quickly by living in saltwater ponds where the fish needed to expend part of their energy on balancing the high pressure of the high-density saltwater and the low pressure inside their body. Besides, the fish also needed algae to produce oxygen.

Apart from unstable productivity with chemical fertilisers, the 'laboratory' itself where the experiments were carried out was an unstable entity. The experimental fishponds were in an outdoor environment so as to imitate milkfish farming in the field as closely as possible. However, according to aquaculturalist' reports, the experimental fishponds were interrupted occasionally, like 'real' fish farms, so that the experiments too were breached, which was unlike fish farms in the field. For the fish farms, there was no such thing as breaching experiments; a loss was a loss. In 1963, an experiment on the effects of different artificial feeds on milkfish yields was about to check its results (Tang & Huang 1966). Note here that artificial feed was expected to be eaten directly by the fish or became organic fertiliser as it dropped to pond bottoms. By the time of the harvest, however, a pond harvested 247 fish more than stock records showed, while other ponds each lost 20 per cent or more. It was said that the excess fish came from other ponds, caused by fish jumping over embankments. For some unknown reason, they gathered in the same pond rather than being distributed over several. Moreover, another experiment with the same purpose used a fishpond three hectares larger, separated into four small plots by bamboo braces with small holes to 'control' the condition of the pond water by interchanging it between the four plots. However, eventually, the milkfish still broke through the bamboo braces, mixed with each other, and thus distorted the results.

Another experiment was conducted when TFRI Tainan had just moved to its present site in Chigu, Tainan, it was designed to determine the most efficient treatment with organic fertilisers on the growth of algal beds and milkfish (Lai et al. 1976). This time, over 36 hectares of fishponds were mobilised and arranged as 13 fishponds to be treated with different proportions of organic fertilisers. However, the experiment's results were largely affected by a series of disasters, including: stormy rain in May and June that breached the algal beds though they were reinvigorated in July, a typhoon striking in mid-August, and another typhoon striking in mid-September. Due to a series of damaging episodes, the growth of algal beds was stunted and expenditure on artificial feeds could not be avoided. Moreover, the pouring rain accompanying the typhoons raised the pond level over the embankments of each pond, and thus the experiment 'object', the milkfish, in different fishponds with different treatments, blended together. It was uncertain whether the fish remained in their original experimental settings.

5.1.2 Experiment and Production

There were more experiments with chemical fertilisers on fishponds than those listed above. Aquaculturalists knew that they had to convince people outside the laboratory of effect of fertilisers by experiment. They could have carried out the same experiment in an indoor, or on a controllable, scale like small tanks, and obtain experimental results showing a significant increase in algae yield. However, even if that was the case, with this scale of experiment it would have been hard to convince anyone, especially fish farmers. An aquaculturalist, Shu-Yen Lin (1968, p.39), concluded that the effect of fertilisers on ‘saltwater milkfish shallow ponds’ was in fact equivocal after 14 years of experiments since 1953. These ‘failed’ experiments make the ‘agency’ of non-humans noticeable.

Aquaculturalists attempted to enrol new elements, ‘chemical fertilisers’, into a given assemblage of fish farmers, milkfish, water, soil and algae. However, on the one hand, these ‘elements’ in the field were in a variable order of relations, and sometimes when this order was ‘out of order’, it would be tended to in the way of milkfish farming rather than as an experiment. For instance, pond water would be changed or fish in stock would be moved to another pond for a while if problems arose. On the other hand, if aquaculture experiments tried to deal with this variable order as fish farmers did, the experiment would not have been considered an experiment.

Therefore, an aquaculture ‘laboratory’ may not have strength relative to regular fish farms at a certain point. For fish farmers, that the fish blended between different fishponds would not be counted as a problem as long as the fish were still in the fish farmers’ ponds. However, that would be a problem for aquaculturalists when they tried to sort out the effects of fertilisers. Aquaculturalists’ experiments on milkfish farming did not offer any advantages over fish farmers’ production practices, if both acted on the same plane, under the same conditions. The major problem for aquaculturalists was when they tried to place *points of reference* (Latour 1999b) in the 'laboratory in the field', so as to trace forwards and backwards an order of relations that they were looking for. But the points of reference that were once in place were either erased by the brutal force of 'nature' or breached by the supposed passive 'objects'—milkfish and others in the ponds not on the list of aquaculturalists' experiments.

Ironically, it was the resemblance between laboratory ponds and those in the field that became a burden to aquaculture studies that aimed to figure out a single order of relations between those heterogeneous materials and thus upgrade the productivity per unit of area. It seems that aquaculturalists faced a dilemma. Either experiments could have been done in an indoor greenhouse, and thus they could have located the '(in)effect' of chemical fertilisers earlier. But in this way, aquaculture experiments became an aquaculture science and could lose the interest of fish farmers whom the aquaculturalists were supposed to 'serve'. Or, aquaculturalists could start the experiments again, because the previous experiments were not 'failed' but 'compromised', until all others lost interest in this technique. Although the aquaculturalist, Shu-Yen Lin (1968, p.40), conservatively said that more experiments would be required to confirm the 'inefficacy' of chemical fertilisers, he also mentioned that milkfish farmers had given up using chemical fertilisers and reverted to manure.

With regard to the relation between experiments and production, aquaculturalists and fish farmers, it can be suggested that there was a divide between them. Because aquaculturalists cared about the equivalence of experiments with production—with regard to the application of this technique to the 'real' world after the experiments—they placed their laboratory and carried out their experiments directly in the wild, and thus these had no relative strength compared to others in the same situation. The aquaculturalist Shu-Yen Lin (1970) summarised that the experiments with chemical fertilisers had not obtained satisfying results, and he wondered if the level of 2,000 to 2,500 kg/ha of milkfish was the peak of productivity. He then 'unrealistically' imagined the possibility that productivity per unit of area could be upgraded by deepening the water level and delivering artificial feed at any cost. Even this idea, mundane today, would be counted as wild at that time.

5.2 Seawater or Freshwater Version of Deep-water Farming

The current literature on the development of Taiwan's milkfish aquaculture suggests that deep-water milkfish farming was initiated by an ordinary fish farmer, Mr. Huang (Hsuch & Tseng 2006; Hsuch 2010; Huang 1981). Some of my interviewees can still describe the location of Mr. Huang's fishponds back in the early 1980s. As I dig into this history more deeply, however, it is questionable whether to treat Mr. Huang as an initiator of deep-water milkfish farming. In fact, even if the initiator was not Mr. Huang, that does not mean that there must be one initiator of deep-water farming. In this section, I am going to trace the process of the formation of milkfish deep-water farming.

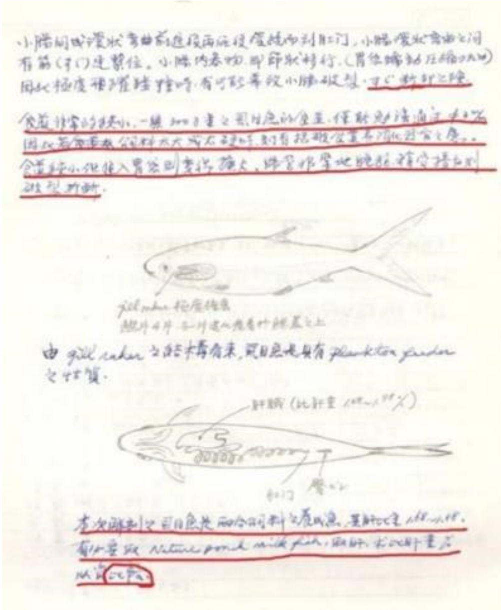
5.2.1 Pelleted Fishmeal

Mose Liu was an employee of the research division of Taiwan's biggest aquatic feed company back in 1972. At the company, Mose first acquired knowledge about aquaculture and eel-farming from experts in Japan. Liu recalled that when he saw Japanese eel-farming could yield over ten tons per hectare, he wondered if this whole set of eel-farming technology could be introduced to milkfish and shrimp farming as well. However, at that time, there were few people who gave credence to this idea. When Mose first mentioned it to the chairperson of milkfish farms, they replied, 'Kid, do you have a fever? As milkfish see humans from 50 metres away, they would flee. Unless they are "head emerging" you won't be able to get close to milkfish at all' (email, Mose Liu, 2015-1205). Although it is doubtful that milkfish in shallow ponds can actually see humans from 50 metres away, there is no doubt that fish farmers avoided crossing their paths in shallow ponds. Even today, shining a headlight on the water's surface will still be cursed by fish farmers who believe this can ruin the fish's appetite. Fish farmers would only intervene when fish's life (an asset) were in danger, such as instances of suffocation. In other words, in the milkfish assemblage of shallow-water farming, fish were fish, while humans were humans, and they seldom crossed each other's paths.

At the start of studying milkfish feed, Mose drew on Japanese carp as a reference model for milkfish, in that both were recognised as 'pro-herbivorous' and Japanese carp already had nutrition formulations and manufacturing techniques for pelleted feed. A Japanese carp expert, Dr. Aoe, was invited to Mose's company as a visiting consultant. However, Dr. Aoe's was pessimistic about the future of milkfish pelleted feed. In a note on the anatomy of a single milkfish sketched by Dr. Aoe, it illustrates that milkfish's oesophagus was too narrow and fragile to hold pelleted feed (Figure 5-1). Milkfish's intestines could have broken apart when they jumped over the surface of the water or bumped into each other, both of which commonly happened during harvest. Because milkfish's guts were treated as a food ingredient, and people also believed that undigested food could spoil the flavour of the fish, milkfish would be agitated to prompt them to evacuate themselves before harvest.

Figure 5-1

Note on the Anatomy of Milkfish



Dr. Aoe's manuscript on the milkfish he dissected. Provided by Mose (email, Mose, 2015-1205).

Despite Dr. Aoe's suggestions, Mose treated milkfish in another way. In his own anatomy of another fish, its intestines in his hands were still 'beating', even though the fish had died 30 minutes previously (interview, Mose, 2015-1207). This 'activity'—causal agency in terms of Bloor (1999)—suggested to Mose that, far from being fragile, the digestive organs of milkfish might be strong enough to accommodate pelleted feed. Mose figured that, as long as raw ingredients for pelleted feed could be ground up in advance, this would decrease the chance of the intestine being fractured by it.

In making milkfish pelleted feed, there was one more thing to consider, this was the water environment where the milkfish lived or were reared. Although milkfish are tolerant of a wide range of salinity, water salinity still has visceral effects on them. The body system of milkfish adapts to local salinity by regulating its osmotic concentration. Like the human body, fish contain 70 per cent of water inside body cells, and they lose and regain water through their environment. In a freshwater environment, milkfish gain water by absorbing it through their gills and absorb salts from the food they take in. By contrast, in saltwater, milkfish gain water by absorbing saltwater and excreting salt, and the food they feed on, such as algae, also contains freshwater for them to supplement their water level (interview, Min-Nan Lim, 2015-1019). That is to say that milkfish living in *saltwater* expend energy on regulating internal fluids and the environment. This extra expense would restrict the efficiency of feed conversion into flesh.

But note that the so-called extra expense of energy or less efficiency was an effect of another technical construction—feed conversion rate (FCR). FCR can be formulated as follows:

$$\mathrm{FCR} = \frac{\text{Fishmeal Consumption (kg)}}{\text{Weight Gain (kg)}}$$

The smaller the FCR number was, the more efficient the fishmeal was; the lower the number was, the better the fishmeal was. For an aquatic feed company, seawater was an unwelcoming interference because farmed fish would expend ‘extra’ energy on excreting salt—a waste of what they had eaten. Under this circumstance, how could they on the one hand claim their product had high quality, while the FCR performance was compromised by saltwater?

The extra expenditure of energy could be solved in two ways. First was to supply semi-moist feed to milkfish. Generally, the moisture of fishmeal was kept low to facilitate its preservation and storage (today’s milkfish feed has less than 11% of water content). However, it would require a set of facilities such as cold storage equipment to keep semi-moist fishmeal from decaying, or fish farmers would not be able to keep many packages in stock. Second, a much cheaper way was to *stock milkfish in a freshwater* or diluted saltwater environment. Mose Liu recalled:

‘I never carried out experiments on pelleted feed in those

> ponds over 30 ppt [33-35 ppt is the salinity of seawater] because I clearly knew that, if we promoted the milkfish feed, it must be used in deep ponds, the salinity of which would be best kept between 10 and 15 ppt. Under this circumstance, the taste of milkfish would be best, and growth would be very fast.' (interview, Mose Liu, 2015-1207)

Accordingly, the salinity of pond water was involved in formulating milkfish feed although, technically, it is not in the formula of the feed. Mose carried out experiments mainly on two sites (Figure 5-2). One was at his feed company in an inland area where livestock farming and agriculture were present. The water source was thus freshwater. The other site was near a reservoir, and the water source was thus freshwater as well. That is to say that, when formulated fishmeal was conceived and used in early experiments, it was freshwater, or more precisely, brackish water, being perceived as pond water compatible with the use of formulated feed pellets. As Mose indicated, 'over 20 [parts per thousand], we would not recommend. We would not suggest using pond water so salty' (interview, Mose Liu, 2015-1207). A feeding manual for milkfish—published after 1986—provided by Mose states that 'milkfish fishmeal formula is targeted at deep-water (freshwater) milkfish farming'.

Figure 5-2
Experiment Sites for Milkfish Pelleted Feed

The photos are provided by Mose (email, 2015-1205). The left is the pond in water reservoir, and the right is in his feed company.

Perhaps this concern with diluted saltwater also led the way in the early unfolding of a business network. When launching milkfish formulated feed onto the market in 1977, the majority of his customers were concentrated in southern Chiayi (to the north of Tainan) and northern Kaohsiung (to the south of Tainan) (email, Mose Liu, 2016-0426). As the 'hometown of milkfish', the Tainan area was 'stubborn' about saltwater, shallow-water farming and only ranked third in this conversion trend. Northern Kaohsiung was where the fishponds of the legendary fish farmer, Mr. Huang, were also located, and he was indeed one of Mose's early customers (interview, Mose, 2015-1207).

5.2.2 Seawater Experiment on Milkfish Pelleted Feed

Mose skipped experiments with formulated fishmeal in saltwater ponds. In his explanation, deep ponds would have little chance of having salinity over 30 ppt because of the massiveness of pond water (interview, Mose Liu, 2015-1207). However, this is not what most fish farmers experienced. A simple way to explain this is that freshwater tends to be at a higher level of water and thus relatively easier to evaporate than high-density of saltwater in the deep layers. The Tainan branch of the Taiwan Fisheries Research Institute ran a project aiming to fill this gap in knowledge and practice. The Tainan branch aimed to experiment with the use and efficiency of pelleted feed in a saltwater environment, shortly after success in the civil sector. At that time, the Tainan branch had moved to the shore of Chigu, where there was an abundant, fresh seawater supply and numerous milkfish farms in the vicinity.

The research team was led by Dr Lim, who had not yet obtained his PhD. The fishmeal at the Tainan branch was made with traditional organic fertilisers, i.e. rice bran, peanuts and added wheat flour to glue them together after being ground up. The experiments on deep-water farming were conducted with 0.8 hectare ponds—small enough to be manageable—in which the water depth was kept around 60 cm—just enough to increase the mass of water and block sunlight penetrating and be observable as well. However, it was repeatedly mentioned that milkfish under cultivation showed no appetite for fishmeal. According to Dr Lim, though milkfish took the feed, they soon spat it out; not until the feed got wet would they swallow it (Interview, Min-Nan Lim, 2015-1019). Thus, he concluded that engaging in seawater deep-water milkfish farming required a sort of semi-moist feed. In our interview, Dr Lim spent time enlightening me on the requirements of food for fish:

> ‘From the perspective of nutrition, [all species in] the whole food chain are absorbing water that occupies the most important 70%. So, dry feed has no water, only including 10 and more percentage […]. The dryer and harder it is, the less water it contains. It [milkfish] lives in high salinity water. What it [milkfish] needs is freshwater. It has to regulate osmotic concentration at the cost of energy consumption. So, if the intake of freshwater is not enough, it will not grow quickly. Seaweed contains over 70% of freshwater […] This observation took some time. After I threw the feed into water, it was hardly consumed; they hardly ate! In fishponds of high salinity, as long as there is other edible food, pelleted feed is not tempting enough for the fish to eat due to its dryness.’ (interview, Min-Nan Lim, 2015-1019).

From Lim’s point of view, the reason why the Tainan branch’s project did not achieve outstanding results was due to the saltwater being pond water. His supervisor, Dr Ting, added that 'the water here had high salinity, the concentration was over 40 to 50 thousand, so the feed conversion rate performed badly.' (Interview, Yun-Yuan Ting, 2015-1112). Despite this, Dr Lim also admitted that ‘there is no solid evidence’ (interview, Min-Nan Lim, 2015-1019) proving that milkfish did not eat due to the dryness of pelleted feed. He took another sea creature as an example—a sea turtle that he used to study in central America—to convince me that sea creatures will not bite dry feed unless there is no choice.

In a manual on deep-water farming published by the Taiwan Fisheries Research Institute, it is advised that raising *milkfish in saltwater ponds* requires a special set of feed-making machines that can manufacture *semi-moist feed*. Feed containing 30% of water was what TFRI Tainan recommended which could make a fivefold difference to the weight gain of milkfish compared to dry feed. Moreover, the feeding machine would require improvement so as to deliver ‘moist feed’. Otherwise, the feed would get stuck in the pipes of feeding machines, or it would have to be delivered manually. From this, we can see that TFRI Tainan was seeing deep-water milkfish farming as another assemblage of a set of techniques that did not yet exist or been put into use.

Instead of inventing a series of new devices to produce moist fishmeal for Mose’s company, an easy solution to raise the feed conversion rate was to suggest that fish farmers working with saltwater ponds replace pond water with freshwater or dilute the salinity, whether sourcing from rainfall, rivers, irrigation canals or digging 100 metres down into the ground. But beforehand, there would be work to do so that fish farmers could be convinced that milkfish could *be fed* instead of them feeding by themselves.

5.2.3 Displaying the Future of Milkfish Farming

Mose had a third experimental site of fishponds, which was on the virtual boundary between saltwater and freshwater fish ponds, right next to Highway 17, adjacent to Dujia village in the Chigu area of Tainan where 500 hectares of milkfish shallow ponds were nearby. This site was rented and particularly suited for displaying the whole system of deep-water farming to chairpersons of joint-stock companies of shallow-water farming nearby. The pond only occupied 0.2 hectares in area, and the pond water was kept to about 1.2 to 1.5 metre in depth. It was equipped with two paddlewheel aerators and one feeding machine. This experimental pond was stocked with 10,000 overwintered fingerlings of 18 to 21 cm in length, and the water source was freshwater. It was deliberatively set up to make a comparison with shallow ponds. One-fifth of the shallow-water area had the same number of milkfish in stock.

The set-up was a crucial step for a display. Mose did not move facilities and fish directly from other experimental sites to this one. Rather, he had done lots of preparation work beforehand. In order to have freshwater, he paid for a well tens of metres deep so as to tap into underground freshwater. More importantly, he had to ensure that the fingerlings in stock would bite when the chairpersons arrived. On the one hand, the fingerlings would have been unaccustomed to this new environment. They might show no signs of appetite for a few days. Mose needed to exclude this possibility. On the other hand, fingerlings would not innately know what the feed was, and when and or how to ingest it. An aquaculturalist, who cooperated with Mose on the milkfish pelleted feed said that milkfish's habit to seek and eat the feed was acquired by cultivation (interview, Jim, 2015-1011). Initially, the feed could be dropped bit by bit, manually, at fixed locations over time, or the feed could be delivered by feeding machines with small output with a cracking sound from a machine. The fish would eventually learn to eat it.

About one week after the fingerlings had been pacified in the ponds, Mose invited chairpersons in this area to come and witness 'how crazy milkfish are about rushing to bite the feed without fear of humans at short distance' (email, Mose, 2015-1205). The milkfish got hooked as much as the chairpersons, they asked 'how could it be possible?' (email, Mose, 2015-1205). This time, Mose indeed proved himself.

Milkfish 'really' took the bait, regardless of humans' presence nearby.

What was displayed was a whole system for the 'future' of milkfish farming, though the future was shown on a small scale, in which the key element of fishponds—pond water—had been supplanted or, in ANT terms, translated as a betrayal (Latour 1983; Law 2009; Law & Hassard 1999; Law 2003c). The separation between fish famers and milkfish was now changed and interconnected by the mediation of these two machines. The cultivation of algal beds was turned into the replenishment of containers for feeding machines, and the exchange of pond water to refresh oxygen and maintain water quality became ensuring aerators keep going. Laborious pond preparation could be cut out. And the characteristics of milkfish changed. It was shy but no longer inaccessible.

More important was the change of pond water. When Mose was marketing his product derived from laboratory ponds—milkfish pelleted feed—to fish farmers, it was not only the feed but a particular set of conditions—freshwater being the pond water—that were promoted to fish farmers alongside it. From this 'translation', an experimental situation was turned into a necessary condition in the field. It was only with low salinity for pond water that fishmeal could act to put weight on the flesh of fish. It was only under this circumstance that Mose's customers' fish grew fast and big, while others grew slowly and stayed slim.

When I raised whether convincing fish farmers to convert to deep-water farming posed any difficulties, Mose Liu replied:

> 'Not at all, the profit was completely different. A traditional fishpond could yield one tonne more, but digging deep could give 15 tonnes or more, which was 10 times more. Fish farmers could do the maths by themselves. […]. As soon as they saw better profit, they turned to deep-water. (interview,

Mose Liu 2015-1207)

The profit now was almost tangible and calculable—the number of pelleted feed packs. Unlike before, the profit depended on the outcome of pond preparation work for the cultivation of algae—partly decided by 'unpredictable' weather. Thus, it was always hard to tell if this year's quantity of supplemental artificial feed would be the same as last year. Besides, Mose's boss told him that in the first year of milkfish reared at the display pond in Chigu, they sold for 2 New Taiwanese Dollars (1 GBP to 50 NT) more per catty (600 grams) at the biggest seafood market in Taipei. 'So, everyone soon followed and opted for deep-water farming alongside formulated feed' (Interview, 2015-1207).

Living in freshwater or low-salinity ponds, milkfish would have less physical pressure from the environment than saltwater ponds. They would be relatively fat-wealthy. Besides, if they got injured, wounds heal more easily than in saltwater ponds. Thus, their appearance would be 'beautiful' and 'outstanding' compared to others. In other words, their singularity was achieved by being like others but still different at the same time (Callon et al. 2002; Hébert 2010); the reference link between the milkfish in shallow water and in deep water was not and could not be cut. It was this *recognisable difference* that drew attention from the market (compared with *recognisable similarity* in Chapter 7). In one word, the bodily characteristics of deep-water farmed milkfish were different, and the market appreciated this change.

We may think of a divide between experiments and production in milkfish farming. In the last section, I suggest that a series of experiments on chemical fertilisers started with inclusion of the production field in the experiment setting but ended up with withdrawal of the experiment from production, and thus there was a divide between experiment and production. This time, however, experiments with pelleted feed started with a divide from production but ended up with the inclusion of an experiment in production. Here we notice that the feed experiment cared little about the inclusion of production in the field in the experiment, less than research staff at TFRI Tainan did. Rather, fish farmers (mostly chairpersons) were asked to convert their operations in accordance with experimental settings—freshwater, aerators, formulated feed and feeding machines—in the name of increasing production per unit of area, and revenue as well. Here, the translation work is not 'word for word' but 'one world for another world'. As long as the proposal for deep-water farming was adopted, the separation between experiment and production would not be great.

However, we come across a core issue of this study—consolidation and fluidification. Did fish farmers adopt the idea of deep-water farming by following and sticking to Mose's project, or did they revise it according to local circumstance and individual needs? This is also an issue with regard to the attribution of prime movers: how can one be considered a prime mover, while one's success largely depends on a mass of others? Therefore, in the next section, I am going to consider how deep-water farming was distributed among separate fish farms under different chairpersons' management, and to whom or what the achievement of this set of techniques and practices can be attributed.

5.3 **Distribution and Attribution of Deep-water Farming**

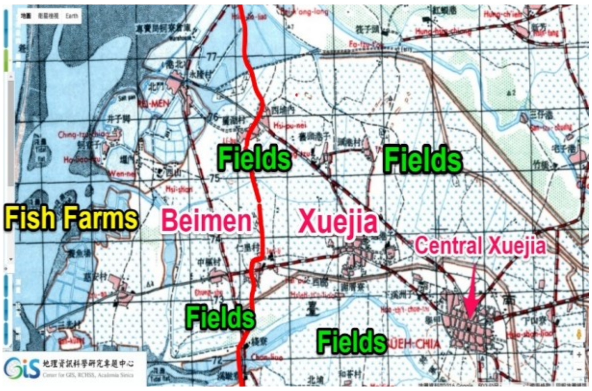
5.3.1 Emergence of 'Small' Fish Farmers

Part of the reason for the adoption of deep-water farming can be traced back to the government's policy on farmland in the first post-war period. The post-war government of Taiwan enforced a series of polices targeting land reform in the agricultural sector in the early 1950s, one of which was *land redistribution* through which peasant farmers could obtain small shares of cultivatable land they used to rent. At the same time, however, this policy did not cover land for 'fishponds' because their ‘management and economic value are different from farmland’ (Wang & Chang 1953, p.245). From this we can tell that the separation between farmland and fishponds was retained under different regulations. A direct and overarching consequence of land redistribution was the creation of numerous *small farmers*. One of my fish-farmer interviewees in Xuejia said their family had shares in farmland because of land reform policy, although now the farmland is now fishponds which have been divided into three parcels for three male family members.

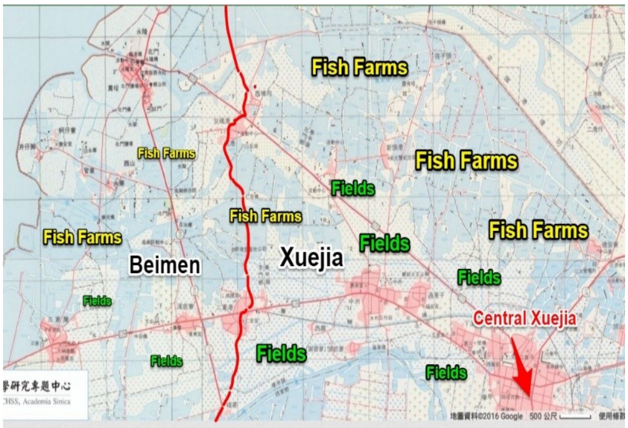
At that time, rice and other crops did not have the same ‘good’ price as it was in the Japanese period. As a result, vast tracts of rice fields were, unofficially, steered towards other cash crops after the mid-1960s (Lin 1984). One of those economic crops was farmed fish, and thus some farmland was converted to fishponds. Later, from 1975 onwards, the government legalised this conversion on certain conditions (Cheng 1995). Within a time limit, farmers could take relevant certificates to local farmers’ or fishermen’s associations affiliated to the government’s agricultural agency and change their occupational identity to ‘fish farmer’ and the registration of farmland to ‘fishponds’ (interview, Mr. Shi, 2015-0730). Compared with below, we can see a dramatic change in the landscape of fish farming from 1956 to 1985 across Xuejia (inland area on the right in both figures) and Beimen (coastal area on the left).

Figure 5-3

Land Use in Xuejia and Beimen in 1956 and 1985



Original map is the 1:50,000 map of Taiwan's terrain [臺灣五萬分一地形圖], retrieved from the website of Centre for Geography Information Systems, RCHSS, Academia Sinica [中研院人文社會科學研究中心地理資訊科學研究專題中心] http://gissrv4.sinica.edu.tw/gis/twhgis.aspx#



Original map is the 1:25,000 topographic map from the Council for Economic Planning and Development [二萬五千分一經建版地形圖], retrieved from the website of Centre for Geography Information Systems, RCHSS, Academia Sinica [中研院人文社會科學研究中心地理資訊科學研究專題中心] http://gissrv4.sinica.edu.tw/gis/twhgis.aspx#

Although the scale drawings in these two figures are different (the one on the top is 1:50,000 but on the bottom it is 1:25,000), crop fields were all over the northwest of the central area of Xuejia in 1956 (dotted region marked on the original map on the top in Figure 5-3), but the same area in 1985 had largely give way to fish farms (blue region on the original map of the figure on the bottom in Figure 5-3). In fact, from these two figures, not only Xuejia but also crop fields in Beimen in 1956 were invaded by fishponds.

These newly converted fish farmers had access to freshwater from water canals and irrigation systems, although the water supply was not all-year round, and each fishpond was small in area. Therefore, their fishponds were several metres deep in order to stock as many fish as possible, and what was stocked in ponds was mainly freshwater fish like carp and tilapia (*Wuguo* fish). For instance, Mr. Shi originally came back home to Xuejia for crop-farming in 1969. Not long after, the fields were adapted to fishponds and officially registered later, in 1978. The pond water was mainly drawn from nearby irrigation canals. What was reared was tilapia in the first place. Similarly, the farmwife of the Li family in Xuejia said that her father tried to raise some milkfish along with carp in the early 1970s, but the milkfish did not survive to harvest because, she figures, there were no aerators in the installation, although it could be that there was no oxygenated water for refreshment.

What I notice from all of the above is the emergence of *small fish farmers* (transformed from small crop farmers), encouraged by the access to freshwater drawn from irrigation canals. As a result, the boundary between farmland and fishponds becomes blurred once again. These fish farmers were described as ‘small’ only in the sense of a comparison with fish farmers involved in shallow-water milkfish farming at the time. These newly converted fishponds, by contrast, were not constrained by the contracts of joint-stock companies. Rather, the land was sufficiently large for further division into smaller parcels, and management could overlap with ownership.

5.3.2 Distribution of Single Attribution

The wide adoption of deep-water milkfish farming was partly contributed to by the emergence of small fish famers. As Mose notes, his early customers were concentrated in non-traditional sites for milkfish farming. Although his milkfish fishmeal appeared in 1977 and he arranged a display to impress chairpersons, it seemed that they did not immediately come to terms with deep-water farming (Table 5-1).

Table 5-1
Yield and Area of Saltwater and Freshwater Milkfish

Year	Saltwater		Freshwater		Total		
	Area (Ha)	Yield (Tonnes)	Area (Ha)	Yield (Tonnes)	Area	Yield	Price per kg (NTD)
1975	16,759	33,164	40	145	16,799	33,309	38.2
1976	16,515	26,651	43	201	16,558	26,852	42.24
1977	16,145	26,261	3	100	16,148	26,361	65.86
1978	15,566	29,858	20	292	15,586	30,150	59.40
1979	15,316	31,879	30	155	15,346	32,034	64.50
1980	15,441	18,883	35	298	15,476	19,181	90.34
1981	14,412	21,929	498	1,933	14,910	23,862	94.57
1982	14,563	24,616	651	6,104	15,214	30,720	67.83
1983	14,740	27,964	724	9,021	15,464	36,985	68.86
1984	13,986	23,344	747	7,259	14,733	30,603	58.22
1985	12,839	25,599	777	6,078	13,616	31,677	56.98
1986	10,223	21,949	701	5,658	10,923	27,607	57.18
1987	6,959	19,476	1,352	9,351	8,310	28,827	54.42
1988	5,728	23,161	1,813	16,511	7,541	39,672	49.13
1989	6,650	12,581	2,757	8,481	9,407	21,062	47.27
1990	8,989	75,244	3,856	15,429	12,845	90,673	31.04
1991	8,772	27,106	3,796	14,126	12,568	41,232	34.16
1992	9,341	15,580	3,163	9,534	12,504	25,114	58.29
1993	7,568	16,844	3,113	28,669	10,681	45,513	42.15
1994	8,193	26,188	3,062	40,590	11,255	66,778	43.84

Data Source: *Fishery Yearbook of Taiwan* (1978–1995) (Fisheries Agency of Council of Agriculture [行政院農委會漁業署] n.d.)

Table 5-1 shows that in 1977 when Mose's fishmeal first appeared on the market, the freshwater pond area was less than 3 ha, decreasing from 40+ hectares two years previously. There was more than a tenfold increase in the area of freshwater milkfish ponds in 1981. Although there was a gradual decrease in the total area of milkfish ponds after 1983, the yield did not decrease correspondingly. For instance, in 1987, the total area was 2,000 ha less than the previous year, but the yield showed 1,000+ tons of increase. After 1993, freshwater milkfish occupied the main portion of milkfish in the market, although the pond area was less than half of saltwater ponds. It is noteworthy that the annual yield in 1990 came to an apex—over 90,000 tonnes (I will return to a discussion of this table in the next section). We can also see that the price per kg in 1975 was 38.2, which was a good price for fish farmers, while that in 1991 was 34.16 NTD (1 GBP: 50 NTD)—4 NTD less—which was disadvantageous to them.

Mose sent me an email that included some pages from his notebook about a speech on milkfish aquaculture given by a famous aquaculturalist, Ting-Lang Huang (email, Mose, 2016-0427). His notes show that he envisaged marketing fishmeal targeting shallow-water farming. He wrote that there was a possibility that fishmeal could be brought into use when the growth of algal beds was interfered with by high salinity of pond water due to strong evaporation. The date of the speech was January 1981, five years after the appearance of fishmeal on the market. In other words, he did not imagine that fishmeal could dominate the world of milkfish farming, and he was considering how to coexist with existing shallow-water farming.

The fishmeal formula may be critical for milkfish farming detached from the cultivation of large algal beds, but it could not by itself 'realise' deep-water farming in freshwater fishponds where there was no constant supply of 'fresh' water. Even though there were groundwater wells, the water drawn from these wells was still short of oxygen and needed time to be oxygenated (placed still and exposed to the air). Therefore, if milkfish farmed in freshwater ponds aimed to compete with shallow-water milkfish, there had to be aerators installed. When eel-farming was initially developed with the help of post-war Japan in the 1960s, the single paddlewheel aerator was introduced. However, this version of aerators was designed for shallow-water eel farming, and when they were used in deep fishponds, it looked like they were only scratching the water surface (email, Mose Liu, 2015-1205). In this regard, a mechanic who had had no connection with aquaculture before, Mr. Guo, was drawn into improving the mechanism of the original aerator so that it could provide oxygen to relatively deep layers, and this improved version of aerators went into mass production along with their application in deep-water milkfish farming.

With the installation of aerators, rather than the number of milkfish stocked in a small area, deep water ponds could be compared to large area, shallow ponds. As mentioned earlier, fishponds in Xuejia converted from farmland via land redistribution were fragmented and small. However, this pond area weakness could be resolved as long as the mass of water via increased depth could make up for a lack of pond width. However, if the difficulty with oxygenating water in these ‘closed-systems’ could not be resolved, deeper layers of water would have been impractical for stocking fish; what happened to the milkfish in Mrs. Li’s father’s ponds could recur at any time.

In my view, aerators, as much as formulated fishmeal, created a relation between previously unrelated sites and situations. Whatever the soil on pond bottoms and however accurate one’s own weather forecasts were, the amount of food for fish was detached from physical fishponds in the field. Also, whatever the sources of pond water were, it was pond water oxygenated by aerators. Whether fishponds were converted from farmland or had been involved in milkfish farming for centuries, they were the same as far as deep-water milkfish farming was concerned. Both aerators and pelleted feed along with feeding machines connected those different sites and situations by *adapting* to them. These non-human entities were far from picky; as long as there was electricity and basic human power in place, they would work. Ironically, it was via this adaptability that different sites and situations were consolidated into deep-water milkfish farming.

However, despite not being picky, fishmeal had its own ‘preference’. Freshwater was ‘better’ than saltwater ponds in terms of striving for a pond of fat-wealthy milkfish. Mose sent me a photo taken at his display fishponds, in which a milkfish was held in his hands (the left in Figure 5-4). It was not a ‘regular’ fish at that time compared with other fish from shallow ponds because of its size and appearance. A single fish of 600 grams was uncommon; at that time, 300 grams was the market size. Also, regular fish would not have a belly as big as this one. The skin of fish from saltwater would not be in as good a shape as this one. More importantly, this single fish was treated as a representative of pond fish, a pond which was 0.2 ha, approximately one-twentieth of a regular grow-out pond (4 ha). As Mose suggests, chairpersons could do the maths themselves, since their revenue depended upon production yields.

Figure 5-4
Deep-water and Shallow-water Farmed Milkfish

This photo was provided by Mose (email, 2015-1205). The actual date is unclear. It was taken when the pond of fish that Mose displayed to chairpersons nearby was harvested.

This photo was taken by Sugiyama Shozo [杉山虔三] (1940) ’Milkfish farmed in Anping’ [安平養殖的虱目魚]. Retrieved from: http://nrch.culture.tw/ Retrieved: 8 Sept. 2015

Therefore, in the cause of striving for a bumper harvest of this big, fat-wealthy version of milkfish, chairpersons subdivided their multi-functional ‘fish farms’ into separate deep-water fishponds (Figure 5-5). In practising deep-water farming, large area fishponds had no more relative strength than small fishponds, since milkfish had to gather together to get fed; it would be difficult to bring a pond of fish together and distribute feed among them evenly in a wide area. In this regard, big and small landlords were now on the same footing and competing with each other. Perhaps, big landlords were in a disadvantageous position due to the lack of freshwater sources and thus had to invest in deep wells to extract groundwater. Thus, other than the landward movement of milkfish farming to places like Xuejia, there was also a coastward movement (invisible to maps) of freshwater ponds to places where milkfish shallow ponds were dominant.

Figure 5-5
Subdivision of Shallow Milkfish Ponds in Dugia Village

These two photos were collected in Dugia Village Museum, Chigu, Tainan. The upper photo was taken in 1976 when milkfish farming was dominated by shallow-water farming, while the bottom one was taken in 2002 when big chunks of fishponds had been divided into numerous, small parcels.

To be clear, I am not suggesting that this new version of milkfish acted alone to convert fish farmers to deep-water farming. Rather, both humans and non-humans were enacted to 'act' in alignment with each other so that the wide adoption of deep-water farming was achieved, although this alignment could have fell apart at any time. In terms of ANT and material semiotics, whatever could make a difference to final results can be regarded as ‘actors’ (Law & Mol 2008b). The fingerlings stocked in ponds could have been reared as usual and harvested when they reached 300 grams in size (the photo on the right in Figure 5-5) regardless of the fat belly (the photo on the left in Figure 5-5). As well, the fish could have spat out the feed and shunned humans, and chairpersons could have rejected the possibility of pelleted feed. However, as long as the fish ingested feed pellet as if no human had been nearby, the relation between fish, fish farmers, and feed was ‘proved’ to be able to readjust and realign, and thus this ‘new relationship’ could be represented by the new version of fish in size and shape and spoken about by Mose. If Mose had only spoken about his own ideas for deep-water farming, he could have been defied by experienced chairpersons. As soon as the fish were involved in this discussion by ‘acting’, chairpersons would have to accept the possibility of feeding milkfish with pelleted feed.

However, as more and more actors joined the move towards deep-water farming, it could take on a different shape from what the original spokesperson—Mose—had thought of. First, because the fishmeal was formulated as nutrition comprising protein, fat, water, fibre and so on, other feed manufacturers (for pigs, cattle or fish) could easily enter the fishmeal market for milkfish. Thus, the potential market for milkfish formulated meal was largely in the hands of these ‘competitors’. Second, although Mose’s strategy targeted chairpersons, the widespread deep-water farming saw the demise of the institution of chairpersons (who spoke about the weather) and joint-stock companies (which separated management and ownership). When the harvest and growth of milkfish were disassociated from chairpersons’ weather forecasts and vast tracts of algal beds, small landlords became ‘actors’—which they were not before—who had their own opinions about milkfish production. That is, not only were shallow ponds dug deep and subdivided into small parcels, but the way of organising these fishponds changed.

If the connection between different sites and situations across inland and coastal fishponds was 'initiated' by Mose but finished in others' hands, could we designate either of them as the initiator of a series of changes? When we try to identify one entity as the initiator, such as the legendary fish farmer Mr. Huang, and Mose as well, we will come across other entities with which those putative initiators could not dispense. If the use of pelleted feed was not accompanied by aerators installed in ponds, the water would be contaminated by the leftover feed, and thus the fish in ponds would suffocate. Mr. Huang could neither have fishmeal to feed without Mose's invention, nor could he engage in fish farming without the transformation of the government's policy on farmland so that he could consolidate vast tracts of marginal land into fishponds. It may well be that this distributive agency of a single entity over multiple realms facilitated the dominant reality of deep-water milkfish farming and replaced centuries-long shallow-water farming.

5.4 Official Statistics and Fisheries Policy

Now let me turn to the gathering of the statistical data that this chapter refers to. Official data collection rarely dispenses with making fishery policy, to a similar extent as it was in the Japanese period. We have seen that the aquaculture study of milkfish started with a concern over the increase of production per unit of area. If there had been no data of milkfish production per hectare, they could not know what productivity could be called 'progressive'. According to Table 5-1, two tonnes per ha was at the best in the era of shallow-water farming, while 10 tonnes was not impossible for deep-water farming.

One difference between the post-war government of Taiwan and colonial Japan was the incentive for data collection. Currently, the government of Taiwan cares more about placing the sector of aquaculture under administrative measures, less about taxing fish.

Table 5-1 shows that milkfish production in 1990 was over 90,000 tonnes, and the annual average price of milkfish was at a historical low at 31.04 NTD (1 GBP is approximately 50 NTD) per kg. The impact on fish farmers' livelihoods and environment (land subsidence due to over-pumping of groundwater) was so huge that fish farmers, politicians and scholars called for government intervention. In 1999, the government of Taiwan framed a policy for dealing with the 'imbalance between milkfish production and consumption' [產銷失衡] (Taiwan Province Forestry Hall Government [臺灣省政府農林廳] 1999). The occasion for implementing this policy was when the market price was considered to be about to fall below 37 NTD, a price which was regarded as the bottom line, given the cost of deep-water milkfish farming.

Part of this policy was to carry out annual censuses of fish stocks. By re-inventorying the sector of aquaculture, considering how many and what kinds of fish were stocked in ponds, the fisheries agency of central government could make preparations for a plunge in the prices of farmed fish. For instance, the government could subsidy semi-official associations of fish farmers to buy those fish items.[8] The incentive for fish farmers to be placed under government administrative measures was a subsidy for loss from natural disasters like typhoons (initiation of the Act of Measures for the Rescue of Agricultural Natural Disasters [農業天然災害救助辦法] was in 1991). The reasoning was that only those fish and fish farmers who registered with government could qualify to apply for government subsidies, if there was an officially recognised disaster. Because the official standard to recognise natural disasters was rigid, until 2015 of my fieldwork, there was only one time that the natural disaster subsidy was triggered (interview, Wu, 2014-0506).

The annual census of stock numbers is done via both self-reports

[8] Nine kinds of fish are covered by this measure, including milkfish. However, this measure is criticized for worsening a given situation.

from fish farmers and field examination by hired inspectors. Before the end of May, fish farmers can come to the office of the local authority to report their stock levels and numbers this year. There are field inspectors at the office to help these fish farmers complete the paperwork. After this period of self-reporting, 5 per cent of the self-reported data will be sampled, and field inspectors will be sent to check the 'reality' in the field and compare it with self-reported 'facts'.

Cindy was an inspector in 2014 (field note, Cindy, 2014-0514). She had official, aerial photographs and maps of fishponds in her allotted district and a corresponding list of owners' names of them. After a field examination, she would go back to the office of her administrative district and type in the collected information into a fisheries registration system linked to the Central Fisheries Agency. In the sampled 5 per cent, if 90 per cent passed the verification check (inaccuracies would be corrected and resubmitted to the fishery registration system), then the facts reported by fish farmers would be considered accurate. If not, another 5 per cent would be sampled for another reality check until the accuracy was above 90 per cent. The whole inspection work would be completed by the end of November. A formal report would be published in the middle of the following year. Even if the report was published a year later, in fact, after fish farmers' self-reporting at the end of May, high-ranking officials at the Central Fisheries Agency could have an overall picture of fish stocks and harvest that year.

Published facts are what policymakers and fishery economists count on. Fishery economists suggested that when the area of milkfish ponds was under 10,000 ha and the production was below 60,000 tonnes a year, the market price of milkfish could hold at a point where fish farmers could earn a living (Kuo 2000; Chen & Huang 2000; Taiwan Province Forestry Hall Government [臺灣省政府農林廳] 1999). Other measures to counter the imbalance between production and consumption included, first, improvement in milkfish quality because deep-water farming diluted the salinity of pond water, which allowed the growth of some 'smelly' algae in ponds and gave a 'muddy taste' to milkfish. Second was expansion of the export market for milkfish (Taiwan Province Forestry Hall Government [臺灣省政府農林廳] 1999). It was hoped that the export market for milkfish could occupy at least 20 per cent of annual production (Kuo 2000).

One issue of the official statistics is that 'reality' tends to be simplified. The characteristics of fish farmers could have changed along with the shape of milkfish, although they were still registered as 'fish farmer' and 'milkfish' in official statistics. It was 'large' fish famers and 'small' fish back then, while it is 'small' fish farmers and 'large' fish nowadays. Although I agree that government's administrative measures need simplification and form a centre of circulation (Callon 1986b; Callon 1987; Law 1994; Latour 1987), we have to consider what is *excluded* from the *presence* of these numbers, which are supposed to represent the 'reality'. First, fishery statistics cannot be just a representation of the reality, even if their compilation is one year after a census. Didier (2007) questions the 'performativity of statistics' in U.S. agriculture and argues that statistics do not *perform* crop farming or create the 'object' that this knowledge aims to explore; rather, most production work is done before the implementation of statistics. However, we may not be able to dismiss the part of the 'state' from 'statistics'. What fishery statistics do in Taiwan does not target production work but the work of *managing production work*.

Secondly, the compilation of official statistics contributes to shaping a singular version of the reality of milkfish. By placing milkfish in fishponds scattered over a wide region in multiple conditions under a common category of milkfish, differences between these fish, circumstances and living conditions are reduced to a minimum: saltwater/ freshwater and monoculture/ polyculture. Besides, information about market prices is drawn from auction prices at fish markets, but the proportion of milkfish passing through fish markets is far lower than other fish items. Most milkfish enter the market through middle-buyers such as bulk buyers or shippers. In Chen and Huang's (2000) estimation, 52 per cent of milkfish is traded on site at fishponds and directly taken up by bulk buyers; only part of this portion goes to auction marts. In other words, the situation concerning an 'imbalance between production and consumption' for fish farmers could be worse or better. Moreover, price information for milkfish does not consider the seasonality of milkfish production. During peak seasons of production, fish farmers may encounter difficulties in retrieving their production cost, while during off seasons, that may not be a problem (see next chapter). One reason that leads to this seasonality is the practice of deep-water farming. Milkfish were stocked and harvested many times a year before, while they are now distributed to the market at about the same time because the fingerlings stocked in each fishpond are selected according to their size and grow to market size at the same time. Thus, a whole pond of fish must be harvested at once, and collectively, most fish farmers' milkfish appears on the market at the same time.

In sum, the homogeneity of milkfish (deep-water farmed) in size, shape, and time takes shape along with the formation of a homogeneous sector for milkfish farming (deep-water farming), both of which are presented in and reinforced by official statistics. Even if we do not say they are 'performed' by official fishery statistics, they take shape at the same pace as fishery statistics. However, a major problem with thinking about the collective of milkfish farming as a 'sector' is that we risk taking this collective as integral to the way that it should be and forget that it is an assemblage which can be assembled otherwise. Worse is that we may use one single measure to address all situations.

5.5 Unforeseen Consequences

Deep-water milkfish farming leads to a series of consequences for today's sector of milkfish farming. Some of them have been specified above, thus I will only summarise them in this final section.

First is the re-assemblage of milkfish farming. Just as the vast tracts of fish farms, chairpersons and joint-stock companies were an effect of milkfish shallow-water farming, subdivided fishponds, individuals and families holding fish-farms are an effect of deep-water farming. The former was associated with algal beds, seawater and unpredictable weather, the latter with fishmeal, freshwater and aerators. In both assemblages, milkfish were enacted differently. In the former, they were shy, away from humans, feeding independently and 'requesting' land for the growth of algal beds. In the latter, they were containable, docile, dependent on humans and requesting food with similar-size companions because it is now the whole pond of fish that is expected to be harvested at the same time. If stocked fingerlings have big differences in size, small ones could fail to compete for food with big companions.

Second, the expansion of milkfish farming took two forms. One was the landward movement of milkfish farming, by which the once clear-cut boundary between fishponds and farmland was blurred. The other was a more invisible coastward movement of freshwater ponds. Freshwater resources were drawn, collected, kept and redirected, and thus the given landscape of 'fish farms' in coastal regions was reshaped alongside the subdivision of fishponds. The expansion of deep-water milkfish farming may be understood as a result of the consolidation of multiple sites and situations into inter-related milkfish farming by the same socio-technical materials. However, the bits and pieces that created this inter-relatedness were, by and large, the result of adaptation into different sites and situations.

Third, although milkfish yields have greatly increased (Table 5-1), the demand side for milkfish has not increased correspondingly, though the number of fish farmers who actually engage in and earn a living from milkfish farming is increasing. A market price that was advantageous to fish farmers in the past may not be so today because of increases in production costs. Milkfish farmers' profit becomes marginal. Despite this, however, fish farmers rarely abandon it. In the next chapter, I will touch on how fish farmers deal with or live with this so-called 'low-price age' (Kuo 2000) of milkfish. Some fish farmers are dedicated to controlling production costs, while others attempt to identify and establish how their produce differs from others.

Chapter 6
Purification and Patchwork of the Milkfish Commodity

In the previous chapter, I mentioned several consequences brought about by the transformation of milkfish farming from shallow-water to deep-water farming. This chapter aims to explore how the milkfish assemblage works today. Milkfish farming today is far from being automated, though much work has been simplified. However, humans' judgement, milkfish's 'agency' and uncertainties are rarely absent from the scene of milkfish farming. This chapter turns to how these entities are interwoven, or attempts to make it interwoven, even across different sites and situations.

The first section deals with the assemblage of fish farmers and milkfish on fish farms. Milkfish farming is organised at the centre of feed intake, through which both humans are enacted to be fish farmers and non-humans to be milkfish. At the same time, the effects and efficiency of feeding are at the centre of fish farmers' concerns. The attention is drawn to a controversy about formulated fishmeal and describe how it came to a temporary stop. This section draws on concepts of simplification/ amplification to conceptualise this milkfish assemblage.

The second section will focus on the scene of harvesting, which I understand as extensive work of purification. The milkfish sold in markets are never directly 'from pond to table'. Rather, they go through this stage of purification so that milkfish can satisfy market requirements and reach marketplaces scattered over the region on time and, more importantly, when they are still 'fresh'. This section also pays attention to how fish farmers ack like an 'actor' that reflects upon their farming results, mainly feed-conversion rates and production costs. They can reflect on their own performance in fish-farming and decide how it can be improved because of the work of purification at the point of harvesting. Until this stage, fish farmers ‘own’ the fish and fishponds but know only part of what is going on underwater.

The third section examines how homogeneity of milkfish in terms of taste is achieved, even if they come from various ponds scattered over a vast region. This section engages in conversation with the concept of a bulk commodity, by which Lien (2015) characterises the industry of Norwegian salmon farming. Although milkfish tend to be treated as an undifferentiated product—as official statistics do for instance—I suggest that this undifferentiatedness is partly out of the concern with supply stability. In part, the characteristics of a bulk commodity are enacted, rather than an essence of nature. In fact, the homogeneity of milkfish in terms of taste has occasionally been challenged.

The final section concerns multiple modes of practising milkfish as a commodity. An actor can have more than one mode of practice in action. Sometimes, different modes are in conflict in one actor, while they can be in co-existence in the same actor at other times. Thus, some combinations of different players can be in cooperation with each, while others could move in different directions. Note that some are at odds with each other, like fish farmers and cold-storage exporters, not because they are contrary in their modes of practice but rather that they share the same concern with cost-control.

The purpose of this chapter is to argue that although a large amount of work is put into consolidating different milkfish to make them a singular, homogeneous commodity, this singularity and homogeneity are rarely achieved. A ‘bulk commodity’ should be the result of ‘purification’, but this purification is never solid enough to withstand tests on the homogeneity of milkfish. Under the same name of milkfish, there are different taste qualities, food qualities and multiple modes of practising milkfish as a commodity. It is within the patchwork of these differences that the milkfish assemblage takes shape.

6.1 Engaging Fish in Ponds

In this section, the focus will be on fish farms where practices of milkfish farming occur. On the one hand, I see the work of milkfish farming as one of network building by interweaving milkfish, fishponds, water, fish famers, pelleted feed and so on. Interwoven with these heterogeneous materials, milkfish become fish in ponds, while humans become fish farmers by ponds. On the other hand, I also notice that this work of network building is never fully achieved. There are uncertainties within it. Despite this, uncertainties do not mean that the network is bound to fall apart. Rather, they are found in a series of translation steps between simplification and amplification. Uncertainties can be put aside, as least for a while, so that 'networking' can go on.

6.1.1 Engaging the Appetite

Fish farmers who collaborated with me for this study are the Li family in Xuejia. The Li family included five members, and four of them (male) were heavily engaged in deep-water milkfish farming. In total, they owned six fish ponds that occupied five hectares or less. The salinity of pond water was about 2 to 3 particles per thousand (seawater is 33 to 35), since shallow underground water in this area contains salt. Although the main source of pond water was drawing from irrigation canals nearby, most of the time, pond water is simply interchanged between different ponds. For instance, when the fallow winter season comes, one or two ponds will have their water drawn out to go to the rest of the ponds. On the one hand, winter is a dry season, so pond water evaporates quickly and overwintered fish still in stock need deep water to avoid freezing. On the other hand, some ponds can take advantage of this dry season to turn the soil in pond bottoms and let it be exposed to sunlight.

As soon as the fallow season ends, in March, milkfish farmers will redistribute overwintered fingerlings—previously concentrated in a mother pool to facilitate looking after them—among different fishponds with the help of hired fish workers. These fish workers deploy a seine-net all over the pond and shepherd the fish into a funnel of nets, where they manually sort the fish out according to size. This process, called 'pond distribution', is also believed to activate milkfish's appetite for feed and help groups of fingerlings grow more evenly. Similar-size fish gathered in one pond have more equal chances to access feed; otherwise, the growth of big fish will be at the expense of small ones.

Despite the practice of pond distribution, however, a certain degree of mixed sizes cannot be precluded. Most fish farmers do not have enough ponds to stock fingerlings in numerous sizes; at this time, the range of sizes is still rough and wide. Moreover, in the process of pond distribution, it is unavoidable that some fingerlings will keep avoiding the fish workers' sights and hands because they are live and active, and what fish workers do is to preserve rather than lose their lives; hence no excess force will be exerted. Therefore, the fish that remain in 'mother ponds' are usually those most mixed in terms of size. As a result, as the fish in this pond are fed with the intended number of fishmeal packs, the size distribution will be widened.

With the arrival of the growing season, the fingerlings are interwoven into a growth arrangement involving feed, feeding machines and fish farmers, alongside pond water, aerators and other unnamed species in ponds. However, it is not uncommon that the fish in ponds have no appetite for a while at the beginning of the growing season. One afternoon, in early May 2014, a fish farmer came to check and replenish the containers of his feeding machines (field note, Mr. Drew, 2014-0510). By then, the appetite for feed should have increased as summer approached. He held a handful of pelleted feed and sprinkled it over the front of the pipes of the feeding machines where fish usually gather around for feed. This was to test or seduce them. Both testing and seducing have no difference here. If they show no sign of rushing to the feed, they have no stomach now, they 'just don't eat' (field note, Mr. Drew, 2014-0510). But the judgement on no appetite has to be carefully made. Fish farmers do not want starving fish, or the fish could feed on mud; also, an irregular diet would make it hard to determine the harvest schedule. Fish farmers anticipate harvest time according to the number of packs of fishmeal, so they inspect their ponds several times a day to check on the fish's appetite and the operation of aerators and to replenish feeding machines. If the fish have no appetite as the feeding machines keep running, the feed could deposit at the bottom and contaminate the water condition by dissolving.

The youngest son of the Lis has a trick to incite the fish to eat. It is to mess around near the fish with a long paddle. He said once that fish in the mother pool showed no appetite for days. He rowed a raft to the middle of the pond and stirred the water with a paddle. Messing around near the fish, 'it works', he said when we talked about a relative of theirs who had just faced the same situation of fish with no appetite. He said that fish that remain in the mother pond usually show little appetite, unlike others which have been moved to new environment. In his trick of messing around near fish, both the paddle and raft act as an interface that mediates (Latour 2005) the fish farmer on land and the fish in ponds. The fish are *enacted* to eat or they eat because of, from his point of view, what he does. A fish farmer who is responsible for the stock in ponds is also *enacted* by the fish that ingest feed.

The Li fish-farming brothers said every fish farmer has their own feeding techniques. In the morning, when daylight is full, they start the feeding machines with low output to test the fish's appetite. The feeding machines make loud and constant cracking sounds. Some say that the fish learn to search for feed by repeatedly hearing the sound in fixed time and come to gather around (interview, Chiou, 2014-0603). Then, the Li brothers increase the feed output as they see the fish gathering and eating. That the fish rush to feed is defined as normal; some of them move and even make the sound of splashing water when competing for food. The elder brother maintains full output for a short time and varies the output based on his observation of fish feeding. He wants to see the fish not only competing but *fighting* for food. Some milkfish under his watch and manipulation even spew water out. In other words, fish farmers are not observing as bystanders but rather engaging in what they observe. They are not separate from the object; rather, the more they engage with objects, the more objects are enacted so they can observe.

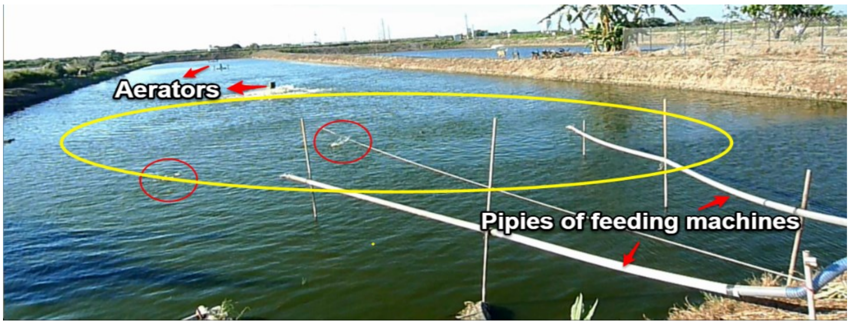
However, some situations are too ambiguous to make a straight judgement on fish's appetite. The behaviour of feed intake is not always easy to read. Usually, in the daytime, fish farmers stand by their feeding machines and watch fish taking in food (Figure 6-1). What they observe includes not only fish on the surface of the water but also those invisible under it.

Figure 6-1
Watching Fish under the Surface of Water

This photo was taken by the author of this study. The feeding machine is the silver container and two feed pipes stretch from it. My field note says that 'although the fish farmer said the feeding machine is running, I cannot see the feed on the surface of water and cannot see the fish ingesting the feed.' (field note, the Lis, 2014-0408).

In the middle of May, 2014 the water in one of the Li's ponds was regarded as not being in good condition from its colour, so the feed output was kept moderate, neither high nor low, because the fish showed no apparent desire to feed (Figure 6-2). The youngest son said, 'If you give too little feed, the fish will not take it in, for whatever reason I don't know' (field note, the Lis, 2014-0517). If the output is kept low, fish farmers are not able to make a straight observation of feed intake and a judgement of appetite. But the Lis did not venture to increase the output because the fish showed a hard-to-determine appetite for the feed; that is, the fish did ingest some feed, but not much. The father cursed that, 'Damn, how am I supposed to deliver [feed], if they eat like this whether I shift up or down?' (field note, the Lis, 2014-0517). If the fish do not show a great desire to feed as they are fed, fish farmers will not set their machines to full output, that would risk residue feed depositing. The youngest son said that, 'Saying that they don't rise up to eat is not correct because they do rise up. To see if there are fish [underwater to eat] is to see the currents, which are different [from the bounded area]' (field note, the Lis, 2014-0517). However, despite what they said, I was unable to tell the difference between currents caused by wind or fish. Judging from the manifestations of feed intake, the elder son even added, ‘I am wondering if there are indeed over 7,000 fish in the pond’ (field note, the Lis, 2014-0517). For the benefit of their growth and feed intake, similar sizes of fingerlings were placed together in the same pond. Despite this, they were not bound to act as a whole as fish farmers expected. There are some uncertainties in this heterogeneous relation; even the most tangible ‘fact’—the number of fingerlings—becomes murky.

Figure 6-2
Feeding Fish and Fish Feeding



The photo is taken by the author. The two small circles designate the significant traces of the fish grabbing the feed. The big circle designates the area where there is supposed to have a crowd of fish competing for the feed. This pond is supposed to have around 8,000 fish in ponds. The area of this pond is about 0.3 or 0.4 hectares.

On another occasion, a feed-company salesman said that fish farmers are far more circumspect than livestock farmers, because the objects they observe are unobservable in general (field note, salesman, 2014-0524). For fish farmers, fish that show their trails on the surface of water do not constitute the whole pond of fish. There is a hinterland of fish below the surface; whether they are eating or not is a matter of concern in relation to increasing or decreasing the feeding machine output, because what is observable is a limited proportion. Consequently, fish farmers have to use circumstantial signs or signals, such as currents, wind, water, and gestures to make observations of the fish below the surface, although those circumvent signs are easy to conflate.

What is above suggests that fish farmers' stewardship is not to treat the object under their watch as an 'object' separate from the 'subject'. Fish farmers' observations of the object are made by *engaging with* it, rather than separating from it. The more they engage, the more they know or believe they know about it. But this does not mean that the object under fish farmers' watch is under their control. Occasionally, the fish hide from fish farmers' sight, and from being sorted out and fed. Even the number of fish fingerlings in ponds, a fact that fish farmers are supposed to know, is not as certain as is supposed. If the fish do not act or react, the fish farmers can only know as deep as they can see into the pond, which is 10 to 30 cm below the water surface at most. In other words, fish farmers can only 'watch over' the object as much as they are reacted to by the object. Fish farmers' agency is *enacted*.

6.1.2 Fishmeal Matters

The salinity of fishponds is not a constant but changes alongside rainfall and the environment where ponds are located. For another fish farmer in Xuejia, Mr. Shi's ponds are near rivers so that water salinity is affected during high tides when seawater flows into fishponds. Their fishponds are mainly diluted by rain during the summer rainy season. Whatever freshwater sources fish farmers draw on, the purpose is to maintain a water environment wherein pelleted feed can be transformed into the flesh of milkfish in an efficient way in terms of feed-conversion rate (FCR).

In my fieldwork in 2014, the Li family kept warning, half-jokingly, the salesman from a feed company, the East Co., that 'if it turns out bad, unlike last year's 1.1, you'll be in trouble' (field note, the Lis, 2014-0427). According to some locals, the feed company had a bad name for the quality of their fishmeal; the quality of fishmeal meant for fish farmers directly affects FCR. The smaller the number of FCR, the better is the quality of fishmeal. However, although the consumption of fishmeal is calculable by counting the number of packs, the only moment when fish farmers can know exactly the weight of a pond of fish is after they have been harvested, i.e. when they are dead and weighed. So, the FCR number can only represent the past performance of a brand of fishmeal for a stock of milkfish. Despite this restriction, for fish farmers, past FCR is used more like a standard, looking ahead, that they are dedicated to keeping up with, or by which they evaluate the quality of fishmeal in use.

Secondly, the quality of fishmeal has effects on the appearance and shape of milkfish. The Li family had just converted to using the East company on a trial basis in 2013, since the salesman convinced them to give the company and himself as a young man one more chance. According to conversations between the Lis and the salesman (field note, the Lis, 2014-0427), the fishmeal company provided fishmeal with extra oil added for free. Later, it turned out that the FCR performance was good, bellies were swelling, and so the Li family even introduced this brand to their relatives and neighbours around Xuejia.[9] They asked the salesman, 'Is it the case that there are previously unknown customers this year?' (field note, the Lis, 2014-0427). The salesman replied in the affirmative. The Li family attributed that to the outcome of last year's fish, i.e. the beautiful shape of milkfish, which was passed on by a middle buyer who bought the Lis' fish.

Fishmeal is a big business, just one unit of fish farming like the Li family could generate sales of over one million NT dollars (approximately £20,000) per year. The pay to fish farmers from middle buyers will be clear a week after the harvest, while the pay to fishmeal company is only clear after the fish farmers have been paid off. Thus, it is not only fish farmers who are concerned with FCR performance but

[9] In fact, the salesman is also a distant blood-relative of the Lis, although they did not realise this until 2014.

also feed companies. For if fish farmers do not see a proper return on their fish, they will not be able to pay to the feed companies. Then, a chain of debt could be activated.

Thus, the salesman always showed uneasiness about the upcoming harvest outcome and FCR performance every time I accompanied him on visits to his customers during harvest; 'If anything goes wrong, they always blame the feed first' (field note, salesman, 2014-0524). The salesman said that Mr. and Mrs. Drew—both interviewees as fish farmers—had switched to other brands because the fishmeal from East Co. was suspected of causing the loss of fish scales, which led to an unsightly appearance disliked by middle buyers. From this, we can tell that, for fish farmers, most local variances of fish farming concede to fishmeal to account for the difference in growth of milkfish, which is one of the few items under their 'control' or 'experiment', as the Lis experimented with new brands of fishmeal.

6.1.3 Checking Bellies

One reason the Li family kept complaining was that milkfish feeding on the company's fishmeal grew without a significant belly shape in 2014. A fat belly is a signature characteristic and the most valuable attribute of milkfish in today's Taiwan; it may not be too exaggerating to say that milkfish farming targets 'growing' the belly. For reference, on a fishmonger's stall in a wet market, the price of filleted belly is almost equivalent to the price of a whole fish bought from bulk middle buyers (field note, fishmonger John, 2014-0307). During the growing season, fish farmers inspect the growth of milkfish by occasionally catching some of them as samples to examine. The Li family said this was done only once per fortnight or month; if done too often, it could interfere with the fish's life underwater, interrupting their appetite for days. After a few checks, however, the Li family found difficulty with belly-swelling. It was suggested by the salesman that when milkfish reach a certain length, their body will grow thick (meaning the back), then they will put on weight quickly, and finally the belly starts swelling whilst the back shrinks. The fishmeal formula corresponds with these stages and includes more unsaturated fatty acids for the earlier stages and more saturated fatty acids for the later stages (field note, salesman, 2014-0427). However, several ponds of milkfish with different members under the Lis' management appeared to have the same problem—no belly-swelling. They immediately attributed this flaw to the feed, the salesman and the company.

In late April 2014, at the Li family's warehouse, where every family member and the salesman were gathered, the youngest son filed a complaint about the disappearance of fat bellies. He supposed that the new fishmeal was responsible for this flaw. In the first place, the salesman blamed himself as he forgot to ask for extra oil last time when calling his colleagues to replenish fishmeal for the Lis, as promised. There were still hundreds of packs of pellet feed piled up at the warehouse. The Li family asked if the feed company no longer added extra oil, because the price of raw materials had gone up but still claimed the formula was the same. The salesman explained that current machines could not be set up to pelletize meal particles with extra oil. The extra oil could jam the machines and delay the whole production line. So, extra oil was added manually after the formation of pellet feed, and this could have been forgotten. On another occasion, however, the salesman mentioned that he may have passed on the request for extra oil, but he was not sure.

Conversations like this between the Lis and the salesman went on for weeks and months. On some private occasions, the salesman suspected that the Lis' problem resulted from the quality of the fingerlings they bought in that year, because his customers in other areas had no such problem. Despite this suspicion, the salesman treated the Lis and neighbours to a barbecue dinner at the warehouse one weekend and gave them barrels of animal feed oil for free.

However, the fishmeal controversy did not go away. In early June, the youngest son of the Lis supervised the fishmeal just arriving and asked why the receipt did not indicate feed with extra oil, the lorry driver said ‘These are all custom-made for you’ (field note, the Lis, 2014-0601). The youngest son inferred from this, ‘That means you still have stuff without adding oil’ (field note, the Lis, 2014-0601). They were suspicious of two kinds of products being conflated. Then, the youngest son went on, saying, with reference to information on his mobile phone, that an enzyme included in the new fishmeal was good at transforming fat into flesh (the thickness of fish flesh), but not good at making milkfish bellies bulge. Although the salesman had a master’s degree in nutrition and physiology, he failed to convince them about the effect of the new formula on milkfish raised in his company’s fish ponds. First, the performance of the new formula in the Lis’ ponds that year ‘seemed’ different from the previous year. Secondly, if the salesman had said that the company’s ponds harvested milkfish with fat bellies, that would have fuelled suspicion about the fishmeal quality. On another occasion, when the Li brothers saw photos of milkfish I took during the harvest at the East Co.’s ponds, they asked me if I meant to take photos of fish with big bellies (field note, the Lis, 2016-0609). Besides, every time they caught fish to let the salesman see, the salesman always paid attention to the thickness of the back rather than the swell of the belly. In the Lis’ own words, nobody cared about the back; without the belly, bulk buyers would not give it a second look. Probably, the salesman’s attention to the back made sense for observing fingerlings in growth, but that was not what milkfish farmers such as the Lis are concerned about. For them, there is no such thing as a gap between theory and performance of milkfish growth.

The Li family and the salesman came to an agreement on a feed test in the field. The youngest son used two of his ponds in an experiment to test the fishmeal by manually adding extra oil offered by the salesman, while the control ponds were as usual under the management of his father and elder brother. Fish in the experimental fish ponds were fed with pelleted feed previously immersed in oil , while the others were not (field note, the Lis, 2014-0601). Although conditions other than the fish meal could vary, they came to an agreement that, one week later, the Lis would catch some fish from different ponds to examine and compare their growth (field note, the Lis, 2014-0606). If the fish from the experimental ponds showed the 'correct' shape of bellies, that meant that the original fishmeal did not have sufficient oil content that was promised.

One week later, when I arrived at the Lis' warehouse in the afternoon, the salesman was already there, talking about the upcoming harvest of his company's milkfish ponds. The youngest son was taking the salesman and me to catch fish to examine. The salesman said, 'Fortunately, it seemed fine yesterday, or I would feel sorry about disrupting the fish pond again' (field note, the Lis, 2014-0606). Accordingly, they checked the result of the experiment the previous day. On the way to the pond, I asked the salesman about the previous day's result, and he simply replied in the affirmative.

On the banks of the pond, a hand net was spread from different sides of two ponds, and one to five fish were caught every time. A check on a fish's growth included weighing it in the hands, examining the belly and then throwing it back. But the Li family did not weight every single fish in the net with their hands, some were measured by sight alone. A complete check takes a mere 30 seconds, but in some cases it took several minutes just to take a fish out of an entangling net. The fish that were caught were almost ready (nearly 600 grams) in their estimation, by sight or hand. Then, the father decided to take one prepared fish for their domestic use. The youngest son held the fish, gestured a virtual curve on the bottom of the belly, and referred to the belly saying that, ‘As long as there is a belly when they are small, then, elongating as it grows, there is no chance that it will become straight in the middle’ (field note, the Lis, 2014-0606) (Figure 6-3).

Figure 6-3
Gesturing the Virtual Shape of a Milkfish’s Belly

This photo was taken by the author.

What he was saying was in contrast to the salesman’s view that milkfish accrue thickness on their backs (the upper part of the body close to the dorsal fin) while growing in the middle, and then the belly develops as the thickness of the back disappears. The whole fish should, in fish farmers’ point of view, develop proportionately. Then, the youngest son turned to the salesman and said, ‘If they are like this, we have nothing to blame you for’ (field note, the Lis, 2014-0606). The tension between the fish farmers and the salesman remained but was partially alleviated.

From the controversy between fish farmers and the fishmeal salesman, we can see both mechanisms of *simplification* and *amplification* that are emphasised in the early ANT literature (e.g. Callon 1986b; 1987; Latour 1999b). In the vein of simplification, a few fish were treated as representatives of the whole pond of fish. The belly shape was treated as a representative quality of an individual fish. The fishmeal was treated as responsible for the growth of farmed milkfish, while the pond wherein milkfish live was largely regarded as a ‘space’ in which water was filled in, aerators worked, feeding machines delivered food and fingerlings fed, rather than a place acting on and reacting to the fish. In the vein of amplification, a few fish were scaled up to representatives of the whole pond of fish, the belly shape was scaled up to represent the quality of a single fish, and the experiment was scaled up to a trial for the quality of fishmeal, the salesman and the feed company. With these two mechanisms, a heterogeneous connection between fish, the belly shape, the fishmeal, fish farmers, the salesman and the feed company could therefore be made. But note that these two mechanisms have similar effects to what ‘ontological politics’ describe (Mol 1999; Law & Singleton 2004; Loconto 2014). That is, some ingredients of a heterogeneous assemblage are made visible and vital and thus need to be maintained and strengthened, while others are not and thus disappear into the background.

6.2 Purifying Fish out of Ponds

The work of harvesting milkfish can be seen as another network deploying and arranging heterogeneous materials to draw a pond of fish into a net: sorting, processing, packing and delivering them afterwards. However, the purpose of this network is more about the *purification* of milkfish from a particular fishpond into a ‘normal’ object of fish as food that will be circulated in the market. We also notice a ‘norm’ embedded in this network of purification, by which some milkfish, fish farmers and fishmeal are judged to be qualified, while others outside this network are not.

6.2.1 Preparation for Harvest

In late July 2014, in Xuejia, a few days after a typhoon struck, one of the Li family’s milkfish ponds was ready to be harvested. A week earlier, a taster for a milkfish wholesaler had come by to test the fish in the prepared fishpond. The Li family caught one fish with a hand net. The fish was treated as a sample that represented the whole pond. It was cooked in boiling water, without added seasoning, and the taster took a bite on the spot. Later, after the taster left, the wholesaler phoned the Lis and made a bid (interview, Hideo, 2015-0904). This time it was over 50 New Taiwanese dollars (1GBP is about 50 NTD) per catty (600 grams). As long as the Lis agreed with the price, the two sides would schedule a time for the wholesaler to come, usually within 7–10 days. This price was still appealing for fish farmers; during the same period in the following year, the price had already dropped by 10 NTD.

One or two days before harvest, middle bulk buyers will make a call in advance. This time, the middle buyer was a night-catch bulk buyer; its main market was milkfish restaurants, and milkfish stalls in traditional wet markets opening from early morning till noon. Therefore, night-catch wholesalers have to collect the harvest during the night, otherwise the fish cannot catch up with their customers' opening hours. The price that night-catch buyers offer is usually 3 to 5 NTD higher per 600 grams than other kinds of middle buyers.

Early in the afternoon on the scheduled day, an employee of the bulk buyer arrived in a lorry with a motorised raft; he was coming to prepare for belly evacuation [*消肚 in Han characters; Siau-Too in Taiwanese-Hokkein*] beforehand. This process is also called 'messing around in the water' [*弄水 in Han characters; Long-Tsui in Taiwanese-Hokkein*]. It is meant to evacuate undigested foodstuff inside milkfish, mostly because bowels and visceral organs are also served as ingredients of milkfish dishes in southern Taiwan, and undigested food is considered to damage the flavour of fish flesh. It is also suggested that the milkfish belly will become more tender and thus more tasty after evacuation (interview, Hideo, 2015-0904).

Figure 6-4
Messing around Water or Evacuating the Belly

The photo is taken by the author.

Belly evacuation was triggered by the employee sailing the raft all over the ponds (Figure 6-4). Being scared by the currents and the sound made by the raft, the milkfish jump out of water surface and are so terrified they excrete; some of them may bump into each other or even hit the ground, get injured, faint and die. The Li family therefore stood by the pond and picked up and checked the fish; if fish were still live, they would throw them back. After sailing around the pond several times, the employee stopped the raft and waited for around ten minutes for them to excrete; this was the first round of belly evacuation, and there were several rounds of the same process to follow.

Figure 6-5
Checking the Guts

The photos are taken by the author. The left one was taken in 2015 and the right was in 2014.

But belly evacuation is not always successful. After a while of belly evacuation, a raft operator asked the fish famer to catch some fish and check if the inside of the fish was cleared (Figure 6-5). At around 6 p.m., all the workers, including net-workers and fish sorting workers, had arrived; and the whole harvest setting, including lighting, sorting, packing and shipping, was set up and ready. The director of the bulk buyer also arrived. The manager asked the workers to catch some fish and check them. This check was not done by sight but by hand. A sorting worker held a fish and deliberatively squeezed it alongside two sides of the belly to the anus. For one fish after another, if nothing came from the anus, that would suggest the insides of all the milkfish in the pond had been cleared. But that was not the case this time, even after several rounds of belly evacuation in the early afternoon. Therefore, a worker was sent to do the belly evacuation again, the rest of workers took a break and had their meal boxes refreshed by the host fish farmers, the Li family, at 7.30 p.m.

The Li brothers said that they had fed the fish less two days earlier, as the harvest was scheduled. They supposed that this would facilitate the belly evacuation and save on feed, given that it might eventually be wasted. However, it is also suggested that if the fish have no regular supply of food, they will turn to ingest mud from the bottom of ponds (Interview, Toshi, 2015-0910). This mud is more difficult to evacuate.

Yet again, letting the fish eat as usual does not necessarily secure belly evacuation. On another harvesting occasion, the intestines of milkfish were still not clear after a whole afternoon of messing around in the water. In late afternoon, a harvesting worker checked some fish in a plastic tub, one after another, but still found stuff being squeezed out. To check carefully, he used his fingers to scoop out a fish viscerally. In just a few seconds, he opened the gills, reversed the fish body, stretching his index finger into the body to take the organs out (the right photo in Figure 6-5). He inspected an organ in his hand and discussed it with another worker nearby. Mrs Li, stood aside and said, 'Easy to get stuck'. This time, however, the motor raft was sent out to deploy a seine-net over the pond, rather than engaging in belly evacuation again.

6.2.2 Deploying Nets, Electrocuting Fish

The harvest was like a lottery day for both the Li family and the salesman. In advance, even fish farmers could only know roughly the number of fingerlings they stocked at the beginning and the number of packs of feed consumption; as for the total weight of the harvest and the size and shape of single fish, they could only estimate those. The relation between the weight of feed consumption and that of fish stock had only been theoretical until the whole pond of fish was harvested and weighed. The harvest was carried out in the following two days; usually, two ponds of milkfish were harvested in three days for the night-catch bulk buyer who engaged with the Li family.

A seine-net was deployed by a couple of workers on a raft, covering three-quarters of the pond area's surface. The net workers would refer to the number of fingerlings, the size of fishponds, the duration of stocking, the number of fishmeal packs, and the wholesaler's demand to decide on the range of the net to be deployed. For instance, if a pond of 8,000 or more fish is going to be harvested over two separate nights, on the first night the net can be deployed to cover three- quarters of the pond, and on the following night over the whole pond to capture the rest of the fish.

There was a net funnel, ten metres or less in length, already set up in the shallow area of the pond (chest height); it was for temporary stocking of fish (Figure 6-6). In the narrow space of the net funnel, the fish rub against each other and thus have some bruises on their skin. Even worse, they could die of stress if they stay too long. Thus, net workers would not risk over-netting at any time. Usually, the net is deployed twice in one night.

Figure 6-6
The Funnel of Nets

The photo is taken by the author

After the seine-net was deployed, it was hauled in by two lines of workers (Figure 6-7); hauling the net is more exhausting than it looks mostly because of water and fish resistance. Sometimes there is foreign stuff, such as feeding-machine containers that have sunk in the water. As for hauling in the net, in the shallow water area, one net-worker was standing by the net. It is said his feet were adjusting the net, even though the footwork was not visible. Sometimes, this worker would wear a helmet because one's head can be hit by milkfish jumping in all directions. At the far end of the seine-net, there was another worker sitting on the motor raft and adjusting the net by hand. There were fish that kept jumping out of the net. Thus, pond water would be discharged gradually so as to alleviate the resistance from the fish and water.

Figure 6-7
Hauling the Seine-net

The photo is taken by the author. The circle designates the man in water to adjust the net by foot.

As the seine-net was hauled close to the bank of the pond, the whole net of fish in the shallow water area was held for a moment (Figure 6-8) until the funnel of the net was open; in the meantime, the fish in the net were rolling around. Then, the net full of fish in the water was dragged by several workers pulling together on the bank towards the net funnel. As soon as the net was open to the funnel, the fish were swarming towards the other side, while some of them just jumped out. Afterwards, the funnel was closed, and then the seine-net was taken away. The whole procedure from pulling the seine-net to settling the fish in the funnel took almost two hours; it was past 9.40 p.m. by then.

Figure 6-8
Holding a Net of Fish

The photo is take by the author.

The net funnel was compartmentalised into two zones, electrocution and stocking. In the stocking zone, the fish crowded together. Their uneasiness could be sensed from the sound of disrupted water. Then, in the electrocution zone, a worker who stood on the pond bank held a long stick, yelled ‘clear’ so that every worker left the water, and then used the stick by pointing it at the surface of water in the electrocution zone several times. Then, the rolling motion of the fish in this zone was pacified (Figure 6-9). Afterwards, plastic baskets were used to scoop up those fish and they were passed, hand to hand, to the zone for sorting fish on land.

Figure 6-9
Electrocution

The photos are taken by the author. The fish in the left photo are simmering the water, while those in the right are pacified.

6.2.3 Sorting out Qualified Bodies

The baskets of fish were first dumped in a plastic vat, with ice and saltwater (pond water plus salt), in front of a central sorting worker who was surrounded by four other vats (Figure 6-10). The sorting worker was roughly sorting fish into four sizes—extra-large, large, medium and small. Others, regarded as ‘unqualified’, were dropped into another basket nearby; they were either too small or deformed. The central sorting worker measured the size of each fish with one hand; usually, by holding one, he could tell which vat to throw it in. The sorting work at the central vat was swift; if it had lagged behind, the fish dumped in the central vat would have overflowed onto the ground.

Figure 6-10
Sorting Out Fish into Four Sizes

The photo is taken by the author. The vats are coded as 0 to 4. Number 0 is for baskets of fish from ponds. Numerical figure 1 is for the extra-large, and 4 is for the smallest.

It was only when something unusual happened that he would stop his agile movements. Once, for instance, a central sorting worker halted while grasping a fish, hesitating, looking and pressing it with his fingers, and then he threw it on the ground. I asked him why. He replied that 'it had died', which suggests the fish may have died during the belly evacuation in the afternoon (field note, Li family 2015-0628). Probably, it hit banks of the pond, the elder Li brother suggested. I touched it and it felt a bit soft, which I could only tell by comparing with other just-electrocuted fish (Figure 6-11)

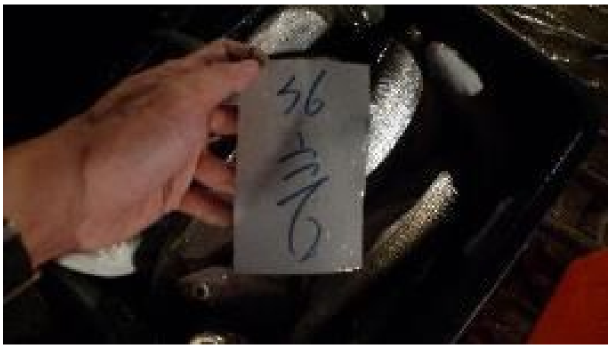
Figure 6-11
The Comparison between Already-dead and Just-dead Fish

The photos are taken by the author. The fish in the left can be pressed down by fingers, while fingers press the right one, its head and tail will be moved up.

In addition, although the activeness of the fish should have been repressed, sometimes they were just paralysed for a while. Once, the first few baskets of electrocuted fish suddenly jumped out of the baskets onto the ground. The whole process of sorting, delivering and weighing was thus interrupted by picking up fish scattered all over the ground. So, the directing manager commanded all workers to stop and asked for electrocution again. This suggests that it is not always plain sailing from the stage of harvesting to that of sorting out fish. If they are clear-cut, it is because they are cut clearly in practice.

There were several fish-sorting workers who held plastic baskets and gathered around the central set of vats to pick out qualified fish to put in their baskets. They picked up fish according to sheets of waterproof paper on which customers' code names and demands for particular sizes were registered. The size of fish was registered in 'figures' [*分 in Han characters; Hun in Taiwanese Hokkein*] from 1 to 10 (the larger the figure, the smaller the size of a single fish), though it was uncommon to ask for a figure below 5. A box of fish had to be 40 catty (24 kg). A figure 5 meant the fish in the box weighed about 2 catty (1,200 grams) per fish, and the total number of fish in this box was 20. And, if the figure was 10, the size of a single fish was about 1 catty (600 grams), and the total number of fish in the box was 40. At this stage, fish previously sorted into four rough sizes were further sorted into figures. Some customers called for milkfish that were bent at the head and tail to show that they were caught alive, when they were not yet stifled and their intestines had been evacuated; if not, the bend would break the intestines and contaminate the flesh. Bending a fish is also done to test and ensure that it was clear-cut between belly evacuation and harvesting.

Figure 6-12
Figures of Fish Sizes



The photo is taken by the author. The sheet says '36' and the code-name of the buyer in Chinese figures. '36' means there are 36 pieces of fish in this box, and thus the size of each is 'figure 9' (about 666 grams per fish).

The sorting workers then put one basket after another onto a digital scale to weigh them. Sometimes, the sorting workers would go back to add or remove fish. Members of the Li family gathered around the scale to watch the readings and register every box in their notebook. The weight was supposed to read between 41.5 and 42.5 because of 5% 'water money' [*水錢 in Han characters; Tsui-tsinn in Taiwanese Hokkein*]; this weight of water is deducted from each basket of fish, and then each basket of fish will be put into boxes. Now, a pond of fish became *countable* in terms of boxes.

After being weighed, some baskets of fish were dragged to workers nearby to scrape the scales, while others were dumped into individual boxes alongside a sheet and covered with ice (Figure 6-12). After scraping scales, the same basket of fish would be dumped into a plastic box, dragged to be covered with ice shavings, and piled up along with other boxes near a lorry; a waterproof sheet was placed on top of the boxes of fish. As soon as it was ready to load onto the lorry, the directing manager would call members of the Li *to count the number of boxes* (Figure 6-13). Fish farmers can compare the number of boxes counted at the scene with the number registered in their notebook.

Figure 6-13
Counting Boxes of Fish

The photo is taken by the author.

Note that fish now become 'boxes' of fish, and they are not only countable but also *mobile*. The lorry came to and fro, two or three times for shipping the stock of fish. By adding up the number of boxes and multiplying this by 40 catty for each dispatch, fish farmers can calculate the size of the harvest from each fishpond. In a further step, they can calculate FCR performance by dividing the weight of feed consumed by the total weight of the harvest and the revenue in a given year by multiplying the total weight of the harvest by the spot price.

6.2.4 Calculating Efficiency

During harvesting, the Li family mentioned nothing about their concerns with milkfish bellies. In fact, before this harvest in late July 2014, the Li family probably had in mind that the harvest that year would not be counted as good. The first two fish ponds harvested earlier, in the middle of July, had poor FCR performance, 1.25 and 1.5 (kg feed/catty flesh; the lower the better) respectively, while the number had been expected to range from 1 to 1.1.

The two ponds of milkfish under Mr Li senior's management did not meet the bulk buyer's demand, either for total weight or the amount of qualified fish. Consequently, he had to let the bulk buyer harvest half of the second pond that had not been prepared. The Li family figured that, regarding the first two ponds, the spot price three weeks earlier was 61 NTD per catty, but by then it had dropped to 52 NTD. As they calculated, if everything had been on schedule then the fish would have reached market size three weeks earlier, the total weight of a single pond was above 10,000 catty rather than below 8,000, so they could have earned 200,000 NTD (approximately £4,000) more per pond (Field note, the Lis, 2014-0721). On the other hand, the expenditure on aerators and feed kept increasing for an extra three weeks. The profit they could make from the milkfish ponds was therefore cut to a slim margin.

The Li family summarised that the milkfish harvest was very poor. As far as FCR performance was concerned, 1.5 was not the worst; the worst was almost 1.7 by their estimation. Even worse still, the fish had no belly swelling in general; most of them were slender in shape. The contrast would be even sharper with the milkfish a year later (Figure 6-14).

Figure 6-14
Comparison of the Belly between 2014 and 2015

The photos are taken by the author. The left was the fish harvested in 2014, while the right was in 2015.

They said that bulk buyers nowadays favour milkfish between figures 9 and 10 in size (600 to 666 grams per fish in weight). But if bellies were not hanging, fish farmers would take this as a signal that the fish had not yet grown enough. More feed would still be delivered, and some fish even ended up oversize, while others were under. In other words, the shape of single fish, the total weight of a pond of fish, and the distribution of all sizes of fish failed to meet the middle buyer's demand. The youngest son said the bulk buyer complained about this to them, and the elder son added that '[I] don't know what garbage they [the East Co.] put into the feed' (field note, 2015-0627). The Li family then changed to another feed company. And the salesman left the feed company. The relation between fish farmers, salesmen and fishmeal companies depends on transferrable relations between fishmeal and fish.

The Li brothers said that the new fishmeal was better, although it was 30 NTD per pack (30 kg per pack) more expensive. According to their experience, feeding a pond of over 8,000 stock milkfish would consume between 450 and 500 packages if the fish were to grow to the market size. That means, the expense on fishmeal per pond is over 12,000 more NTD overall. But they said it was worth it because their milkfish can reach market size more quickly; this is key to be put on the waiting lists of bulk buyers and to save on the cost of aerators and feeding machines as well.

There are several lessons that can be learnt from the above fragments on harvesting. The first is about fish farmers' *cost-control*. Like the salmon producers in Lien's (2015) study, their profit depends on the relation between the money invested in production and the spot price when deals are made at a given time; it has little to do with adding value. Milkfish farmers care about when to stop both aerators and feed deliveries that will become extra expenses. They care about the effects of fishmeal and FCR performance because both have to do with production costs and spot prices as well. The sooner fish satisfy market requirements, the sooner they can be harvested, and thus the cost of aerators, feeding machines and feed can be reduced.

Secondly, however, milkfish are not bound to be subjected to cost-control, although they are put into an artificial environment in which fish farmers attempt to keep the cost of milkfish production under control. Seen from the position of fish farmers on land, feeding machines regularly deliver feed into a pond with 8,000 or more fish. However, only part of the fish's feed intake can be observed, the rest of it is hidden from human view. Sometimes, there is no direct link between fish being fed and running feeding machines; neither is it the case that a few fish caught as samples can represent a whole pond of underwater fish. That fish are an ‘actor’ is a fact that human-centred aquaculture often overlooks (Lien 2015). They follow the path that humans set for them only because they are enacted to do so in a web of relations, even though I doubt there is one in which milkfish can be entirely domesticated. Consider that even the fish’s bowels and intestines could not be clearly evacuated after several attempts at ‘belly evacuation’, and that electrocuted fish came back to life and interrupted the harvesting.

Thirdly, the harvesting scene is not independent of milkfish farming. During milkfish farming, ‘bulk buyers’ are brought to fish farms. Their views on evaluating the corporeal characteristics of fish are put into practice by fish farmers. This also suggests that the separation between production, distribution and consumption is not always as clear-cut as is supposed. Fish farmers are concerned about belly shape, total weight and individual bodies of fish because, from their perspective, others, in the sectors of distribution and consumption, care as well; and this concern matters to their revenue. Thus, fish farmers *do* fish farming influenced by putative others’ point of view, although most of the time they seem to work alone in the field. In other words, fish farming even on one ‘production site’ is a collective of multiple sites and situations, from manufacturing fishmeal to the end-consumption of milkfish.

Fourthly, however, the collective of multiple sites and situations on one site does not mean that they add up to or are reducible to one another without friction. As we have seen, the fish farmers made up another pond of fish which was not yet ready for the bulk buyer. This suggests that possible frictions between fish farmers (production) and middle buyers (distribution) exist and can only be reduced in situ.

Meanwhile, the reduction of possible frictions also suggests the existence of a quasi-criterion that holds together milkfish, fish farmers and middle buyers so that they can be evaluated as qualified or not at the same time. Herbert (2010) uses 'volume-oriented fishery' to conceptualise the characteristics of Alaskan salmon fishery in terms of harvest quantities rather than qualities; the quantity of a harvest is the criterion according to which Alaskan fisherpeople work. Milkfish aquaculture is partly characterised by volume orientation, but it differs in caring about the corporeal characteristics of individual fish more than does volume-oriented fishery. Rather, belly shape, the clearness of intestines, mixed sizes, total weight and FCR are treated like *registers for valuing* (Heuts & Mol 2013) qualities not only of milkfish but also of fish farmers and fishmeal as well. These registers of valuing may 'tinker' with each other sometimes, and be in conflict at other times. There may be compromise, but some registers like belly or total weight do not yield.

However, there is one register for valuing the qualities of milkfish that we have not touched on. That is the register of valuing the taste of milkfish. Lien (2015) characterises Norwegian farmed salmon as a 'bulk commodity'. It is profitable by way of cost-reduction and the point when spot prices are made. Despite the similarity to a bulk commodity, however, milkfish are farmed under conditions that differ across regions. They are stocked in different types of pond water and engaged with by numerous individual fish farmers. How are milkfish collected from these multiple fishponds counted as a 'bulk commodity'? So far, little attention has been paid to how milkfish from multiple ponds can be taken as the same with regard to taste.

6.3 The 'Fish' that Slip through the 'Nets'

In the previous sections, I went through the practices of milkfish farming and harvesting. In this section, I turn to two situations of tasting milkfish. The first is *pre-tasting*, which means tasting milkfish before harvesting. The second is *post-tasting*, meaning tasting milkfish after harvesting. In what follows, we will see how qualities other than belly shape, total weight and mixed sizes are *excluded* from pre-tasting, while differences in the quality of milkfish are then again *enacted* in post-tasting. How the gap in tasting milkfish between these two stages occurs is the object of analysis in this section.

6.3.1 Pre-tasting Differences

Before harvesting a pond of fish, middle buyers come for tasting tests one to three times to ensure that the pond fish have not lost their flavour. Most taste tests are done by collecting samples of fish in the field and taking them back to a taster in the office. During my fieldwork, I once saw tasting in action at the office of a processing plant. The taster was the deputy manager. A fish was cut into chunks and cooked in water without any seasoning. The deputy manager took some bites of the fish meat, chewed and sucked the fish bones. After thinking for a while, he said 'this pond can be caught'. This pond of fish would be in their schedule for harvesting. Although this step is not dramatic at all, it is pivotal to put physical fish and fishponds onto a two-dimensional list for harvesting. A taster cannot distribute his or her embodied taste among different sites of fishponds, but the fish in these fishponds can be taken back to the office. Next time, a fish truck could return to the same fishponds and take the whole ponds of fish.

The number of pre-tasting episodes depends on individual middle buyers. A cook in a milkfish restaurant said that the flavour of milkfish could turn within a few days (interview, Tong, 2015-1103). In the past, pre-tasting a pond of fish was only done once, after which harvesting days could be scheduled when the fish had passed a tasting test. Now the taste can be only assured just before harvesting (field note, Tong, 2014-0218). The most important pre-tasting is the one on harvesting day. Take the Li family's milkfish harvest for instance. Until the directing manager of the bulk buyer nodded, no harvest work started. If the milkfish had not passed the final test and the fish farmers insisted on completing the transaction, the situation would have become difficult. A bulk buyer may offer another price far lower than the present one and sell the fish to freezing companies aiming to export them. According to some middle buyers, 'overseas customers don't care about the flavour of milkfish' (interview, T&C Co., 2014-0304). Or, they might ask for fish farmers' agreement that they can come back another day with another price when the off-flavour has gone.

On the same day as the Lis' milkfish harvest described in the previous section, the fish farmers wanted to sell another pond of milkfish to the same middle buyer in the following weeks when the market price was expected to remain good. So, they caught one fish, cooked it and asked the manager to taste it. After a few bites, however, the manager yelled that 'there is a "*drug flavour*". Come on! Eating fish with that flavour nauseates me. I can't eat any more' (field note, 2014-0730). Then, the manager left the bowl of milkfish chunks on the spot (Figure 6-15). I caught up with Mrs Li who was taking some bites of the meat and asked her, 'Is there any flavour?' I smelled the bowl of fish chunks and could not tell if there was any. A few metres away, two Li brothers were whispering. The elder one said, 'It is just one week after the dosage. Probably, it will be fine the next week when they come back to try again' (field note, 2014-0730).

Figure 6-15
Testing of Taste in the Field

The photo is taken by the author.

The fish that the manager disliked was one from the Li's youngest son's pond. During the growing season, from May to July in 2014, the youngest son was bothered about the colour of the pond water changing to dark 'red', which was regarded as a bad signal of over-fertilisation within the pond. The risk was that the blossom of single algae and bacteria could monopolise the oxygen in the water; or, the fish could turn an off-flavour due to a change in water condition. Therefore, the youngest son dosed his ponds with cans of an aquaculture product, namely BKC (benzalkonium chloride), meant to kill excess bacteria and algae in ponds, although it was already on the official list of prohibited use for aquaculture. I asked the youngest son if it was safe. He replied, 'Sure, we dose according to the instructions. This is not like a fishpond cultivating fish for somebody else. We also eat [the fish from] it! Besides, you think the drug is free. It's very expensive' (field note, the Lis, 2014-0605). The point he made regarding the price of the drug is that, given it is expensive, they will dose below the suggested instructed level. Besides, the Li family are consumers too, they have no reason to poison themselves.

Another reason for dosing with BKC was to prevent the pond water turning bad and giving an off-flavour to the milkfish. The Lis' elder son's pond was dosed with BKC in anticipation of a blend of lower and upper layers of pond water caused by a typhoon coming over. In their interpretation, the blended water could generate an off-flavour in the fish by bringing up the lower level of water that was 'dead' due to a lack of oxygen. The youngest son dosed the pond with BKC, along with molasses too. The molasses was also expected to improve the quality of water. As the elder son explained, 'If the pond water has no flavour, then the fish have no flavour either' (field note, Li family, 2014-0721). Flavour used here denotes an 'off-flavour'. What they said is that the flavour of the fish is an effect of the environment. Fish farmers 'maintain' this environment by, sometimes, dosing it.

But did the manager of the bulk buyer 'really' identify the drug flavour by tasting? And, was the drug flavour physically related to the use of drugs? It may be that neither is the case. First, several days before harvesting, an employee of the bulk buyer had come by to catch a fish to take back to the office for tasting, but he complained about an unpleasant flavour. Because of this complaint, the Lis dosed the fishpond in attempt to improve the flavour of the fish (field note, Li family, 2014-0721). Secondly, the Li family did not take the drug flavour seriously. One year later, in late June 2015, when I went back to Xuejia a second time for fieldwork, I asked the Li family about the flavour that the manager complained of. The youngest son responded that it was just an excuse not to schedule the harvest because the waiting list was already full. In other words, the Li family saw the drug flavour as a 'red herring' during the peak season for milkfish stock. They added that, during the off season, they never heard any complaints about 'flavour' from middle buyers. As long as there are milkfish to harvest, the middle buyers will be satisfied.

Bulk buyers do not actually care about the issue of drug dosaging related to food safety. Rather, they care more about *off-flavours*. In fact, to fish farmers and bulk buyers, the use of aquaculture drugs seems to improve the taste of milkfish taste than spoil it. For them, it is just a matter of time until the flavour of drugs diminishes. It seems to fish farmers that *pre-tasting is fluid within the seasonality of milkfish production*. Despite this, however, even in the same season, professional tasters can be poles apart in their opinions on the same pond of fish. Another fish farmer, Mr Shi, said that he once had a pond of fish that was suspected by a middle buyer of having an 'off-flavour', while the same pond was acceptable to another buyer in the same period of time (interview, Shi, 2015-0730). Thus, he did not deal with the so-called 'off-flavour' and simply sold it to the other buyer.

A taster said that he would not tell fish farmers exactly what the off-flavour was, even if a pond of fish could not pass pre-tasting. Whatever he said the off-flavour was, the fish farmers would deny it (interview, Hsiao, 2015-0630). Rather, telling fish farmers that 'there is a flavour' is enough. He did not want to get involved in the quality of fish farmers' milkfish too much. Even if he had given fish farmers advice about using drugs to get rid of an off-flavour, he did not have the ability to track it and determine if they had indeed dosed with the drug or not. But if he had got involved too much, the pond with off-flavour fish might become a sort of duty on his part; he would rather keep the relation simple. For him, good quality of milkfish means that the *taste has no flavour*. That no flavour is a good flavour is a measure of a pond of milkfish in pre-tasting. In fact, pre-tasting is more about netting the bad while letting the good slip through.

Mr Tong, who is a chef in a milkfish restaurant established by his father in the 1960s, introduced six off-flavours of milkfish to me. They include muddy, musty, algae, feed, sour and drug (field note, Tong, 2014-0218). Some of these flavours have a seemingly sensible origin. For instance, an algae flavour usually occurs in freshwater fishponds where the freshwater environment is suitable for the growth of certain varieties of algae that could cause an off-flavour; therefore, some call this off-flavour a 'freshwater' flavour as well. However, when it comes to a good flavour of milkfish, Mr Tong ran out of words, like many professional tasters. Compared with the diversity of bad flavours, vocabulary for good ones is in short supply.

Mr. Tong deliberates about the flavour of milkfish. Every night he drives his RV-car to the ponds to taste fish and ensure there are no off-flavours and takes the stock of fish back to the store. I asked if he had experience of flavours he regarded as good being disregarded by others. He replied that it is not few. From time to time, he had disagreements on the flavour of a pond of fish with bulk buyers that he was used to cooperating with. ‘Say the passing score is 60, there is nothing to say if the fish are under 50 or over 70’ (interview, Tong, 2015-1103), because the difference between them is significant. But the most controversial moment is when ‘the flavour that is there seems to be yes and no, slight, just around there’ (interview, Tong, 2015-1103). He added that even tasters of bulk buyers get confused with this kind of flavour around the passing score. This is the most difficult moment to make a judgement.

During our interview, Mr. Tong showed his preference for saltwater milkfish. An experienced harvester of milkfish said that saltwater milkfish tasted solid in texture and ‘sweet’ in taste, while freshwater milkfish taste soft and mild (field note, Li family, 2015-0628). Solid and sweet are a couple of tasting points for saltwater milkfish. Living in saltwater, milkfish are in an environment of high density, so their bodily texture grows firm, but it takes energy to grow such firm flesh. And, they fill their cells with amino acids to balance the saltiness; later, the amino acids and related amines turn into the source of a sweet taste (McGee 2004). Mr Tong picked up a piece of cooked belly from his stall and said that it was freshwater milkfish, judging from the thickness of its belly fat (Figure 6-16). Sometimes, belly fat is regarded as a source of odour, partly because the fat in fishmeal is sourced from oil of inferior quality to save on the cost (email, Mose, 20115-1205), and partly because fat decays quicker than other body tissue. Thus, some customers rather remove the belly fat. However, Mr.

Tong said that belly fat from saltwater milkfish, though flimsy, is extremely aromatic, but some customers do not understand this difference, which seems a waste to him. From fish farmers' position, however, this seawater belly is also 'expensive' in terms of feed conversion.

Figure 6-16
The Lining of Milkfish Belly Fat

The photo is taken by the author.

Then, I asked if Mr Tong if he would select saltwater milkfish for his restaurant. Mr Tong simply responded that this did not depend on him because bulk buyers were responsible for which ponds to harvest, and he could not have idea about the salinity of fishponds beforehand. In his words, 'As long as it tastes acceptable, we will take it' (interview, Tong, 2015-1103). Besides, there is not the capacity for his restaurant to take a whole pond of fish each day, from thousands to tens of thousands of harvests a night; all he needs is tens of boxes at most each day. Thus, he can only decide if he 'accepts' the flavour of a pond of fish or not. If Mr Tong has some concern, he will ask the bulk buyer to give him the stock of fish from another pond.

From the 'passing score' and the 'acceptable' flavour of milkfish, we can see that professional tasters aim to sort bad flavours out, and the rest is 'good'. The bad are enacted as having a shape, while the good are shapeless. It seems to fish farmers that there is a seasonality in the enactment of good and bad flavours. It seems to a professional chef that a stable supply is far more important than insisting on one's own taste.

Even if there are differences in the texture, flavour, FCR and production cost of milkfish, not all of them matter in pre-tasting. Pre-tasting is about enacting sameness out of differences in milkfish. As long as a batch of milkfish has been through pre-tasting, they are enacted or qualified to be the 'same'.

6.3.2 Post-tasting Sameness

Do milkfish appearing on the market taste the same even after having been through pre-tasting conducted by professional milkfish tasters? For market professionals, differences in taste between milkfish are what they deny, while for lay people, like me, I am occasionally surprised by the milkfish I try. How is this difference shaped?

In the interview with Mr Tong, he mentioned that it was not always the case that his customers could accept the *fresh flavour* of milkfish, or *Tshinn* in Taiwanese Hokkein. Freshness or *Tshinn* is widely adopted to describe a good flavour of seafood. In his words, 'sometimes, *Tshinn* is also a *flavour*' (interview, Tong, 2015-1103). Note that the term flavour is used to describe an off-flavour when it comes to milkfish. In Mr Tong's memory, there were six or seven times when he argued about the flavour of milkfish dishes with customers who were saying that the milkfish belly had a 'flavour' at the store. There was one time when customers were talking of an 'off-flavour' to the staff of the restaurant. Both the senior workers in the kitchen and Mr Tong himself came out to taste the same dish but did not agree with the customer on the flavour. Mr Lin said, in a temper, 'I would have forgotten it, if the flavour had been around the boundary' (interview, 2015-1103). Here the boundary he meant is the passing score. But in his view, the customers misrecognised *Tshinn* as a bad taste. Finally, Mr Lin told the customers that their money could be returned, but the restaurant could not accept that the flavour was bad. He further explained that the customers might have been accustomed to the flavour of frozen fish produce. For that kind of customer, he said, the flavour of *Tshinn*, or freshness, is too strong to accept; rather, they are more used to 'tasteless' frozen fish.

Toshi, a character shown in previous chapters, is not only the ex-chairperson of a joint-stock milkfish farming company but also a cook in his own milkfish restaurant located near his 20+ hectares of fishponds. The fishponds are stocked with hard clam as the main species and milkfish as a subsidiary. Hard clam is a saltwater farmed shell fish. Although hard clam fetches a good price on the market, they require two years to grow to market size. Unlike saltwater milkfish farmers, who hope that rain will dilute the salinity of pond water, hard clam farmers keep the salinity stable. Because the environment of hard clam ponds is like shallow milkfish ponds back in the olden days, it is said 'milkfish out of hard clam ponds taste the best' (interview, Yang, 2015-0818). Hard clam need milkfish to feed on seaweed in order to clear competitors for nutrients and oxygen, because their habitat involves digging into pond bottoms; otherwise, hard clam could be suffocated by seaweed. Therefore, fish farmers usually stock 4,000 milkfish, or less, per hectare of fishponds to eat excess seaweed. If there are too many fish in stock, there will be an extra cost for fishmeal.

At Toshi's restaurant, I ordered a bowl of milkfish belly soup with noodles. The belly that Toshi served was in slices with skin (Figure 6-17). Toshi took a seat nearby, and we started to chat. I took some bites of a slice of the supposed 'milkfish belly', finding it unfamiliar and wondering what I ordered before. Until taking the second slice, however, I could not help but ask, 'So you put chicken slices into this?' (interview, Toshi, 2015-0910), given that the slices of milkfish belly looked very much like slices of chicken fillets. He laughed out loud and said, 'it's milkfish belly. Isn't it that what you ordered?' (interview, Toshi, 2015-0910). I took one slice and scrutinised it, trying to make a connection with the milkfish meat I knew. The meat I was tasting was *tender in texture, neither solid nor soft*. The fish meat tasted *mild in flavour*, without a strong flavour closely related to the milkfish in my memory. Toshi explained that this was saltwater farmed milkfish. Compared to what I tasted before, it was much more solid. He added that the difference could be compared to the difference between free-range and cage-raised chicken. He further explained that this was the 'authentic' flavour of milkfish. At I was about to leave, I bought four pieces of raw frozen milkfish belly to take away. Toshi took four from a freezer and wrapped them in newspaper. He then told me how to cook it: cut it into slices and cook it in boiling water, as the whole fillet is just taken from the freezer; he also warned me that he could not promise the belly had been fully deboned, although he had tried to pick out all the bones.

Figure 6-17
Toshi's Dish of Milkfish Bellies

The photo is taken by the author.

I tried to follow Toshi's advice and to prepare and cook it as he said, but I could not achieve the same result. The first problem was that a frozen piece of thick belly was difficult to cut into slices as Toshi suggested. As my best effort, one piece of frozen belly could only be cut and sawn into two chunks. Then, the next problem was how long those chunks should be cooked for. I boiled the belly chunks twice, because I was afraid that the inner part of the chunks might still be raw, considering that the fillet was frozen and thick. The flavour, however, was far worse than what I had tasted at Toshi's restaurant. Particularly, the texture of the fish meat was as *tough* as chewing gum, though the flavour was *light*, and an additional problem was its annoying *numerous, thin bones*; without being reminded by these two pieces of belly, I almost forgot how bony milkfish was.

The next time I visited Toshi, in early September 2015, I mentioned the poor experience with the self-catering belly. Hearing my explanation, he replied that the belly must have been overcooked so that the flesh shrank, and the flavour had gone with the exit of flesh fluids. It sounded sensible that I *cooked it the wrong way*, rather than something to do with the belly. Then, we talked about the frequency of catching his own fish for preparation. Quite surprisingly, he replied that the milkfish he prepared were bought from bulk buyers, rather than netting his own from ponds just metres away. This was unexpected, since I used to suppose that the milkfish I tasted and bought before had been from his fishponds; I supposed that there was some sort of consistency in the object I tasted so that I could blame the bad flavour on my own cooking. He added that it would be bothersome to catch his own fish daily, and the turnover of the restaurant was low these days. He could just order a box of fish a day. The box of fish would be placed in front of the door, covered with ice, in early morning. This is far more convenient than netting some fish and then sorting them out into sizes.

Being told of the quarrel over the fresh flavour of milkfish, Toshi said it was impossible to confuse a fresh flavour with any off-flavour, even for customers who are used to frozen fish (interview, Toshi, 2015-1108). In his view, that Mr Tong attributed the confusion between *Tshinn* and off-flavour to the customers' inexperience was to cover for the fact that Mr Tong failed in pre-tasting. He emphasised that 'real' *Tshinn* tasted *smooth* without any 'flavour'. If *Tshinn* flavour tasted like off-flavours, Toshi added, how could he serve raw slices of milkfish, like Japanese Sashimi, at the restaurant?

However, far from being ignorant, Mr Tong is cautious about the taste of milkfish. Therefore, he brings batches of fish directly from fishponds to his stores every night at midnight. In his view, the professional tasters of bulk buyers with whom he collaborates may sometimes fail, even after a pond of fish has been through pre-tasting, as hauling the seine-net could cause a whole pond of fish to change their flavour due to mixing from the lower level of 'dead' pond water; or at other times, with the weather changing or fish behaving unexpectedly, the whole flavour goes off (field note, Tong, 2014-0218). It is noticeable that the practice of harvesting attempts to 'purify' fish in the pond, but sometimes this practice also affects the quality of milkfish and becomes a work of 'translation' in the sense of 'betrayal'.

Being strong or smooth, I have no intention to specify which is right or wrong regarding the *Tshinn* flavour of milkfish. What I suggest is that one-time consolidated sameness between milkfish out of multiple fishponds may not hold steady in the stage of post-tasting. Earlier in this section, I suggested that good or qualified fish for pre-tasters are fish that slip through a net intended to capture bad flavours so that the collective of qualified fish can be expanded. However, post-tasters, such as customers, have their own 'net'; only milkfish that slip through their net can be called qualified. Not all fish that have been through pre-tasting can slip through the net of post-tasters. Whatever slips through the net of tasting is qualified, while others caught by it are doubtful.

Therefore, we can suggest that, first, it is questionable whether to take the collective of qualified milkfish that pass professional tasters' tests as the 'same'. Second, the differences between pre- and post-tasting sometimes co-exist well, such as in co-operation, while they may be in opposition at other times. Sometimes, customers who tasted the fish 'off' blamed themselves for enacting the fish wrong ways so that the difference between pre- and post-tasting does not tear the connection between these two stages apart. Third, the irreducibility between these two stages of tasting suggests that while milkfish are characterised and treated as a bulk commodity, this irreducibility undermines the base for milkfish being a bulk commodity from time to time. Fourth, a bulk commodity is not bound to be so; neither are milkfish bound to be a bulk commodity. Instead, it is enacted by filtering out characteristics that are defined as failed or unqualified. Failed or unqualified characteristics are not a by-product but a staple product of tasting. In this way, milkfish as a bulk commodity comes into play.

6.4 Patchwork of Practising a Fish Commodity

What is the point of having a taste criterion that is so *inclusive* as to qualify milkfish as being the same? The simplest answer is that another part of the milkfish assemblage, other than milkfish farming, needs stability in milkfish supply to cope with the seasonality of milkfish produce. In this section, I turn to this other part of the milkfish assemblage, which includes bulk buyers, fishmongers, processing plants and cold-storage plants. A contrasting case is 'quality' milkfish growers and suppliers, for whom the homogeneity of milkfish is questionable. What I focus on are the *modes of practice* that these actors hold. By modes of practice, what I mean are ways of doing and figuring what is suitable for a particular situation in which 'actors' are located, and I also suggest that different modes can be interwoven. Bulk buyers hold the mode of bulk buying, but other actors may hold the same or interweave this mode into their own mode of practice. However, although different modes of practice are 'interweavable', they are not always cooperative, but rather in conflict sometimes.

6.4.1 Bulk Buying

Hideo is a retired milkfish bulk buyer whose business has been run by his son since 1996. He held the same opinion about qualified milkfish, i.e. that 'no flavour is a good flavour', like many others. As a night bulk buyer, the most important thing was to prepare and schedule the amount of fish at least one week in advance (interview, Hideo, 2015-

0904). The daily demand from his customers for fish was fairly foreseeable in terms of quantity. Even if sometimes customers withdrew scheduled orders, the extra fish could either be sold through a fish auction or sold to other bulk buyers who required them. On other occasions, bulk buyers still had to exchange goods in their possession because it was not uncommon for one size of fish to occupy too much proportion in a harvest batch, while his customers needed other sizes. It seems that there was (and still is) a 'social tie' between bulk buyers, through which they can interchange goods they hold. However, fish from different fishponds were interchangeable only because the quality of each pond of fish raised no concerns having passed pre-tasting. After all, it is hard to imagine that that 'social tie' can be kept if every single pond of fish is a matter of concern.

As a bulk buyer, Hideo never meant to pick from saltwater fishponds, although he preferred saltwater milkfish. Note that the cook, Mr Tong, would not take saltwater fish because his restaurant had no capacity to take up a whole pond of fish. Although Hideo had this capability, he did not adhere to this preference in his business, first, because it was not always possible to have saltwater fishponds ready for harvesting, though the demand from his customers was always there. Secondly, ever since deep-water farming became widely adopted, his customers' demands for fish were for ones with a significant belly shape. Saltwater milkfish do not have as significant a belly shape as freshwater ones. Thirdly, even if there were saltwater milkfish in hard clam ponds, the density of milkfish therein was too low. In Hideo's words, 'the milkfish out of three hard clam ponds cannot compare to one deep-water pond of milkfish in terms of quantity' (interview, Hideo, 2015-0904). The harvesting work would have taken longer. Besides, the size of milkfish in hard clam ponds was too large per fish since they could have lived there for over two years. Such 'oversize' fish would be 'economically inefficient' for his retailing customers, such as milkfish restaurants and fishmongers who profited from filleting and selling deboned belly. Since one huge fish could only have one belly, and the rest of its body could not generate the same profit as the belly, these customers would prefer to have two fish of medium size instead of one large fish.

For milkfish processing plants, which have production lines to fillet and process fish into raw and cooked products, their major customers include retailing chain stores (frozen filleted products) and middle fish dealers (chilled fillets) in the northern region of Taiwan, and a small number of products go to overseas market. They share the same concern with night bulk buyers about the seasonality of milkfish production, but being oversize is never a serious issue. The manager of a milkfish processing plant said that the seasonality of milkfish production made his business hard to run (interview, T&C Co., 2014-0304). Sometimes, the off season can be for over six months a year, and thus the spot price remains high for all this period. The manager of another processing plant said that they could not take a break and send hired workers back just because it was the off season, and their customers might turn to competitors and never come back (interview, Jet Co., 2014-0606). Thus, even if selling processed products at a loss, processing plants still have to run as usual and wait for peak season to recoup their losses. For processing plants, filling the capacity of the production line is the main concern.

Figure 6-18
Processing Lines of Milkfish Products

The photo is taken by the author.

This seasonality is more obvious to relatively large-scale processing plants than to small ones (Figure 6-18). First, 'oversize' fish are not counted as a problem since the cost of producing belly products out of oversize milkfish can be built into the production line for filleting. Secondly, a manager said that, during the off season, they even had to fill the production line with other farmed fish. Thirdly, when it came to the quality of milkfish, one said that 'there is no matter of good or bad, only big and small; they are all the same price [by weight]' (interview, T&C Co., 2014-0304). Milkfish are the same as long as they have been through pre-tasting and are on the production line. A manager's words express the core issue of a bulk commodity, 'I cannot allow any problematic fish into my plants. If fish enter my plant, I cannot tell where they go' (interview, T&C Co., 2014-0304). That is, as soon as several ponds of fish get into the plant, they will soon be mixed and made into products. Thus, it must be ensured that ingredients (milkfish) are of same quality in the first place; the only allowable variation is the 'material specs' of products: weight, size and price. Accordingly, we may say that bulk buyers cannot care less about the qualities of milkfish because the fish are treated as a homogeneous bulk commodity, while they cannot care more about them because qualities are made equivalent to weight, size and cost of each batch of fish.

Interestingly, a 'quality-oriented' producer of milkfish who now has a processing plant said that he once wanted to outsource his milkfish produce to be processed by a processing plant located nearby (field note, Yang, 2015-0818). However, he was very shocked by the 'flavour' of the sampled milkfish products provided by that processing plant. After paying it a visit, he declined their cooperation. He was so afraid that his 'quality' produce would be mixed with such bulk commodities.

This part covers two kinds of bulk buyers: night bulk buyers and milkfish processing plants (big and small-medium). They are similar, in that they provide their customers with daily harvested fish. What their customers and they themselves target is the 'freshness' of milkfish (*Tshinn*). They are commonly disturbed by the seasonality of milkfish production. To maintain a daily supply, they cannot embody too much of their preferences into what they harvest from fishponds in all directions.

6.4.2 Belly-added

Here I turn to fishmongers at wet markets to see how they deal with the seasonality of milkfish production and fish bodies. Fishmongers usually place orders with bulk buyers. In some cases, they may turn to other fishmongers or processing plants to buy semi-processed milkfish fillets. For this kind of fishmonger, milkfish are only a sideline product on their stalls. However, it is not uncommon to see fish stalls specific to milkfish in traditional markets. They deal with the 200 or more bones within a fish body at the scene. These fishmongers order their stock from night bulk buyers by designating the number of fish boxes and the size of fish they require. Early in the morning, around 2 a.m., bulk buyers deliver fish stock directly to fish stalls, and then fishmongers deal with the fish as they arrive at around 3 a.m. Their customers include ordinary consumers, other fishmongers and milkfish restaurants.

I went to fishmonger Mr Chiou's stall in Tainan in late April 2014, when it was still off season for milkfish. At that time, the price was advantageous to fish farmers but not to fishmongers. Early in the morning at the stall, Mr Chiou dumped fish out of a fish crate onto the stall and started to fillet them. Each fish's body seemed to be so stiff that the fishmonger had to press some of them down with some effort. The work of filleting was done by working through a procedure for filleting a whole fish one step at a time, e.g. cutting off heads, removing gills and guts, and taking out the belly (Figure 6-19); each step dealt with one thing. The rest of the fish body, without head, belly or guts, was left by the stall until his assistants came to fillet it further.

Mr Chiou said that their knife techniques are different from most milkfish filleting factories. For fishmongers, fish guts, stomachs and intestines are all edible and saleable if they have undergone belly evacuation. Thus, fishmongers carefully separate out those parts out of a fish by hand. As Mr Chiou cut off the head, he would not go straight through but kept the head attached a little and then stretched his fingers into the body to take out the edible organs. He said that directly cutting off the head could risk breaking the gall bladder and making the intestines bitter. By comparison, other milkfish processing plants cut off the head in another way, simply because they do not sell those internal organs. In a way, fishmongers' cutting is more like 'carving' raw fish with chefs' knives.

Figure 6-19
Filleting Bellies from Bones on Fishmongers' Stalls

The photo is taken by the author.

Fishmongers seek to maximise the profit from a fish in hand. This maximisation is done by carefully sensing the fish in hand. In most cases, Mr Chiou held one in his hand and cut the head off of another out of the same fish box without hesitation; the same box means the same size. However, there was one time that he measured a fish in his hand by dipping it several times and then placing it on a scale to read the weight. He was not quite sure about the weight of this one and needed the scale to be sure. He said, 'It felt bigger. I would like to sell it at a higher price if possible'. By then, it was still off season for milkfish; thus, the cost of milkfish stock was relatively high. But the retail price of milkfish could not fully reflect the high cost. For instance, the retail price might increase by up to 5%, while the spot price could increase by over 50%. Fishmongers require milkfish stock daily, as do their major customers such as milkfish restaurants, but the latter can place their orders instead with bulk buyers and do the cuts themselves if the cost of fishmongers' cuts is too high. Therefore, fishmongers will haggle over even a few ounces.

Watching over the weight of a single fish is not the only way to generate profit. On the side of a milkfish, it has a lateral line that is used to separate the upper, dark body, and the lower, pale body (Figure 6-20). A milkfish belly is taken from both sides of a fish. A few millimetres below the lateral line is an intangible boneless line that only exists in practice. The products of milkfish belly have regular vernacular names, i.e. big/black, white, small and deboned. Deboned belly has been on the market since the early 1980s, after deep-water farming. At the very beginning, deboned belly was the smallest product of milkfish belly since the cuts have to avoid all the bones attached to the flesh; thus, deboned belly is flimsy and small. And the size of the belly depends on the size of the whole fish; only a big fish can have a big belly to be cut off. At the time when the market size of milkfish was below 300 grams per fish, deboned belly might not have appeared.

Figure 6-20
The Lateral Line of Milkfish

The photo is taken by the author.

According to Mr Chiou, fish bones are located 1 to 5 mm below the skin. Thus, when filleting belly with bones, the cuts must take a 'turn' to a certain degree as soon as the knife is in the fish body and there are only a few millimetres of margin to avoid the bones. Though the cutting appears intricate in words, when fishmongers were doing it, it took less than 30 seconds to cut a belly out. Mr Chiou said that the most difficult moment to fillet a fish is when it has just died. The flesh of a just dead milkfish in professional fish filleters' own terms is 'still living'; even the sharpest chef's knife will stick in the living flesh of a dead fish. Living flesh has to be tackled by covering it with ice for a period soon after the fish dies, so that the flesh will gradually turn 'dead' (field note, fishmonger Chiou, 2014- 0507; field note, Mrs Tong, 2014-0218).

During the off season for milkfish production, fishmongers prefer small–medium fish to large ones. This preference is mostly because the most profitable part of a milkfish is its belly (deboned or not), but each fish has only one belly regardless of the size of the fish. Thus, by ordering a box of small fish rather than big ones, fishmongers can have more small fish, which means more bellies, than in a box of big fish. Besides, the retail price of milkfish belly is nearly stable, regardless of seasonality, unlike the spot price. If fishmongers can make the 'same' size of bellies out of smaller fish, they may make up the higher cost due to the off season. As such, fishmongers prefer smaller fish so as to have as many fish (bellies) as possible, rather than a few large fish. Under this circumstance, ranging between figures 9 (nearly 666 grams per fish]) and 10 (600 grams per fish), those previously 'unqualified' fish (500 grams per fish) are more welcome than in peak season.

More importantly, with small fish, fishmongers start filleting the deboned belly above, rather than below, the lateral line, wherein there are numerous thin bones. In other words, figuratively, the 'boneless line' moves upwards despite the presence of annoying bones. After filleting the belly from flesh, fishmongers will use pincers or scissors to pick out the bones, or they may use chefs' knives to shave the bones out of belly fillets in hand. On the one hand, what fishmongers do is pack fish meat that is not regarded as belly into the 'belly', rather than making a belly fillet by taking it out. On the other hand, the 'belly' as a physical part of a fish body is enacted to be expandable or movable. We may call this way of doing milkfish *belly-added*. That is, taking off the belly does not always mean reduction, it can also mean adding something.

Belly-added practices are done in an effort to cooperate with bulk buyers and to adjust to the seasonality of milkfish production. During peak season, the source of the preferred size of milkfish does not bother fishmongers; they can ask for whatever size they require from bulk buyers at a low price. During the off season, however, they have to deal with high costs and rigid retailing prices and wait for the coming peak season. The bottom line of enacting deboned belly in the off season is the signature black linings of belly fat in the middle of the fillet and meat clear-cut from bones.

6.4.3 Embodying Variances

Among bulk buyers, there are people who hold different views about the qualities of milkfish. Some appeal to the history of milkfish farming, like the 'home of milkfish', while others appeal to 'physical' differences between fishponds, and between processed products as well.

Mr Chai is the chairperson of a milkfish producers' cooperative, a seafood company, and has run a competition called the Milkfish Championship for years. On the one hand, his milkfish-related business targets *differentiation* between milkfish more than a bulk commodity. Although his plants process undifferentiated milkfish collected from numerous fishponds to make cooked, processed food, the processing plants are hygiene-certificated by an officially recognised laboratory. By attaching a food safety certificate, this is one way in which he differentiates his milkfish products from others.

Mr Leung is another quality-oriented milkfish supplier who stocks his two fishponds with a low density of milkfish, rejects the use of drugs and electrocution at harvest, and acquires EU export certificates by passing safety inspections (interview, Leung, 2015-0704; field note, Leung, 2015-0912). The fish that Mr. Leung is proud of have 'authenticity' of flavour. He said that neighbours would rather sell their produce to bulk buyers but buy fish from him because Leung's milkfish have the original taste, or the 'taste of proximity' (Paxson 2012). Here we notice his efforts to interconnect with the original taste (a concept concerning 'tradition') and food safety (a concept related to 'modern hygiene').

Apart from resorting to food safety and hygiene certificates, another way of differentiating milkfish is through embodying differences between different fishponds. Mr. Chai collects milkfish from various fishponds; by collect, it means that he seeks fishponds where milkfish are said to have outstanding taste; and the locations of fishponds will be marked. He said, ‘You probably notice that the quality of milkfish varies considerably’ (interview, Chai, 2015-0920). In his view, the homogeneity of these ‘same’ milkfish makes little sense. He said, ‘You know, the best milkfish I ever taste are not from what you call saltwater ponds, but the salinity is under 10 [seawater is over 33 mille]’ (interview, Chai, 2015-0920). In fact, this outstanding fishpond is one of his own. He recalled that, once, a fish farmer wanted to participate in the Milkfish Championship but could not net his own fish. Given that Mr Chai was the host of the contest and could not participate, he gave the fish farmer two fish from that outstanding fishpond for free, these had been caught two days earlier and soaked in ice water. In the end, however, the two fish almost won the championship but got low scores for appearance—for they had been stored carelessly for two days.

The outstanding taste of milkfish that Mr Chai seeks is substantial, with even physical characteristics distinguishing them from those of others. Mr Chai recalled that once he cooked a fish given by his friends as a present. It had a familiar flavour, which reminded him of the ‘authentic’ saltwater milkfish flavour back in the old days. However, he could not finish the whole fish because the flavour—though not an off-flavour—was only a ‘taste of proximity’ (Paxson 2012). This taste is no longer counted as good but has nostalgia for him.

In an attempt to figure out how differences between his and others’ fish occur, Mr Chai does milkfish farming experiments in different fishponds. At the moment, he can only tell that the ‘environment’, like water and soil, plus fishmeal contribute to a good taste. However, the difficulty in commercialising outstanding milkfish is that the density of these fishponds cannot be compared to regular fishponds with only a half or one-third of the density. He said that fishponds nearby—though with similar environmental conditions—cannot produce the same quality of fish as his. He once tried to stock the ponds with more fish, but the good taste disappeared. A low density, however, hinders the possibility of turning a good taste into a bulk commodity. This is also why Mr Chai holds the Milkfish Championship so that he can register and collect 'fishponds' where the milkfish are judged as good. As much as safety and hygiene certification, the competition is used to embody differences in the quality of fish between fishponds. He attempts to use the resources of his processing plants and production cooperatives to bring these different good milkfish under the same brand. In this way, the mode of a bulk commodity can cooperate with small volume production. That is, small-volume milkfish can become a product, while the bulk commodity becomes 'outstanding'.

One similarity between these 'quality' milkfish suppliers is that they attempt to identify 'physical differences' between their milkfish and others, differences which can be 'proved' objectively and collectively. For instance, they actively seek certification of all kinds issued by university-based laboratories or officially-recognised institutes; some of these producers even have multiple certification. Most of these quality producers/ suppliers are small in scale, and so certification fees are high for these producers. Despite this, acquiring certificates is how these quality producers/ suppliers communicate with 'invisible mouths' (Lockie 2002). In most cases, traditional markets and chain supermarkets will rarely see these quality products because the pricing of these products needs to include the cost of low-density farming and certification fees.

Moreover, these quality producers/ suppliers have different criteria for valuing the qualities of milkfish. With regard to milkfish belly and belly fat, for instance, Mr Chai states that the good taste of milkfish comes from an even distribution of fat over the whole fish body, rather than being concentrated in the belly (interview, Chai, 2015-0920). He describes how his appetite is activated by fish fat covering the whole chef knife when he is preparing fish. This experience or enactment of good taste is not what processed milkfish fillets, whose liquids are taken as waste, can provide. Alternatively, milkfish are endowed with new values linking to authenticity (the original taste of milkfish), food safety, ecological and biological friendliness, and so on (field note, Leung, 2015-0912). These new values or quality criteria may be overshadowed by the common way of handling milkfish as a bulk commodity. However, as much as Mr Chai is trying to maximise the good taste of milkfish, the logic of a bulk commodity may not entirely be excluded by quality-oriented milkfish suppliers.

6.4.4 Cold Storage and Export

Cold storage is what the fishery agency of the central government advocates to tackle the problem of a falling spot price during the peak season of milkfish production on the one hand, and to stabilise the retail price during the off season on the other. The Fishery Agency subsidies fish farmers (at least ten) to form cooperatives for milkfish production and sales. However, in the domestic market, milkfish from a cold chain and storage are not appealing to either retailers or end-customers.

Filleted and processed products from cold-chains are quite contrary in quality to what night bulk buyers target—a fresh flavour (*Tshinn*). The pursuit of no distance between ponds and markets is the main reason why night bulk buyers and their customers are willing to pay a premium price. The manager of a processing plant said that they did try to process defrozen milkfish into fillets, but the quality was terrible (interview, T&C Co., 2014-0304). Even milkfish processing plants organised by milkfish production cooperatives which have processing lines and cold storage equipment target the raw milkfish market as well. Thus, it is not unequivocal to say cold chains and storage have an effect on stabilising the spot price of milkfish.

However, cold storage alongside cold-chains does bring new opportunities to some ‘quality-oriented’ milkfish suppliers. Chain supermarkets now have packages of the frozen and filleted milkfish belly on sale; most quality-oriented milkfish suppliers survive on this kind of distribution channel. Some of them have broken into high-end and organic food supermarkets by resorting to hygiene-certified food safety. For instance, Mr Leung’s milkfish produce, in his words, is reserved by high-end markets even before the start of stocking new fingerlings (field note, Leung, 2015-0912). However, stability of supply is a problem for these quality-oriented producers. Another quality-oriented milkfish supplier who brands his produce as ‘wild-farmed’ and hygiene-certified buys in his neighbour’s milkfish produce so as to meet the demand from a high-end supermarket (interview, Kim, 2015-1109).

Among bulk buyers of milkfish, there is a kind of buyer called ‘cold storage plants’. On the part of fish farms, however, cold storage plants are not attractive at all. The spot price offered by these plants is the lowest among all bulk buyers. Cold storage plants only buy in milkfish during peak season when the market price falls. As for these companies, there is no such thing as oversize or undersize fish. All milkfish count as qualified fish; the concept of a bulk commodity connects and works well with cold storage and the cold chain. Their primary product is frozen whole round fish. Their major customers are oversea seafood wholesalers, who need milkfish to increase the diversity of their seafood supply (interview, T&C Co., 2014-0304).

Cold-storage plants usually cooperate with international seafood traders who have no fish in stock. But traders will receive orders worldwide; what they do is to save seafood wholesalers the effort of finding prospective sellers or growers one by one (interview, T&C Co., 2014-0304). When orders are placed, traders will complete the bureaucratic procedures, such as paper trails of hygiene certificates, and then tell the freezing companies when to pack and ship. Thus, what matters to cold-storage companies is the cost of the milkfish stock they acquire.

Very occasionally, milkfish farmers need cold-storage plants, e.g. when a pond of fish goes wrong (dying or turning bad in flavour), and no other bulk buyers want to take it up. At this time, cold-storage plants may be the only ones that will take the fish, but at a price far lower than the market price. According to fish farmers, however bad milkfish may taste, they can be dumped in cold-storage plants. As for the destination of those 'failed' milkfish, which even Asian supermarkets in the U.S. will not take, they will probably be exported to the Middle East where consumers are regarded as having 'no taste for milkfish'. I asked an employee of a cold-storage plant if they might confuse different ponds of milkfish in the same freezing warehouse; they simply replied, 'No way.' Despite this, considering that the manager of the milkfish processing plant mentioned earlier said that milkfish are mixed as soon as they are in the plant, I have my reservations about what this employee said. The cold-storage plant could have the same view as the processing plant that milkfish are all the same once they are brought into the warehouse and leave all variances in quality behind; the only difference is the costs they pay for the fish.

To a large extent, cold-storage plants may see themselves as 'helping out' fish farmers (interview, Hsiao, 2015-0630; interview, T&C Co., 2014-0304), while fish farmers may see themselves as being 'taken advantage of' by cold-storage plants. Although there may seem to be a conflict between cold-storage plants and fish farmers, the reason why they are conflict is that they share the same way of doing milkfish, based on cost-control. In fact, if cost-controlled milkfish farming unavoidably has a proportion of failed milkfish in the shadows, cold storage and exporting may be ways to deal with it. In this sense, cold-storage plants and fish farmers are mutually dependent.

The crux of this chapter is that undifferentiated, homogeneous and singular milkfish in bulk are only one version of milkfish and one way that milkfish collective can be assembled. Previous sections have shown that however hard the work of purification attempts to create an undifferentiated bulk commodity, its 'purity' is in question. Some would therefore call for more work of purification in the name of integration, as will be seen in the next chapter on the export scheme for milkfish. However, I suggest that it is through the patchwork of multiple modes of practising milkfish as a commodity that both milkfish and milkfish assemblage take shape.

Chapter 7
Continuation of Bulk Commodity by Exports Scheme

When the scheme for cross-straits contract farming came to Xuejia in 2011, it attracted fish farmers' attention, not only in Xuejia but also in other regions. The export scheme for milkfish contract farming was perceived as offering a bright new future to fish farmers. After five years passed, however, the whole scheme ended up being closed down in 2016; the Chinese market rejected the fish, as the chairperson—Wang Wen-Tzong—for the milkfish exporter in Xuejia spoke to a Chinese on-line news agency:

> Wang Wen-Tzong admitted that all the contract-farmed milkfish from Hai-Kuei Seafood Co. last year was resold in Taiwan due to the sales situation in mainland China; none of it ever crossed the Taiwan-Strait. (Zhao 2016).

When I introduced milkfish as a case under study to a scholar from Shanghai—who appreciated Taiwanese fruit—by saying that it is a fish that Chinese consumers do not eat, he simply replied 'How could it be possible that there is one fish that the Chinese don't eat? Just don't sell it to the mainland yet!' (personal conversation, Dr Dong, 2016-0621). Apparently, even this person based in Shanghai had never heard about the fish. If Chinese consumers have such accepting stomachs, how could such a scheme fall apart?

At the time when the scheme for contract-farming was implemented, between 2011 and 2015, it was often criticised for being a scheme born out of 'political purchase' in relation to the policy for fruit diplomacy (Hsieh 2011) in 2005 which granted zero tariffs to several types of Taiwanese fruit to ease fruit farmers' aversion to 'reunification' with China. A Taiwanese magazine published a documentary report and suggested that although the sales figures for milkfish in Shanghai were poor, the export scheme continued because it was a politically oriented scheme ordered by top ranking officials in China. In other words, there must be an ‘invisible hand’ manipulating behind the scenes; this is what the term political purchase implies. However, it would be a pity to stop the enquiry into politics at political intention only. Say there was no such ‘invisible hand’ like the Chinese government, could there not be politics involved?

In response to those who have criticised the ANT for ignoring power relations, Latour (2005) argues that ANT seeks to explain power rather than use it as a resource for explanation, in parallel with the idea of reversal of background and foreground (Latour 2005; Latour 1996). On the government’s intervention in Norwegian salmon farming, Lien (2015, p.73) also emphasises distinguishing between the ‘intention of control and control as a resulting outcome’. In both cases above, dominance over others is a result or effect, it is an object to be explored. In this chapter, I intend to explore the formation of power alongside the assemblage of the export scheme and milkfish, rather than using ‘power’ as a given fact or factor to explain this assemblage. The aim is to argue that the export scheme was a continuation of milkfish being a bulk commodity by other means.

7.1 Initiation of the Export Scheme

At first glance, the export scheme was politics-laden. The export company— *Shinejai Food Co.*—set up in Xuejia targeted matters to do with the export scheme on the side of Taiwan. The chairperson of Shinejai Co. is Wang Wen-Tzong, an ex-speaker of Xuejia town council. The chief manager of Shinejai is also an ex-town-council member. There are another four to six staff seated in a small office, half the size of the chairperson’s office. I could not determine the exact number of staff because some of them are formally registered with different organisations under Chairperson Wang. A frequent visitor to Chairperson Wang is a current member of the City Council, Councillor

Hsieh, a former mayor of Xuejia Township. In the first interview with Chairperson Wang in 2014, Councillor Hsieh was seated alongside but spoke very little.

From time to time there were tourist groups comprising officials or semi-officials from China who came to visit Xuejia and were looked after by staff at Shinejai. Xuejia town is twinned with Baoan District, Shengzeng City, Guangdong province, in China. It is said that every township in Taiwan (over 300) has already been 'adopted' by either a city or province of China (interview, Huan-Chih Su, 2015-0807). The chairperson, Chairperson Wang, has a branch office of Shinejai Co. in Baoan. He said that the branch handled the import of milkfish meatballs (a processed, cooked food) from Taiwan before the export scheme began.

In mid-2010, Taiwan and China signed an economic agreement under the framework of the World Trade Organization. Alongside the agreement was a list of 500 or more types of goods to be given preferential tariffs in advance of 2011. Ironically, the initiation of the export scheme had little to with 'free trade'. In August 2010, the deputy of the Taiwan Affairs Office of the Chinese central government, Zheng, came to visit rural areas in Taiwan, including Xuejia. Councillor Hsieh arranged a meeting between Deputy Zheng, Chairperson Wang and local fish farmers to discuss how to improve local people's livelihoods. Other than Xuejia, he also visited another town where milkfish farming was widely undertaken. At a certain point, Deputy Zheng, Chairman Wang and Councilor Hsieh decided to try a scheme for contract farming milkfish in Xuejia. Then, Deputy Zheng called a state-run company, Shanghai Seafood Corporation [上海水产集团], to handle the business on the side of mainland China. This corporation is the biggest seafood wholesaler in Shanghai. Most of the time, it acted more like a supplier than a marketer, in that it supplies seafood to retailers or middle dealers rather than directly to consumers.

It is hard to resist using a 'political frame' to understand the initiation of the export scheme. After all, first, the Chinese government has long had the intention to take back Taiwan, which has been regarded as a renegade province of China since 1949. Second, otherwise, it is difficult to understand how a 'small' company like Shinejai Co. in a small district with some twenty thousand or more of population in Taiwan can be compared to the largest seafood supplier in Shanghai, with over twenty million population. Explaining the symmetry of this 'asymmetry' by resorting to 'a political frame' is nothing new. This frame, when it comes to affairs concerning Taiwan and China, is usually the 'cross-straits relationship'. This relationship is one whereby the Chinese government's Taiwan policy targets reunification with Taiwan, while Taiwan's government resists it, and so the Chinese government will not officially interact with the government of Taiwan; most of the time, it seeks to establish a 'united front' with the 'people' of Taiwan. One exception to this rule is when the government of Taiwan also recognises the so-called 'One China Policy/Principle', whereby both sides of the Taiwan Strait are part of China. Although the 'One China' that the Chinese government and worldwide major powers recognise is known as the People's Republic of China, the Chinese government alongside some Taiwanese politicians created a term called the '1992 Consensus', thus avoiding direct recognition of 'One China' of which Taiwan is a part. At least, it seems to be that way.

The '1992 Consensus' is a strategic term and concept. It is a concept because it refers to the first time there was a cross-strait semi-official dialogue since 1949, held in 1992. It is said the meeting came to an agreement that both sides recognised, 'One China', although 'One China' meant different entities to the two sides. However, some said that this difference meant it could not be called an agreement or consensus because what was at stake was the meaning or content of 'One China'. Despite this, the '1992 Consensus' is also a strategic term.

By referring to, recognising and speaking it, both governments can have an 'official' and 'stable' 'cross-strait relationship'. The signing of an economic agreement is an example of the improved relationship.[10] In fact, the 2008–16 administration of Taiwan recognised and spoke out this consensus, while the 2016 administration has made no mention of it, which is condemned by the Chinese government. This discrimination reinforces the way that the export scheme is understood within the frame of cross-strait politics. It was initiated in 2011 when the administration recognised the consensus but ended in 2016 when another administration made no reference to it.

However, one dimension was omitted from the discussion of the export scheme, which is milkfish. Mostly, people talked about this export scheme as well as other export schemes for Taiwanese crops and fruit since 2005; all were an effect of cross-strait politics (see for instance: Chiao 2015). Partly, people talked about milkfish, but it was only taken at face value. A documentary report suggested that the fish were bony and had a muddy taste so that people in Shanghai could not accept it (Lai 2011). However, as Chapter 6 suggests, treating milkfish like an undifferentiated, bulk commodity is an object of enquiry, not a point of departure. First, it would be surprising if all batches of fish always tasted the same. If that was the case, how all milkfish kept the same bad taste would deserve our attention. Second, if milkfish and milkfish production are under the mode of a bulk commodity, to what extent can they 'co-operate' with the export scheme? Third, in an attempt to reverse the explanatory relation between the export scheme and cross-strait politics, how was 'cross-strait politics' enacted by implementation of the export scheme? I will try to answer these questions in the following sections.

[10] In fact, the relation between the consensus and the cross-strait relationship is an instance of a reversal between large and small. A small slogan like the '1992 Consensus' can refer to an entity as big as the 'cross-strait relationship'.

7.1.1 Annual Meeting on the Contract Price

Since 2011, every year towards the of March, Shinejai Co. called a meeting to specify the details of the contract to participating fish farmers. It was held in March because early April was the conventional time for stocking with new fry, and the expected harvest time could range from August to December. The meeting I attended was in 2014. Then, in late March, southern Taiwan was still cold by local standards, around 20º C, plus a strong wind in wide open areas, so people needed to put on winter jackets, and milkfish's appetite for feed was still low.

The meeting was held in a conference room in Xuejia District Office that could accommodate over a hundred people. On the day, at least five news agencies showed up. The layout was arranged for face-to-face conversations between Shinejai Co. on a platform above ground level and fish farmers seated on chairs. Because the room was an official facility, it was stipulated to hang on the wall a photo of the national flag of the Republic of China (established in mainland China in 1911 and fled to Taiwan in 1949) and a photo of its national founder. The managerial staff of Shinejai Co. were seated on the platform with their backs to these nationalistic symbols, while the audience faced these symbols and the staff.

The host, Chairperson Wang, took a seat alongside other managerial staff. In his opening remarks, Wang apologised for the delayed pay the previous year. Then, Chairperson Wang spoke of a plan to build a cold-storage plant in Xuejia so as not to be restricted by the limited freezing space provided by a collaborative plant. He recalled the experience of the previous year when it took two days for a batch of milkfish to be put into storage, although the fish had been covered with ice. Afterwards, Chairperson Wang came to the crux of this meeting, the contract price for that year (2014).

Chairperson Wang declared that the contract price of 2014 would be 40.5 NTD (£1 was approximately equal to 50 NTD at that time) per catty (600 grams), which was a new low point over three years, and added that this price, it seemed to him, had been decided. Hearing this, the audience was in uproar. Chairperson Wang explained this drop was because the collaborative corporation in Shanghai could not endure more losses. In terms of the cost structure, he said, the market price of whole-round milkfish sold in supermarkets in Shanghai was 10 RMB (£1 equals 10 RMB) per 500g, but the market price could not reflect the total cost, including vehicle shipment (1.5 NTD per kg), cold storage (12 NTD per kg per day), the cost of sea transportation to China, and value-added tax in China (17%). The market price in China should have been at least 20 RMB to break even. In his company, he kept saying, only 2 NTD had been earned from the fish per 600 grams. And this year, the Shinejai Co. had already given up 0.5 NT of commission fees and added it to the contract price, which should have been 40 NTD. So, the price, 40.5 NTD, it seemed to him, was settled already.

On the spot, Mrs Drew first stood up to respond. She was upset because 'I was already disappointed last year at the contract price of 42.5 NTD' (annual meeting, Mrs. Drew, 2014-0321). In fact, she was an exemplary person who had been invited onto many TV programmes and been interviewed by some major print media, as a representative of fish farmers, to talk about the benefits that contract farming—thanks to the cross-strait economic agreement—brought to her and her family. Before this meeting, I had interviewed her about being part of the contract scheme. She said 'I am grateful to the mainland compatriots for taking care of us' (interview, 2014-0220). At the meeting, however, she asked Chairman Wang 'if it is like last year, [when the spot price] rose to 50 NT, I still sold it to you without breaking the contract … if [the price] this year rises to 50 again, can I freely sell [fish]?' (annual meeting, Mrs. Drew, 2014-0321). Wang responded that 'this would make my company close down' (annual meeting, Wang, 2014-0321).

Then, Mrs Drew replied, '40 [.5] NTD per catty, fish farmers cannot earn a living from that; following this trend, next year the price could drop to 38; I feel we are [manipulated by] the united front [tong-chang; 統戰 in Han Characters]' (annual meeting, Mrs. Drew, 2014-0321). Mrs Drew was upset mainly because the cost of milkfish farming had soared; and the government of Taiwan no longer provided subsidies on electricity. After speaking up, she left the conference room, regardless of Wang trying to persuade her to stay.

Chairperson Wang defended himself, saying 'The contract price for the first year was 45 NTD, but people still said that this was because of mainland China's tricks on a united front' (annual meeting, Chairperson Wang, 2014-0321). He then explained much about how Shinejai Co. had been condemned because of all kinds of preferential measures taken for fish farmers that broke market conventions. Another fish famer, Kevin Liao, spoke up, saying that even if the current contract price was unsatisfactory, the arrangement that Shinejai Co. made had been pleasing. The arrangement included Shinejai Co. taking all the crop, even if the amount was over the contract, calling up net-workers even if the time was rush when the fish were dying, and the company offering an appropriate price on those just-dying fish. In addition, the company made a concession to fish farmers on 'water money' (see the last chapter on harvesting), going from deducting 5% of water weight to 3%. Yet fish farmers, nevertheless, spoke of their discontent with the falling contract price.

Chairperson Wang replied that he would like to make a concession on commission fees, from 1.5 to 1, and add this 0.5 NTD to the contract price. Then, he asked if anyone had different thoughts on the contract price for this year, 41 NTD. He said that if anyone wanted to take on the business, he would like to concede his seat as well. After a short while, some people stood up to show their support in words. Kevin spoke up, saying that Wang leaving would be a loss for all fish farmers because Wang was the one who understood both the business and fish farmers' efforts, 'So please don't abandon the fish farmers; what fish farmers want counts on you to strive for us' (annual meeting, Kevin Liao, 2014-0321). Wang replied, 'If you want me to stay, you are going to have to support me in return. And, if you do support me, please applaud' (annual meeting, Wang, 2014-0321). Afterwards, fish farmers and Wang came to agree on a contract price for this year of 41 NTD per 600g.

7.1.2 Work of Deletion and Unilinear Heroism

This annual meeting was like a fish farmers' convention, in which Chairperson Wang was, officially, made the leader, despite some twists and turns in the process. He spoke of the difficulties in market sales, gave a breakdown of costs and commission fees to the audience, made a concession on the contract price to fish farmers, provided preferential treatment, and asked for fish farmers' support. Different voices were just a temporary transition; twists and turns would be back on track. As an ex-politician, this stage could not be more familiar to Chairperson Wang.

We may say that Chairperson Wang was a 'heroic actor'. In his speech, he reiterated the efforts he had made, the criticisms he had withstood from the outside world, and the consideration he had for fish farmers in Xuejia. Law (1994) notes the work of deletion in the making of ranking systems in which high and low rank are enacted as if they are the natural order. He emphasises that the formation of dualism between high and low rank in an organisation relies on the deletion of traces of the high having once been low or even that the big relies upon the small, no less than the other way round. There is no difference as to Chairperson Wang, his Shinejai Co. and the annual meeting with fish farmers. By exposing himself to the public, Chairperson Wang was not giving the impression of weakness but rather self-advertising, in contrast to being self-effacing (Law 1994, p.56). All he suffered and strived for was for the benefit of fish farmers, not for his own interest.

At the end of the annual meeting, the fish farmers and the managerial staff together took group photos; by then, Mrs Drew had come back with a smile on the face, lining up and talking with others. In the group photo, the backdrop was a national flag, and a photo of the 'nation's founder' as well; it seems that they now align with one another, being on the same united front. A few days later, the photo was published along with Shinejai Co.'s news release on 'a meeting briefing about the contract for milkfish farming in 2014' on the official website. The photo creates a divide between the back and front stage. The quarrels and discontent at the back stage were enveloped and separated from this photo. On the frontstage, the two sides of contract farming were now 'partners' on the same footing. They were a group of people who worked together and moved towards the same target—the production and export of milkfish.

However, two months later in May, after the contract had been made with fish farmers, the same photo was published again, along with another news release to announce that the collaborative partner on mainland China in 2014 had switched to another seafood processing company. Apparently, the collaboration with the Shanghai Co. had ended.

Figure 7-1

Time-Shift of the Briefing on Milkfish Contract Farming for 2014

National symbols hang on the wall in the background of this photo. This photo was retrieved from the official website of Shinejai Co.: http://www.shinejai.com/index.php/news Retrieval date: 29 May 2014

More important was the date of the news release about the annual meeting that took place in March being shifted to May as well (Figure 7-1). An old event was now placed under a new deal, with a new agent (the seafood processing company). It may well be that the Shinejai Co. was not trying to doctor the sequence of events, since everyone could now trace back to the news about the annual meeting in March. Rather, it was likely that Shinejai needed to make things straight and unilinear—as if there had been an order to events after the annual meeting, making a contract and stocking fingerlings—by effacing traces that could have been interpreted otherwise. What ought to be kept on the backstage could not move to the frontstage. As a fish farmer was suspicious after he knew about the switch of the collaborator, the annual meeting was about reducing the contract price first so as to find a new buyer who would like to take it on. Note that this collaborator was a fish processing plant whose 'interest' was not in line with fish produce, because the higher the cost of 'raw materials' was, the lower the profit the processing unit could make.

What I suggest from the above is that there is little chance to see a 'pure' order, and that even things as simple as announcing a price and making a contract are not in themselves unilinear. If there is any linearity, we should consider what traces have been effaced and for what reasons.

7.2 **The Contract Flexible**

In this section, I will turn to the implementation of the export scheme. I will focus on how this scheme was divided into two portions: export and milkfish contract farming.

7.2.1 Preferential Measures for Fish Farmers

Each year, Shinejai Co. provided about 2,000 or more metric tonnes of milkfish (less than 5% of the annual yield in Taiwan) bound by contract to be shared with around 100 or more fish farmers in Xuejia and neighbouring areas. A fish farmer could have 18,000 kg of milkfish at most to hand over to the company between August and December. In April, if there were vacancies because some fish farmers dropped out, the company would hold a lot-drawing event to give the rest of the quota to those who were members of the fish farmers' association under Chairperson Wang's administration.

The contract stipulated four grades of milkfish by weight, the scale of which was by reference to the standards practised in cold-storage plants. These grades range from first, over 800g, then 500 to 800, followed by 300 to 500, then below 300g. Among them, the first two grades could get the full contract price, 41 NTD (1 NTD: 50 GBP) per 600g; the 300 to 500 category had to have 5 NTD deducted, thus 36 NTD per 600g, and those below 300g would receive half of the contract price, which was 20.5 NTD in this case.

As such, fish farmers would be more likely to raise every single one of their fish to over 500 grams to 'optimise' the relation between income, fishmeal and fish flesh. Fish farmer Kevin was such a case. He adjusted his own way of milkfish farming to the terms of the contract by downsizing the population of milkfish stocked in his ponds. If it used to be 10,000 fish in stock, it was now 8,000. First, this had to deal with reducing the chance of oxygen deficiency, since competitors for oxygen were reduced in number. Secondly, he expected that this downsizing could help the distribution of pelleted feed over the fish more evenly by reducing the number of competitors for the feed. And, thirdly, this downsizing in number was related to an increase in the proportion of fish above 500g, by which he could earn as much as possible from a pond of fish according to the contract conditions. Given that the amount of payment was calculated by the total weight rather than the number of fish, in his perspective, feeding the same amount of pelleted feed could generate the same weight gain but concentrated in fewer fish. Say, if it was 6,000 kg from 10,000 fish that he expected to harvest, it was still the same weight but from 8,000 fish. Thus, he figured, not only could the total weight be kept, but also the proportion of fish size below the grade of 500 grams could be reduced.

However, this optimised calculation is from a human-centred point of view. We have seen that fish farmers are uncertain about what the results will be until the harvest (Chapter 6). In fact, another quality milkfish producer suggested to me that low-density fish farming would only broaden the uneven distribution of size, rather than narrow it down. This was mostly because, he said, *the fish live in a pond*. When their living space increases, they have no urgency to come back to fight for feed (field note, Louis, 2014-0504). Comparing Kevin's pond with that of the Li family, who also stock 8,000 fish in ponds, Kevin's is almost 1 hectare, while the biggest one of the Lis is only 0.5 or 0.6 ha. It could be that Kevin's fish will be more uneven in size distribution than the Lis'. Or, on the other hand, there are always some fish that ingest more feed and grow better than others, and thus grab more feed. For this kind of fish, a reduction in competitors for feed will expand rather than shrink the difference in size. Even if Kevin's strategy works out, however, there will be a problem with 'oversize' fish, since now there are fewer fish competing for the same amount of food.

On another occasion when fish farmers were gathered, Chairperson Wang reminded them that 'It would be best to keep between 500g and 700g, 800g is too big for the mainland, difficult to deal with' (field note, Wang, 2014-0403). I asked the chief manager why, she replied that 'People [on the mainland] don't like those fish over 800g, too big to sell' (field note, Chief Manager, 2014-0403). Besides, 'Last year, in order to do a favour to those fish farmers, those over 800g were still taken up, even including those that were almost two catty [1,200g]!' She added, 'We take care of them; they should also take care of us.' For fish farmers, as long as their fish are priced according to their weight, oversize fish still count as qualified and can be translated into earnings. However, for the company, it may be seen as a tricky problem. On the one hand, it had to 'do a favour' to local fish farmers, while it had to consider the business partner in mainland China. The dilemma was that if the company enforced the rule on oversize fish by reducing the price, fish farmers would be upset; but if not, it would cause the collaborator trouble. The operation of the contract for milkfish farming was fraught with these kinds of dilemmas all along.

First, the milkfish farming contract made some provisions favourable for fish farmers, provisions which no regular middle buyers would adopt. One was with regard to the 'muddy taste'. Regular middle buyers could just turn it down and turn to another producer. Instead, the contract stipulated that a pond of fish suspected of having a muddy flavour would not be taken up until it passed a taste test. In this way, Shinejai applied a more flexible condition to fish farmers than did other buyers.

Second, was 'water money'. Fishery goods include some water, and the regular convention is that 5 per cent of the weight of a basket of fish will be deducted from the readings shown on a weighing scale. The company reduced the percentage of 'water money' to 3 per cent instead. This 3 per cent of water money for fish farmers, Kevin for instance, was a big concession. It would be advantageous to fish farmers to include water in weight calculations. Kevin mentioned that the reason for 5 per cent of water money was because fish containers in the past were made of plant material [bamboo] that absorbed water. Though the material for baskets had already been replaced by plastics, the condition for water money was kept, which Kevin regarded as taking advantage of fish farmers. Say, for instance, a pond of 8,000 catty (4,800 kg) of fish requires 200 baskets (40 catty per basket) to temporarily place fish in. Then, 5 percent of water money equals 2 catty (1.2 kg) per basket, which amounts to 400 catty (240 kg) given to middle buyers for 'free', which translates to 16,000 or more NTD if one catty is priced as 41 NTD with reference to contract farming. For an almost profitless fish, this amount of money matters to fish farmers' livings.

Third, was the application of a sampling method conventionally used by freezing and storage plants, interpreted as 'betting on the number' [*Pha-bei-a in Taiwanese Hokkein*]. When Shinejai Co. engaged in harvesting and weighing, the staff would not sort the fish out into different sizes as precisely as night bulk buyers. Rather, one of an initial five baskets of fish would be picked out, with fish farmers' agreement, and the proportions of the four grades in this basket would be representative of the whole pond of fish. This proportion would be amplified to the proportion of the whole pond and translated into fish farmers' earnings. Then, the harvested fish would be shipped to cold-storage plants and sorted by hand. There, Shinejai Company could tell if it took advantage of fish farmers or not; usually, the company would 'lose' the bet, instead of the other way round.

Other preferential treatments, not included in the contract, were made. For instance, emergent harvesting was targeted as an emergent situation when fish were suffocating or dying; under normal circumstances, it was not feasible for fish farmers to find harvesting workers who usually worked with middle buyers. But Shinejai could react to fish farmers in only a few hours. This measure twice saved Kevin's milkfish. Once at the midnight, he found a whole pond of fish in an emergency, and immediately called Shinejai. Before dawn, harvesting workers had arrived. If that had been other middle buyers, Kevin said, 'The wholesalers would have come to the spot of harvesting with a "sword" to cut down the price' (interview, Kevin, 2014). He would have been forced to sell the fish at a low price since no one else could have taken up the dead fish. However, the problem with such preferential treatment during emergent harvesting was at the cost of bypassing taste tests.

The preferential measures for contract farming were indeed favourable to fish farmers in Xuejia. Particularly, fish farming now operated as individual family holdings, middle buyers would not take on much burden other than economic concerns into account. Although Shinejai Co. looked like a regular exporter, its actions were more bound by these provisions and treatments advantageous to fish farmers. In this way, however, the company might fail to meet its Chinese collaborators' demands and maintain consistency of milkfish in terms of quality, from taste to other aspects like hygiene certificates. A staff member of the company said that milkfish for export to China required hygiene certificates for every fish farm, which meant that 120 fish farmers had 120 certificates. To acquire these certificates, the exporter had to send fish samples from respective fish farms to an officially certificated laboratory. In practice, it was the exporter that harvested the fish and stored it, and then 'found' certificates for these fish.

7.2.2 Harvesting as a Work of Hybridisation

During fieldwork in August 2015, I twice observed a harvest of contract farmed milkfish, and once followed it all the way down to a refrigeration-storage plant 40 or more km away from Xuejia. From this, we can see how preferential treatments were practised by deviating from the terms of the contract.

Two staff members of Shinejai Co. were in charge of taste tests and harvesting on the spot for fishponds. One of the harvesting supervisors was Mr Lin, aged 50 or more, and the other was Mr Hsiao, in his 30s. Lin was involved in a milkfish-related business for a long time; he used to work for a fishmeal manufacturing company and as a broker between fish farmers and middle buyers. In rural regions, it was difficult to locate fish farmers who had fish in ponds ready to sell. Lin claimed that 'every pond of contracted farmed fish has to pass his taste' (field note, Lin, 2014-0403). At the annual meeting in 2014, when Chairperson Wang exposed the difficulty for his company making a profit, he invited Mr Lin to speak up in public about this issue as a witness. Mr Hsiao was relatively new to this trade, from the beginning of contract farming in 2011 or earlier. He acted more like an assistant to Chairperson Wang. Sometimes, he stayed in China to help Wang's business.

One harvest occasion that I observed was a fishpond located in the area between Xuejia and Beimen in mid-July 2015 (field note, Kuo, 2015-0715). It was around 8 a.m. that Lin came to lead the way for me. By that time, Lin, harvesting workers and a hired lorry had already harvested another pond of milkfish and got it stored in several glass fibre boxes covered with shaved ice. The sun was not yet at its full capacity, but it must have been over 30ºC Celsius. The contracted fish farmer was Mr Kuo, who had his own business; he had tens of hectares of fishponds in this area and hired a manager to operate them. Kuo's manager said the salinity of the pond water was around 7 to 8 ppt (particles per thousand, seawater is 33–35) that he had just measured the previous day, 5 to 6 mille higher than the more inland Xuejia area. Kuo said that their fish was 'fine and delicious', that everyone including bulk buyers appreciated it.

By that time, the spot price of milkfish was around 30 to 35 NTD per 600g; as mentioned earlier, the spot price that year (2015) was 10 dollars lower than the corresponding time the previous year (2014). Therefore, the contract price, 41 NTD, was in the fish farmers' favour at the time.

The harvest work for contract farmed milkfish was not as complicated as that of night bulk buyers. The way it was done was largely by reference to the standard procedures for refrigeration-storage plants to collect fish during peak season. First and foremost, there was no procedure for bowel evacuation that could take several hours. For it was believed that oversea customers did not see visceral organs as edible food ingredients. Therefore, as shall be seen later, readings of weight of milkfish displayed on a scale were numbers that included inedible and unmarketable excretion inside the bodies of milkfish.

The procedure of electrocution was kept as the fish were led to the working zone of a funnel tunnel. In a temporary stocking zone, harvesting workers were picking out other fish. The milkfish in the tunnel were in a panic, judging from the simmering water. A fish farmer, Kuo, erected a water outlet from plastic plumbing to oxygenate the area of water near the temporary stocking zone, alongside a waterfall, by which means he hoped to make the fish 'feel better'. This was for the sake of keeping them live until electrocution, although the distance between death and life was just a few metres and tens of minutes away. Besides, making them stress less would on another occasion mean reducing bruises due to rubbing against each other in the confined space of a tunnel.

After electrocution, it was time to weigh the fish. In the electrocution zone of the funnel tunnel, a lot of fish floated to the surface, and more were underneath. Harvesting workers used a big plastic basket to scoop fish in and filled it up by hand. Then, the basket was hooked on a crane arm stretched from a lorry and moved onto an electric scale on the ground. Over the short distance from the pond to the scale, water kept leaking out through holes in the basket. The readings on the screen of the digital scale were between 90 and 120 for each basket of fish, and the measurement unit was the catty (600g) and a smaller unit called the Leung (37.5 grams), which meant a basket of fish weighed around 54 to 72 kg. A fellow fish farmer would read aloud the numbers of the readings and omit the Leung. A staff member as well as another fish farmer noted down the numbers, respectively. As soon as a basket of fish was hooked off from the scale, water leaked out again, which suggested that in a large basket such as this is more water remained during weighing (Figure 7-2). Regular export buyers do not care about this because the price they offer is generally 5 dollars per 600g lower than the market price.

Figure 7-2
Weighing Milkfish for Export

This photo was taken by the author of this study. Note that this basket has been weighed and recorded but water is leaking out from the basket (the circle) on the way to the container.

The harvesting workers on the lorry tractor took the basket and poured the fish into one or more glass-fibre boxes as there were already fish in the boxes in which the ice had started melting and so water kept flowing out of the lorry.

A few baskets later, I was wondering when the method of ‘betting on the number of all sizes' would start, which I looked forward to witnessing. I asked a staff member, Lin. He simply replied that there was no need. I took it to mean no more 'betting on the number of all sizes' would be done this year. Beforehand, I was told that Lin did not know the trick of this method. The method is used by picking up one of the initial five or six baskets of fish to represent the proportions for the whole pond of fish sizes, with agreement between both sides of the trade. The initial two baskets of fish would not be agreed upon by the buyer because it is said that the large fish tend to 'swarm' into the baskets first; surely, they are inactive already. But the final basket would not be agreed upon by the fish farmer either because it is believed small sizes of fish occupy it in large proportions. Thus, only two or three baskets in the middle would be conventionally agreed upon by both sides. Sellers can pick one basket, while buyers can agree or disagree. According to some fish farmers, however, Lin agreed on the initial baskets that the fish farmers proposed tentatively. The fish farmers told me that they felt like 'winning a bet'.

However, it was more likely that Mr Lin turned a blind eye to the fish farmers; let the fish farmers 'take advantage of the company'. Another staff member, Hsiao, told me that even when fish farmers intentionally designated a basket of fish that seemed obviously to over-exaggerate the proportion of large fish, he would just let it go (interview, Hsiao, 2015-0630). He said that this was dependent upon fish farmers' attendance at events that Shinejai Co. held, such as events for receiving official visitors from China. But I doubt that he did actually monitor fish farmers' attendance as he said because it was not every time that Hsiao himself showed up at such events in 2014.

On another occasion of harvesting, when I was with Lin at one site whilst Hsiao was at another site, Lin got a call from Hsiao to enquire about taking up or not. Lin simply replied to just take it up and half-jokingly talked to himself, something about 'universal salvation' [普渡

眾生 In Han Characters] out of Taiwanese folk's belief after hanging up his mobile phone (field note, Ms. Chou, 2015-0716). Even though I could not tell what went wrong at the other site, I could tell that Shinejai Co. could take it up even when something went beyond expectations, whether it was an excess of fish or an over-exaggeration of the large size of fish. Accordingly, it was not that Lin knew little about the tricks of this trade, but that he just let them go instead.

Right on the spot for another harvesting, I once again asked Lin when the 'betting on the number of all sizes' would begin. He replied that it was already done, right there and then, when I was looking at the harvesting workers working, and when Lin was a few metres away from me talking to the fish farmer. The practice of picking one basket up, negotiation, reaching consent, and sorting out the sizes of fish in the basket, was all finished out of my sight. Either the operation of 'betting' was not as dramatic as I supposed, or Lin once again turned a blind eye.

Later, the fish farmer Ms Chou was talking to Lin about how grateful she was. The previous morning, the fish showed signs of oxygen deficiency—their heads emerging from the water surface, and this was not the first time. She did not want to keep the stock and thus called Shinejai Co. to harvest and avoid any loss. In this regard, the fish in this pond could not have passed Lin's taste examination. Though this may not be always the case, we can still tell that the supposed procedures were not tightly adhered to, if doing fish farmers a 'favour' was a major concern for Shinejai Co.

Returning to fish farmer Kuo's fishpond, the work of harvesting was done around 10 a.m. This time, half of Kuo's contract quota was executed. However, his 'finely delicious' milkfish were then all packed into glass-fibre containers on the lorry mixed with other milkfish from elsewhere. There was no more 'difference' between fish from different ponds. Fish from different fishponds were put together without many obstacles, thanks to the melting ice after hours of daylight. They were the 'same' thing only because the procedures to put them together are flexible enough to allow them to be enacted the same. From Kuo's case, we can notice that the harvesting work implemented here was more about 'hybridizing' the fish, water, excretion, different ponds of fish, the disproportionate numbers of large fish and the absence of taste tests, and less about 'purifying' one from another. It may well be that with more hybridization, fish farmers would feel and experience more favours.

7.2.3 Purification of Fish from Favours

At the end of harvesting Kuo's fish, Lin told the lorry driver that I would follow for the rest of the journey to the refrigeration-storage plant. The lorry driver was impatient because the whole procedure of harvest had been delayed in his perspective. The driver said that if we could not arrive at the plant by noon, we would have to wait for hours to commence unloading the fish. Before we left Xuejia, the lorry stopped by a shaved-ice factory. Fishery vehicles lined up to fill up with shaved ice. Although the lorry was loaded with shaved ice in cold preservation containers in the early morning, with the persistent sunlight over many hours under 30ºC heat, the ice had melted and emptied from the storage space for the fish. The replenishing ice could only squeeze in with fish and cover the top of them.

As we arrived at the freezing storage plant an hour later, another four or five fishery lorries had already checked in and were waiting. We were told we would have 3 to 4 hours to wait. The freezing storage plant was a company that Shinejai Co. outsourced to. It had cooperated with Shinejai since 2011 but interrupted the cooperation in 2014. Despite this cooperative relationship, the cold storage plant had its own business and could not always make time and space for Shinejai. When it was the peak season for harvest of milkfish and tilapia, it was also the peak season for the cold-storage plant to buy in these fishes. The driver parked the lorry in the shadow of nearby trees; melting ice kept trickling down. By around 4 p.m., we were finally told that it was time to enter.

In the working zone of the plant, workers gathered around a steel-made platform. One cold-preservation container of fish after another was dumped from the lorry onto the platform. The fish were sounding tough and stiff as they hit the steel platform from a height. They felt cold to the touch, although the ice had already become water. Female workers were sorting the fish by size into four grades (Figure 7-3), while males were carrying and moving crates of graded fish around. The sorting procedure here was handled quicker than harvesting workers at the scene of night harvesting, because four grades of fish by weight were enough here. Over 800 grams, 500 to 800, 300 to 500, and under 300 were put into respective baskets to dry out, while others (deformed and other fish) were thrown into a corner on the ground. Most fish were in two grades above 500 grams. Very rarely did the workers put the fish onto a scale nearby. Occasionally I held a fish to speculate on its weight, and a worker soon put it on the scale to demonstrate that it was not sorted wrongly. I was thought of as someone related to this batch of fish.

Figure 7-3
Sorting Fish into Four Grades

This photo was taken by the author at the cold-storage plant in collaboration with Shinejai Co.

Sorted fish were temporarily placed in rectangular baskets. These baskets of fish would be moved by male workers onto a scale to weigh them. The weight readings of each basket along with the grade of each basket would be noted down on pieces of paper (left of Figure 7-4). Then, one basket after another was moved and soaked in water—this time after weighing, for cleaning—then poured into another plastic box without mesh, ending with fish fixed in taped-up boxes. The boxes were piled up, waiting to be put into an instant freezer in which fish could be frozen in a very short time (right of Figure 7-4). They needed to wait until fish unloaded by preceding fishery vehicles were moved out and placed into a long-term storage freezer. I noticed some of 'our' milkfish packed into piles of polyfoam boxes; judging from the size of the boxes, there were at most 40 catty (24kg) of fish in one box. I asked a male worker nearby about these boxes. He simply replied that they would be despatched to market immediately. I was wondering why this batch of fish would not go to China.

Figure 7-4
Folding Fish into Figures and Baskets

Photos taken by the author.

At the end of the day at the cold storage plant, it was almost 6 p.m. when we were about to leave, the boss of the plant rushed out of the office and asked us to take a cheque to Chairperson Wang. At that time, I suspected that a small proportion of contract farmed milkfish would not move across the Strait but would end up in local markets instead, because otherwise the cheque should have been paid the other way around as fees for outsourced processing and cold storage. However, as per Chairperson Wang's words that I quoted earlier in this chapter, it was Shinejai Co. that sold the contract for farmed milkfish to domestic buyers in 2015.

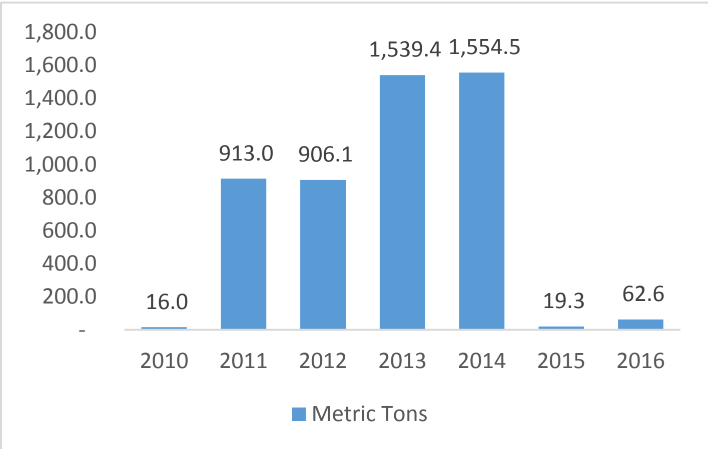
7.2.4 Partial Connectedness

The purification of the fish led to a series of differences between fish farmers, Shinejai Co. and the Chinese counterpart. According to the harvesting supervisor, Mr Lin, the pay to fish farmers was based upon the result of 'betting on the proportions of all sizes' on the spot when harvesting. However, the numbers acquired from the scene at the freezing storage plants would be different from those at the site of harvesting because the fish were drained, selected by hand and weighed in small baskets, where water and others had been excluded. By contrast, at the site of harvesting, there was a set of numbers which included water and others that would be translated into debt between fish farmers and Shinejai Co. Consequently, there would be different sets of numbers regarding the amount of harvest and the proportions of the four grades between these two sites. Thus, there would be gaps between the amount of money paid to fish farmers by Shinejai and the amount of money paid by the Chinese counterpart for the same batch of fish. This gap may be called a marginal error, but it would become a divide when 120 contracted fish farmers were considered. Both sets of numbers were based upon the same batch of fish, but they were different.

Let us consider another set of numbers—official data on the amount of milkfish export to China. From 2011 to 2015, every year saw 2,000 or more tonnes of export-scheme contract-milkfish farming undertaken. As seen in Figure 7-5, however, although there was a leap in the level of milkfish exports to China between 2010 and 2011, the first two years of the export scheme (2011 and 2012) saw less than half of the amount of milkfish being exported to China. In 2015, the level of exports even decreased to that before the scheme. I consulted over this with a staff member of Shinejai, she replied that some exports were conducted via a semi-official channel between Taiwan and China established in 2001, called 'small-volume trade'. This route regards the trading of goods across the Strait as 'domestic trade', free from tariffs, and thus the trade is not registered in official statistics, though the value of goods in a cargo ship has a limit of US$ 100,000.

Figure 7-5

Level of Milkfish Exports to China



Data Source: Customs Administration, Ministry of Finance, Executive Yuan, Republic of China (Taiwan). Milkfish export items of include mince, fillets, whole fish and so on, eleven kinds in total. The years 2010 and 2016 had no such export scheme.

How can we consider these two sets of numerical figures that were supposed to reflect a respective, single reality, such as the levels of harvest and exports? Lien (2015) uses the concept of partial connectedness to understand the relation between salmon as biomass and fleshy salmon. The inspiration for me is that friction between different numbers of the putative same reality only occurs if these different numbers are seen in light of another entity (biomass or fleshy salmon) (Lien 2015, p.102). Specifically, the numbers at the site of harvesting were fine because they were 'favours' to fish farmers, while those at the scene of selecting were fine as well in their own right because it was the selector (the cold-storage plant) that was going to pay for this batch of fish. As long as these two sets of numbers were kept apart, there would be no friction.

However, if the selector needed to pay as per the numbers at the site of harvesting, friction would occur. Similarly, if fish farmers got paid as per the numbers at the scene of selection, there would be conflict. Mrs Drew mentioned that on one occasion she was involved in the process of manual selection at the same cold-storage plant and saw some fish of around 500g being thrown into 300g to 500g (deducting 5 NTD from the full price per 600g); and she did not want their stock of fish 'stolen' (field note, Mrs Drew, 2014-0424). Therefore, since 2014, Shinejai Co. turned to the method of 'betting on the proportion of all sizes' in response to fish farmers' demands (annual meeting, 2014-0321). That is, fish deals were concluded at the site of harvesting.

The relationship with the Chinese counterpart in Shanghai was in tension as well. Shanghai Co. was not satisfied with the quality of the fish and performance of cold chains. For the former, it was the 'muddy taste'. For the latter, the boxes of fish were damaged, and the fish had started to defrost as batches of fish arrived in Shanghai in 2011 (Lai 2011). It would be quite something if Shinejai Co. aligned with Shanghai Co. alongside fish farmers to improve the quality. However, Taste tests would have been implemented rigidly, so there would be no 'emergent harvesting' or other preferential measures. Shinejai. Co. would have needed to establish its own cold-storage and packaging plant—which Chairperson Wang kept mentioning from 2011 to 2014—and would have acted more like a selector in a cold-storage plant. Moreover, the given status of a 'bulk commodity' of milkfish would have been forced to be open to examination, and the practice of milkfish farming would have needed to be re-arranged, if it was indeed the 'muddy taste' that thwarted the acceptance of milkfish in Shanghai.

It would be something else if the export scheme was separated into two parts, between exports and contract farming. In this way, there would be no friction between the contractual amount of milkfish farming and the export amount of milkfish to China. The export scheme enacted was more about executing the contract and less about exporting fish to China. As long as fish were harvested, and fish farmers got paycheques, the responsibility for milkfish contract farming was met; the fish could be sold to anyone. Preferential measures could be kept and the status of the 'bulk commodity' would continue.

In 2014, when Shinejai Co. had just changed its Chinese counterpart, Chairperson Wang called for help from an experienced collaborator in Taiwan to prepare a presentation to the Chinese partner about an investment plan for building a 'modern' milkfish processing factory in Xuejia (field note, Shinejai Co., 2014-0529). In a preparatory meeting with two staff from Shinejai Co., the collaborator talked about packing milkfish better at 15kg per box rather than 20kg, because that would allow workers to move it up and down. He talked about the most advanced equipment worth one million GBP. They talked about the official hygiene certificates that the export of food required. They could apply for one, and the certificate could be used for six months for more of the same items, however different fishponds and the practices of fish farming were, and no matter the level of exports. Most important was what was *absent* from their conversation—milkfish. They never actually talked about them. They did not mention the 'muddy taste' or any qualities of the fish. In their conversation, milkfish were the object, the only thing for sure, a bulk commodity.

The most difficult work for the implementation of the export scheme was, on the one hand, to keep apart those different versions of reality so that they would not be in conflict, and, on the other hand, to keep the export scheme going. These two goals were themselves in conflict. How could products attract consumers but without involving consumers in the production of products, as Callon and others (2002) notice? In this regard, as much as the separation between the portion of export and of contract farming, how could it be possible that the product of milkfish and the production of milkfish had drawn in consumers without involving them but separating them? It was almost impossible. In fact, the way that milkfish developed in Taiwan was done by including consumers' preference for bellies (even though this contributes to the formation of milkfish as a 'bulk commodity') into production and processing. This is the very dilemma that inspired the present study: how does one stay the same while involving more helping hands? If the best of both worlds cannot be held at once, how can the trade-off be made? Now let us turn to contracted fish farmers.

7.2.5 Quitting the Contract

Although the conditions of milkfish contract farming seemed generous, not every fish farmer in Xuejia would stick to them. My collaborators, the Li family, dropped out of the scheme in 2015. Before then, they had been talking about dropping out because the contract price no longer seemed appealing when it went down from 45 NTD per 600g in 2011 to 41 in 2014. Although we can calculate that fish farmers' revenue would be short by 120,000 NTD (2,400 GBP) when the amount of contractual milkfish was still 18,000 kg, what fish farmers calculated was not this intuitive. Here I provide two other explanations. One was the instability of payments from Shinejai Co., and the other was fish farmers' own calculation of farmed species in ponds.

A collaborator at Shinejai Co. said that transactions between fish farmers and the Shinejai rarely followed the 'contract'. During peak season, Shinejai would pay farmers a price lower for fish than the contract price but slightly higher than the market price at the time. For instance, when the market was 30, they paid 35, far lower than the contract price of 41. I asked the collaborator if this information was gleaned from fish farmers. He simply replied that 'This is the way business gets done, isn't it?' (interview, anonym 1, 2015-1005). Another fish farmer told me that what Shinejai Co. did was to push down the spot price (field note, anonym 2, 2015-0912). For instance, Chairperson Wang told the media that the spot price was plummeting, and thus fish farmers would be keen to sell their produce at whatever price the company offered. Then, Shinejai Co. kept buying in milkfish at a price a bit higher than the market but lower than the contract. Despite what this fish farmer said, I doubt that Chairperson Wang had such far-reaching influence.

During my fieldwork in early 2014, it was said that many fish farmers had not yet received their pay for fish even in March, three months after the end of the 2013 harvesting season (interview, anonym 1, 2014-0304). However, after handing over their produce, within a week, fish farmers expect to receive their cheque and use the proceeds to pay their debts to the fishmeal company. If they are in debt to the fishmeal company, it is difficult for fish famers to do business with the fishmeal company the next year. Fish farmers' cash flow would be interfered with, similarly the fishmeal manufacturers'.

Why the contract price was appealing was relative to the spot price during peak season from late summer to early December. If fish farmers aimed to make big money from milkfish, they would let their fish overwinter and sell them during the off season. But If the paycheque was delayed, the contract price would appear no more appealing than the spot price during the off season between January and May. In other words, what fish farmers were concerned about was not only the price per 600g, but the time to pay as well. If fish were stocked for overwintering, fish farmers would have to bear the risk that overwintered fish might end in failure. But there would be little difference between taking the risk of overwintering and that of receiving the paycheque several months late.

Moreover, the harvesting time for milkfish matter to fish farmers' income in terms of the survival rate of the present cash crop—white shrimp. Contract farming stipulated that the contract had to be executed before the end of December. However, milkfish farmers nowadays rely on the revenue from white shrimp reared together with milkfish (polyculture).

The white shrimp cannot be reared alone in intensive ways because of the risk of outbreak of viruses deadly to the shrimp. Besides, the shrimp has a high price in all seasons, partly because of this mortality. It is said that a 30% survival rate would be a bumper harvest; by comparison, milkfish have to be harvested at a rate of over 90%, or fish farmers will consider they have been cheated by fingerling sellers. During the off season for shrimps, the spot price can reach 200 NTD per 50 pcs/600g. During peak season, the price is still over 100 NTD. Shrimps are harvested many times per week. Trap nets are set alongside the banks of ponds. If shrimps go into the net, they become trapped. Fish farmers come by and check daily. Shrimp shippers go around fish farms and actively ask fish farmers if there are any in the nets. The income from shrimps is weekly.

An aquaculturalist explained that, when living together with milkfish, weak, unhealthy shrimps are eaten by milkfish, and thus the outbreak of viruses is constrained to an extent (interview, Ting-Lang Huang, 2015-0829). Plus, by rearing shrimps together with milkfish, fish farmers need no extra feed because they can feed on leftover fishmeal. More important is that the survival rate for white shrimp in freshwater ponds is far higher than in saltwater ponds. In the former, the rate can be 10 to 30%, while it can be 5 to 10% in the latter.

For fish farmers in Xuejia, they had better opportunities to harvest white shrimps than in saltwater areas. In fact, the relation between milkfish and fish farmers can no longer be considered the same since the intervention of white shrimp. Even when milkfish only have a marginal profit, sometimes down to the cost of production, fish farmers still stock milkfish on an intensive scale because of the profit from shrimps. Although the major crop is officially registered as milkfish, fish farmers live instead off white shrimps. A fish farmer said that speaking about the feed conversion rate was no more accurate because white shrimp also feed on the same feed. Thus, he said that any 'loss from milkfish can be taken from white shrimp instead' (field note, the Lis, 2015-1007). However, if a pond of milkfish is harvested, the shrimps cannot survive alone (interview, Shi, 2015-0730). Plus, if the contract price is not as good as before, and the time to receive the cheque becomes uncertain, it may not seem advantageous for fish farmers to have a contract. This complication between milkfish, white shrimp, paycheques and contract prices was why Mr Shi dropped out of the export scheme in 2015.

A major lesson drawn from the interconnection between the export scheme and fish farmers is that the former attracted the latter not only because of the premium price in the contract. Rather, or in addition, enactment of the contract farming was flexible enough to be enrolled in fish farmers' daily practice of milkfish and white shrimp farming, their way of making a living, in short (Singleton & Michael 1993). Therefore, the 'same' export scheme for contract farming drew different responses as the flexibility extended to fish farmers became flexibility to be paid by Shinejai Co. However, would this flexibility to fish farmers and milkfish be a problem for implementation of the export scheme, in which it was the undifferentiated bulk commodity under consideration?

7.3 A Different Kettle of Milkfish in Shanghai

In this section, I turn the focus to milkfish in Shanghai. The fieldwork in Shanghai was conducted in mid-2014. The last year of contract-farmed milkfish for export to Shanghai was 2013. At that time, most milkfish had been removed from markets where they were supposed to be on sale. However, there were still some traces of milkfish left behind. I tried to talk to people who had an experience of milkfish, and, on some occasions, I arranged opportunities for locals to sample the fish. The purpose was not to ‘prove’ that locals consumed or experienced the fish in ‘the wrong way’ (Woolgar & Lezaun 2013). ‘Proof’ is a concept related to the assumption of single reality. Rather, it was to show the dilemma of adapting to local circumstances while keeping the original status of being a bulk commodity.

7.3.1 Inter-connection between Fish Stalls and Fishponds

In Shanghai, in mid-2014, there were three sites to experience different kinds of milkfish products. The first was mega-chain supermarkets where frozen whole-round milkfish were showcased. The second was chain or independent Taiwanese food stores where frozen packed milkfish fillets were displayed in showcase refrigerators. The third was Taiwanese restaurants where milkfish were an ingredient of a dish. Despite these sites existing, experiencing milkfish-related things and people in Shanghai was never an ordinary experience. In fact, it took a lot of effort to arrange such encounters in Shanghai.

Nothing is more evident than the journey itself, which can show how unappealing the fish was in Shanghai. During my fieldwork in mid-2014, most supermarket outlets that were supposed to have milkfish no longer had milkfish on sale. It was not until five days later, when I arrived at a Taiwanese chain hypermarket (RT-MART), that I saw for the first time whole-round frozen milkfish being sold. Before, I had only seen packages of processed milkfish products sold in Taiwanese food stores, the scale of which is very much like Chinese or Asian food stores in the UK. At RT-MART, all milkfish were packaged in plastic bags and stored with other frozen fish in a showcase refrigerator in the fishery products department. Shoppers could see fish products through the glass door of the freezer and price tags with the name of the fish and the price per Chinese catty (500 grams) in the freezer. On the price tag was 6.9 RMB per 500 grams, which translates to 41.4 NTD per Taiwanese catty (600 grams) (Figure 7-6). There was a series of numbers on the same fish tag in the display below, i.e. 2013-12-03. The milkfish displayed in front of my eyes were imported to Shanghai six months earlier, at the end of 2013, when the contract price was 42.5 NTD per 600g. The retail price was lower than the contract price. What was implied by the import date was that 2,000 metric tonnes of contract-farmed milkfish, less than 5% of annual milkfish production in Taiwan, could not be consumed in such a large city as Shanghai six months later.

Figure 7-6
Packs of Whole-frozen Milkfish Sold in Shanghai

This photo was taken by the author. The tag says 'Chilly Fresh Milkfish'

In the same place, there were other display refrigerators in which milkfish were stored and displayed. But the price tag suggested 9.6 RMB per 500g for these milkfish, which translates as 57.6 NTD per 600g, much higher than the contract price at any time, though it is still doubtful that this retail price could cover the cost of crossing the Strait. There was a fishmonger standing near the area for frozen fish, yelling at shoppers to stop and take a look. I asked him why the same milkfish were priced differently. He replied that they came at different times via different providers. As mentioned earlier in this chapter, the partner in the export scheme on the mainland side was the biggest seafood supplier in Shanghai, which stood second in line to provide seafood items to middle dealers or end retailers; Shanghai Co. had none of its own retail outlets (so-called ‘B2B’). According to this fishmonger, there were other middle dealers taking up milkfish from Shanghai Co. and then selling the fish to this outlet under different conditions.

On another occasion, I encountered whole-round milkfish at a seafood stall in a branch of Tesco in Shanghai that I had previously visited but had not seen any. At the time of my second visit, whole-round milkfish were displayed in ice as chilled seafood in the stall along with other fish. I asked the fishmonger in charge of the seafood department why milkfish were not displayed several days previously. He replied that they were only placed on the stall recently because over two days they expected to see bulk buyers of milkfish coming. These buyers were from a nearby Taiwanese enterprise; every time they come they buy around 100 kg of milkfish to do catering for the staff of their company. The market sales of milkfish at this department largely depended on these Taiwanese buyers, companies or individuals, and partly on other southern Asian consumers, according to the fishmonger.

Here we can see one way of managing the seafood stall. Milkfish could not be displayed daily, mostly because it was not an item consumed daily by locals. Its showcasing was according to the regularity of expectation that major buyers would come; otherwise, it would occupy a certain part of the space on the stall to showcase a fish that locals have no interest in. In one sense, the space on stalls is a business-related or generated social-material arrangement. When customers come is as important as when fish are moved out of cold storage and shown on the stall. Even if there are people like me who are seeking a fish, an encounter with it is largely decided by chance unless such regularity is known in advance.

Let us take a look at another fishmonger, Mr Cheung, who was at a local branch of a nationwide supermarket chain in Shanghai. Surprisingly, he knew what milkfish were since the stall under his management had displayed them before. In fact, he said, there were still some stocked in a freezing warehouse. I asked him if I could buy some. He said better not, because they had been stocked for too long and there could be concerns over food safety.

Under fishmonger Cheung's management, there were three kinds of fish on display. One was 'live fish' in water tanks with air pumped devices (Figure 7-7), the use of which was everywhere to see, whether in modern chain supermarkets or traditional wet markets all over China (Twilley 2014; Freidberg 2010). Two was chilly fish displayed on shaved ice on the stall where there were defrosted fish out of refrigerators and those dead 'live fish' as well. Three was 'frozen fish', sold whole, and raw processed fillets of fish such as salmon and pollock. Surely, we could never forget a cold-storage warehouse absent from the spot, which was also connected to Cheung's fish stall. Despite there being three categories on the spot, it was never clear-cut between them. As much as dead 'live fish' could become chilly fish, nearly out-of-date chilly fish became frozen fish by being repacked on the spot behind the stall. Also, some chilly items were those directly taken from the cold-storage warehouse and allowed to defrost on ice on the stall. I asked Fishmonger Cheung how long the items chilled on ice would be sold for. He waved his hand and said 'No problem, they will be sold out in two days at most' (field note, Fishmonger Cheung, 2014-0701).

Figure 7-7
A Fish Stall in A Supermarket

The photo was taken by the author. No. 1 is water tanks of live fish. No. 2 is a stall for chilly fish. No. 3 is a showcase refrigerator.

'Two days at most' was a calculation based on the fishmonger Cheung's experience of managing chilly items and summarised the social-material engagement of his fish stall. Once frozen items were taken out of refrigerators and displayed on the stall, he would not put them back into refrigerators, even if the stall was closed. Those defrosted items would be put into polyfoam boxes with shaved ice inside and stored under the stall. On the following day, they would be taken out and displayed as chilly fish again. Thus, it was extremely important to control the amount of fish taken out of refrigerators; not too much, otherwise, they could need more days to sell them and thus disturb the social-material arrangement of the fish stall. Thus, whatever is taken out of refrigerators must be sold within two days. For him, customers as well as the fish on sale at the stall are both expected, although the business of his stall in this district of Shanghai could not be counted as good; his stall management could thus tend towards conservation. In other words, fish stalls in other districts might have different arrangements for social-material engagement with fish and customers.

What if a new fish intervenes, such as milkfish, in the given social-material arrangement? On the one hand, the given social-material arrangement would have to be rearranged. The fish stall alongside the showcase refrigerator had to find space for milkfish, so it was put in a cold-storage warehouse. If market sales of the newcomer remained low, the fishmonger would rather leave it spoiling in the refrigerating warehouse than occupy space on the stall, because there was a condition between wholesalers and these retailers, i.e. goods could be returned within three months. In this way, however, a series of chain effects on temporal spatiality would be triggered; or, to put it another way, the temporal-spatiality of fish between end-outlets and production sites was therefore revealed or generated.

When milkfish were unmarketable, Shanghai Seafood Co. had to take back all returned goods. As long as it was within three months, fishery goods were returnable from retail stores or middle dealers to Shanghai Co. (interview, Boss Chen, 2014-0704). Shanghai Co. was a seafood supplier that held several varieties of fish in stock and hardly stood on the first sales line. What they could do to help the milkfish market was to find big buyers, the procurement sectors of chain supermarkets, and middle dealers as well, and provide them with favourable conditions for taking up milkfish together with other regular fish. Chen's company located in a fish market in Shanghai was a middle dealer that the Shanghai Co. asked to find buyers for the Shanghai (interview, Boss Chen, 2014-0704). Retailers would not have necessity to market the unfamiliar and unsalable fish; at best was the situation like the fishery department of the TESCO that displayed the fish on a regularity to sell as much as it could. At worst, before the three-month long period overdue, the fish could be returned soon or later. The hot potato was then given back to the Shanghai Co.

It was one thing that Shanghai Co. was the biggest seafood supplier in Shanghai, but another that it marketed an unfamiliar fish. For Shanghai Co., marketing milkfish was never intended for mass consumers but rather middle dealers or retailers. Its major customers might take it up but never considered it seriously. When milkfish failed to attract consumers, as soon as the items returned and piled up in the cold-storage warehouse or the number of return goods was reported to management, it was hard to tell the Taiwanese counterpart, Shinejai Co. in Xuejia, when to replenish the supply of milkfish. If there was no replenishment, there would be no shipping, no trade and no cash flow, while milkfish were still harvested and stored in outsourced cold-storage plants in Taiwan, since the export scheme for milkfish contract farming was in two parts. Consequently, there would be no payment to either fish farmers or outsourcing partners. A collaborator thus ended the collaboration with Shinejai Co. The collaborator said that the peak season for harvesting contract-farmed milkfish was also their peak season. They put their usual business aside and turned to 'help' Shinejai Co. earn marginal processing fees—for they too wanted to break into the Chinese market—but ended up with delayed payments. Accordingly, the expected temporal-spatial arrangement across the Strait, if not broken, was crumbling into bits and pieces.

7.3.2 Enactment of Cross-Strait Politics

Boss Chen operated a fish wholesaler's in Shanghai for over ten years; milkfish belly was one of his products, mainly provided to Taiwanese restaurants or food stores in Shanghai. He was invited by Shanghai Co. to help with sales of milkfish products. Since 2012, the export scheme adapted to import more processed milkfish fillets than whole-round fish. Despite this, however, the acquisition cost of processed milkfish fillets via Shanghai Co. vis the regular, tariff-free trade route remained high relative to the cost of those arriving through 'small-volume trade' (interview, Boss Chen, 2014-0704). Milkfish products had arrived in China via this route and occupied the market for milkfish in China long before the export scheme. On this route, milkfish fillets as goods had bypassed tariffs as well as the value-added tax (17%) on processed products, including milkfish fillets, while value-added tax was applied to processed milkfish fillets arriving via Shanghai Co. (interview, Boss Chen, 2014-0704). In his estimation, at most, in one year, they could sell 120,000 packages of milkfish belly through his wholesaling dealer.[11]

Thus, when Boss Chen was invited to give a hand, the products he took from Shanghai Co. had no relative strength in terms of price compared to those from small-volume trade; his customers felt the same and thus stuck to the usual way of doing business. This usual way of business (the small-volume trade) became a barrier to the export scheme. As such, Shanghai Co. resorted to the central government in Beijing to defend its own interest in the milkfish-related business in China. Boss Chen said that Beijing gave a clear order to impose a restriction on milkfish imports via ports other than Shanghai so as to help the export scheme and Shanghai Co. In fact, just before we had a conversation, Boss Chen had just finished a call to Taiwan, asking his counterpart to contact Shinejai Co. to ask the Taiwan Affairs Office in Beijing if the restriction had been lifted, since Shanghai Co. had no longer handled milkfish since 2014, and his stock of milkfish fillets was running out.

Boss Chen was not the only one invited to help market milkfish in China. Another case was a chain Taiwanese restaurant that operates over one hundred of stores, in both Beijing and Shanghai. The CEO said he was invited by the Taiwan Affairs office to get involved in marketing Taiwanese milkfish (telephone interview, CEO, 2014-0701). The chain of Taiwanese restaurants used processed milkfish belly as the main ingredient of several dishes. However, the cost of processed and value-added taxed fillets was too high for an ordinary dish, and thus the retail price could not be reduced (interview, executive chef, 2014-0630). Moreover, the market response was monitored almost in real time by recording in branch stores, reporting back to central office and doing

[11] If we translate the number of packages into the number of fish, and assume 600g per fish, then we can calculate the amount of fish by weight, i.e. 72 tonnes. And the amount of milkfish for export to China was between 900 and 1,500 metric tonnes between 2011 and 2014.

calculations. I asked the executive chef how much milkfish belly they had consumed so far. Later the same day, he texted me with the exact number of milkfish belly consumed, i.e. 136,500 packs in total. By that time, however, at two stores of the chain restaurant I saw no more milkfish dishes on sale. The CEO said that no more milkfish dishes would be sold in the chain restaurants and concluded that milkfish just did not meet the requirements for either high-end restaurants where fish could be sold by weight or low-end ones where small profits must be generated from large sales volumes (telephone interview, the CEO, 2014-0701).

On the other side of the Strait, the debt to both fish farmers and outsourced partners in Taiwan had to be made clear; in fact, some partners interrupted the outsourcing relation with Shinejai Co. mostly because the outsourcing fee was not paid on time. According to Lin, the harvesting supervisor of Shinejai Co., Chairperson Wang, did ask another local political figure, Councillor Lee, to reclaim the payment due from the mainland side for the 2014 contract term. Lee was the Speaker of Greater Tainan Council and had his own business in China; it was believed that he had personal ties on the other side of the Strait or, it would not be easy for a political figure in Taiwan to do business in mainland China.

What I suggest from the above is not using a given political frame—cross-strait politics— to explain the intervention of politics in the export scheme. Rather, it seems that 'politics' should be invited to intervene in implementation of the export scheme, precisely because milkfish did not show any good sales figures in China.[12] In this regard, cross-strait politics were enacted by milkfish. I will return to this topic

[12] Note that I distinguish 'sales figures' from a dislike of milkfish, because these two entities, though related, are also partially connected. For the purpose of making decisions on when to import and how to market it, the sales figures were taken as 'real'. But we still consider the possibility that dislikes were an effect resulting from sales figures.

later in this chapter.

7.3.3 Enacting Milkfish Locally

Here I turn to the enactment of milkfish as a food ingredient in Shanghai. I will focus on how milkfish were 'enrolled in' local recipes and evaluated.

In the fishery department of a hypermarket, I noticed the fishmonger in charge was attracting shoppers to whole-round frozen milkfish by yelling 'Milkfish, by steaming [*清蒸 in Han characters; pronounced as Qing-zheng*] and braising with soy-sauce [紅燒 in Han characters; pronounced as Hong-shao], both have good taste' (field note, RT-MART, 2014-0622). A female shopper stopped by, looked into the freezer, held up a bag of milkfish and asked the fishmonger what the fish was; he replied 'Yes, that is exactly what the fish is; it is from Taiwan' (field note, RT-MART, 2014-0622). The name of milkfish reads 'Shi-mu-yu' in Mandarin, it is like asking 'What is the fish?' She held it in her hand and took a closer look, put it into her shopping trolley, then put it back in the freezer, and left.

On the one hand, soy-sauce braising is a rarely heard recipe for milkfish in Taiwan. An ex-local politician in Xuejia, when he heard that braising was the main recipe for milkfish in Shanghai, responded 'How is soy-sauce braised milkfish supposed to be eaten?' (Zhao 2011). The main recipes for milkfish in Taiwan include poaching chunks of fish to make fish consommé, and pan-frying belly as well (Figure 7-8). On the other hand, although steaming is not a strange recipe for milkfish in Taiwan, it is fillets of milkfish belly that are steamed, rather than whole fish. The thing is that a thick piece of whole-round milkfish is hard to be evenly cooked by steaming. Part of the piece of fish could be overcooked (McGee 2004). In other words, the bodily characteristics of a whole-round milkfish is not cultivated to suit the streaming recipe.

Figure 7-8
Milkfish Dishes in Taiwan

These two photos were taken by the author. The dish on the left is milkfish belly consommé. On the right is pan-fried belly. The black part on the right one is the lining of the belly fat.

On another occasion, I asked Fishmonger Cheung, who had experience of milkfish, what the preferred recipe was for locals in Shanghai. He replied 'Steaming, because they are lazy; they don't want to spend time on cooking' (field note, Fishmonger Cheung, 2014-0701). Then I asked how he cooked milkfish before. He replied 'Braised with soy-sauce,' because he came from a region in favour of strong and spicy flavours, unlike the locals in Shanghai. However, a dish of braised milkfish did not taste good to him, which he attributed to a 'freezing-ness', i.e. the fish had been kept in a freezer too long (field note, 2014-0620). When he asked me how the Taiwanese cook it, I simply replied 'Pan-fried.' He opened his eyes wide as if I was saying something unheard or unbelievable and replied 'So that is supposed to be pan-fried!' (field note, Fishmonger Cheung, 2014-0623). To be clear, pan-fried can be a procedure for braising fish, but it skips the procedure of cooking it with a special-made sauce such as Cheung's strong and spicy sauce. However, pan-fried seemed too simple for one interviewee from Shanghai, Mr Zhou. He said 'It would taste too simple; if pan-fried was the case, the dish would certainly require more ingredients added' (conversation, Mr Zhou, 2014-0628). Despite this, if a pan-fried dish plus more ingredients was the case, it would be much more like a braised one.

The boss of a Taiwanese food store in Shanghai, Mr Green, said that the locals in Shanghai favoured a braised fish dish (field note, Mr. Green, 2014-0621). From his perspective, it was not that frozen fish had an off-flavour out of 'freezing-ness', but rather that the locals knew very little about the 'right' way to deal with milkfish. And braised milkfish seemed a waste to him since the original flavour would be clouded by the braising sauce. He mentioned a story about Taiwanese restaurants in Shanghai. Back then when milkfish were priced at 10 RMB (1 GBP at that time) per fish, the bosses of those restaurants went to supermarkets to buy whole fish, prepared them by themselves, and sold dishes of pan-fried milkfish on their menus. Some locals ordered pan-fried milkfish dish to taste and, surprisingly, felt it was so tasty that they asked what the fish was. It was even more surprising that they came to realise that the fish they had just consumed was the same fish they had cooked by themselves before.

However, the boss of another Taiwanese restaurant, Mr Kim, told me an opposite story of his own from three years previously (interview, Mr. Kim, 2014-0730). He was damned by a table of Chinese customers right on the spot, after serving pan-fried milkfish belly, and kept being interrogated as to what the fish was. Their conversation comprised repetitive questioning and answering of 'What is the fish?' At the time, his restaurant served two dishes of milkfish belly; one was braised milkfish for lunch, the other was pan-fried for dinner. Bearing that negative impression in mind, Mr Kim no longer actively introduced pan-fried milkfish dish to non-Taiwanese customers who he recognised by their accents, it was mainly served to Taiwanese based in Shanghai. Mr. Kim added that the braised dish was to cater for locals' taste, they might like to give it a try (Figure 7-9). Despite this, he recognised that the braising recipe might not suit milkfish well because it had a tougher texture than other fish commonly used for locals' braising recipes; braising could make the toughness worse.

Figure 7-9
Soy-sauce Braised Milkfish Dish in Shanghai

The photo was taken by the author at Mr Kim's restaurant in Shanghai.

I mentioned that some braised fish dishes made with fish common locally tasted fishy or muddy to me. Kim replied that 'It is not all about the flavour.' Fishiness or muddiness may not always be a matter of concern. Locals may tolerate fishiness or muddiness as long as their meat is 'tender' in texture, while they could not tolerate milkfish because of toughness. What Kim said is intriguing because fillets of milkfish belly in Taiwan, especially those from low-salinity water, are often criticised for their softness.

On another day I visited fishmonger Cheung's fish stall, I took two packs of milkfish belly to him bought from a Taiwanese food store. One pack was deboned, the other was not. I instructed him how to pan-fry it and wrote down the steps on a document. At the stall, he and his fellows carefully studied the text on the packages and tried to see through the pack to the actual piece of fish. A few days later, I went to the fish stall again and asked how it tasted. Fishmonger Cheung responded that it tasted 'so-so', very much like fish he had eaten before. It could be seawater fish common in Shanghai, namely Hisao-huang fish [小黃魚 in Han characters] (*Larimichthys Polyactis*) (field note, Fishmonger Cheung, 2014-0701). It was a small one, less than 20 cm in length, usually served as a pan-fried dish. Another fishmonger described the meat texture of milkfish as more tender than one fish but tougher than another locally accessible one (field note, Fishmonger Guan, 2014-

0704). Comparison was a way of understanding a strange fish. However, this comparison was itself an enactment of a cooking recipe—soy-sauce braising. It presented what the fish was rather than simply represented it.

Regarding the off-flavour that some would call fishiness, while others regard it as muddiness, the fishmonger replied ‘I could not tell what the flavour was, probably because I have eaten too many fish’ (field note, Fishmonger Cheung, 2014-0701). Then, I asked how he dealt with the belly fat of milkfish since he used to scratch out the belly fat of milkfish before. He said that he kept it this time, but it looked ‘terrible’ and tasted ‘oily’. He asked me ‘Are you Taiwanese in favour of such oily stuff?’ (field note, Fishmonger Cheung, 2015-0701). Apparently, the fishmonger did not appreciate the effort that milkfish farmers put in to growing belly.

Obviously, the reference standard by which milkfish were evaluated in Taiwan did not work here in Shanghai. Rather, the fish were drawn in and understood as per local standards of reference. On the one hand, the standard of reference was other locally accessible fish; tasting notes were mostly drawn from those upon when tasting and evaluating locally accessible fish. There were recognisable similarities when attempting to establish a link between milkfish and local counterparts. Callon and others (2002) use ‘singularization’ to capture the process of products standing out from the crowd while referring to the rest of similar others as well. Among a bunch of similar products on shelves, the result could, paradoxically, be assimilating to each other (Lien & Jacobsen 2013; Hébert 2010; Miele & Murdoch 2004), if they all comply to a common standard of reference. A recognisable similarity designates processes of establishing similarity between different goods.

On the other hand, we also notice that the common standard of reference used to evaluate and compare milkfish with local counterparts in Shanghai was an effect of locally preferred ways of cooking. This comparison and evaluation was made possible because both milkfish and other fish were enacted by the same way of cooking. Thus, milkfish were enacted as ‘tough’ in texture and ‘bland’ in flavour in Shanghai, but differently in Taiwan. As such, even when it comes to the ‘defects’ of milkfish, they are still different across the Strait; the ‘soft’ flesh in Taiwan becomes ‘tough’ in Shanghai, while the ‘strong’ flavour becomes ‘bland’. The fleshy milkfish in which the standard of reference from Taiwan was embodied was enacted to be a different version by different ways of cooking in Shanghai.

However, I am not suggesting that milkfish were enacted in the *wrong* way in Shanghai, even though presenting or representing them in the wrong way was the reason why participants of the export scheme believed the result was milkfish being unappealing to people in Shanghai. As previously suggested, milkfish are multiple in taste and other qualities, even in Taiwan. Any definitive answer as to why milkfish failed to attract people in Shanghai often assumes the undifferentiated status of milkfish, and thus differences in response to the ‘same’ object are often taken as a problem. As such, solutions often resort to re-consolidation of the bulk commodity. I will return to consider this issue at the end of this chapter. Next, I will turn to see how difficult it was to enact a Taiwanese version of milkfish in Shanghai.

7.3.4 Enacting a Taiwanese Version of Milkfish Dishes in Shanghai

One day in Shanghai, I decided to cook a pan-fried milkfish dish to treat people who shared a table of meals with me during the fieldwork, given that it was difficult to ‘naturally’ find a local milkfish consumer. In advance, I went to a supermarket in a chain mega-mall (RT-MART) to buy milkfish. It seemed from a map of public transport that it was not far from my residence, but it actually took more than two hours to make a round trip. At the supermarket, the fish was scraped of scales and gutted by a fishmonger who sold but never tasted milkfish. The fishmonger filled the bag containing a whole-round milkfish with ice cubes. When I arrived at the residence, the ice had melted already.

During my fieldwork in Shanghai, I resided in a room of the warehouse that Mr Yuan's own company used to treat his friends. Yuan was Taiwanese and based in Shanghai, he ran a small-medium company there. He rented an apartment to provide some employees and himself with a residence in Shanghai. He also hired a female housekeeper to keep the flat and cook for residents under the same roof. I was kindly invited to join in their dinner during my stay in Shanghai. Usually, there were five people at most who commonly shared a table of dishes, including myself.

The fish was a big one, weighed over 900 grams before being scraped and gutted (Figure 7-10). It was a big fish because I had no experience of dealing with a whole-round milkfish before; the only experience I had was to do with milkfish belly. I measured the relative size of the fish and the pan, and figured how to do it pan-fried. The whole fish was too thick to be pan-fried; the result could have been the outer surface being overcooked and interior meat being undercooked. I decided to cut it into two halves from the bottom of the belly, where the fishmonger had cut an opening to gut the fish. Beforehand, from what I had seen from fishmongers in Taiwan, I knew I could cut the head and tail off. Cutting used to seem like an easy action: holding the gill fins, cut directly through to the end by the verge of the gills, the head and body will be separated off. But this time, I had a blunt knife in my hand. I was cutting, but the knife could not cut through and got stuck in the flesh. I had to saw the head off. It worked, although the cuts looked ugly. I could not tell if it was the flesh, the knife or the 'I' resisting being enrolled in dish-making.

Figure 7-10
Whole-round Milkfish Bought in Shanghai

The photo was taken by the author.

Then, it came to cutting the fish's body into two halves (Figure 7-11). It was a struggle because there were many bones. Bones stuck to the flesh as well as pricking my hands. Every time I was trying to saw through flesh, my hands got pricked. I tried to pick out the bones with my fingers at first as the opening flesh got sawed wider open. But some flesh also tore apart alongside the bones; they were bound up with each other very tightly, which was a waste. When I tried to do some delicate picking-out by touching and feeling where the bones were, I got pricked again. I decided to stick to the original plan—cooking a pan-fried milkfish dish—rather than picking out the bones and keeping the flesh.

Before placing the two halves of fish flesh in the pan, I salted the flesh by hand. Salt was the only seasoning for pan-fried milkfish that I knew. But evenly spreading salt was difficult because of the ubiquitous bones. Spreading salt evenly counted on using my fingers, which pricked my hands again. I came to realise that what I had seen at milkfishmongers' stalls in Taiwan was a well-arranged assemblage between fishmongers, fish flesh and sharp knives. Only by cutting one fish's body into two halves took me a long time, let alone tens of baskets of fish.

Figure 7-11
Cutting A Fish into Two Halves

This photo was taken by the author. Note that the black parts are the lining of belly fat. The bones are spread out but could not be captured by this photo.

Back in the kitchen, it was time to cook. I put some edible oil to heat up in the pan, waited a short while, and then put one half of the fish into it. While cooking the dish, the housekeeper came by and asked 'What is this fish? It smells good.' I simply replied 'Shi-mu-yu [milkfish in Chinese].' She said nothing, and I figured she was prompting me since she had other two dishes to make. One fish piece after another, it took me over half an hour to cook them. It was almost 6 p.m., and dinner was expected at 6.30 p.m.

When the dish was done, I was about to clean up the mess in the kitchen and the pan. Because of pan-frying, some small burned pieces of fish were stuck to the pan. The housekeeper came by and asked me again what the fish was. I pointed to the fridge, saying 'This is as same as those in stock.' I was told in advance that Mr Yuan carried some packs of milkfish belly from Taiwan every time he returned. She looked surprised at what I had just said and replied 'Is this the same as those?' I nodded my head and was about to dump and scrape off the burned pieces stuck on the pan into the sink. She stopped me and said 'Don't waste it. Only by smelling I can tell how tasty it is.' Then, she took the pan and collected all the burned pieces into a pot alongside the fish head left in the sink. She poured tap water into the pot and cooked it on the stove right away; it was fish soup in the making. In fact, milkfish heads are enacted the same way to make soup in Taiwan as this housekeeper did in Shanghai.

I was told that the housekeeper scratched off the belly fat every time she got milkfish belly pan-fried; Mr. Yuan was upset about that. In other words, the housekeeper had seen, cooked, smelled and tasted milkfish dishes several times before, yet she could not tell that what I was cooking, despite being told several times by me. In fact, even Mr Yuan's daughter who had lived there could not tell what the fish belly they had eaten was by its appearance and taste as the belly fat had been removed. As the housekeeper was making soup and preparing vegetables dishes, I suggested that next time she could keep the belly fat which would make the pan-fried dish smell as good as this one. She replied 'It's very fatty, very unhealthy.' At that moment, I could not find words to respond but I said 'No, it is fish fat, different from pig fat.' I hesitated mostly because I had seen how belly fat was enacted.

On the table, the dish was like a 'fish for compliments'. One of Mr. Yuan's employees said that it tasted good and smelled great, and he asked me what the fish was. I responded that it was fish they had eaten several times before, but this time I kept the belly fat to get it pan-fried. As she learnt about the price of the fish (less than 10 RMB per 500 grams), she said 'It's not expensive at all, so cheap and so tasty.' I asked her if she tasted any 'muddiness'. She hesitated and replied no; according to her response, I suspected she did not grasp what I meant by muddiness but took it to be an unpleasant flavour. She asked me where it was bought. Apart from the name of the mall, I could not tell her where the exact location was; too far, too long and too complicated to remember.

I noticed that the two Chinese friends at the table dealt with fish bones better than the rest, at least than I did. They were picking out bones by hand from their mouths and stuck them to the edge of their bowls, whilst their eyes were on the TV. By contrast, Mr. Yuan, his daughter and I could not take our eyes off our bowls as we were chewing fish meat and concentrating on separating bones from the meat as if any distraction would have got us choked by bones. Picking out bones was so annoying that I swallowed some short, thin ones. In fact, the 'boniness' of milkfish may not be the problem it was thought to be in Shanghai (Lai 2011). Fishmongers who had experience of milkfish did not regard or remember the fish as bony, but they did recall the texture of the meat (field note, Fishmonger Guan, 2014-0704) and an oily taste (field note, Fishmonger Cheung, 2014-0701).

During this scene of making a pan-fried dish, I was trying to enact a Taiwanese version of milkfish dishes in Shanghai by connecting previously unrelated entities— belly fat, bones and pan-fried cooking— at one site. The purpose was to show the difficulty in enacting such a version of milkfish dishes in a different place. In brief, it was difficult to obtain a milkfish, to fillet the fish for pan-frying, to spread salt evenly and not get pricked, and to keep rather than scrape off the lining of belly fat. Every action could potentially have been enacted the 'wrong' way, although this 'wrongness' presumes a single reality for milkfish and a 'centre of calculation' (Latour 1987) that both overlook friction (Lien 2015) and effort during the translation from 'What is this fish?' to 'Is this the same as those [fish]?' Therefore, it would be an uncommon achievement to consolidate the differences in milkfish between the two sides of the Strait into a 'cross-strait milkfish assemblage'.

7.4 The Weaker the Milkfish, the Stronger the Export Scheme

In the previous sections, I suggest that there was no consistency in the so-called qualities of milkfish, since the composition of fish for export was literally collected from various ponds and went through varying taste tests, although milkfish were largely seen as a bulk commodity in quantitative measures. In fact, this contradiction can be seen among most bulk buyers, from night bulk buyers to cold-storage exporters; the difference is in the degree, not the essence (Chapter 6). The reason why this contradiction did not fail these bulk buyers is mainly that, as a processor suggested, '[Consumers] only consume it once in a while. They can't tell the difference' (interview, Boneless Fish Co., 2015-1007). I was asking this interviewee how to maintain the supply of saltwater milkfish that his company branded, even in the off season when the cost of fish becomes very high, let alone the consistency.

A milkfish exporter based in the Philippines suggested that milkfish exported from Taiwan were far worse than those from his company—the biggest milkfish raiser (8,000 tonnes of annual yield), supplier and processor in the Philippines—because, most importantly, milkfish production was too scattered, and milkfish processing was too distributed. What he saw as milkfish for export was the full measure of materialisation of a bulk commodity, rather than a collection of milkfish from various ponds. He added:

> A 40-feet long cargo may have 20 tonnes of fish which were collected from two or three fish farms. Because milkfish nowadays in Taiwan are reared along with white shrimp, and the survival rate of white shrimp could be low if the biomass of algae is not enough. If [the biomass of algae] is enough, there is a high survival rate for white shrimp, but the harvested fish will have the flavour of algae. So, what to do about this? Dose with drugs to kill the algae. Harvest the fish one or two days after, regardless of decay of the drug. Therefore, the quality of milkfish export from Taiwan is totally inconsistent. (interview, Jim 2015-10-11)

This inconsistency, in his view, includes hygiene and taste as well. Although I doubt that there can be consistency in quality in his version of a bulk commodity, it is more far-fetched to say that there is a unified quality to the bulk commodity of milkfish in Taiwan, milkfish for export in particular.

Thus, we can say that implementation of the export scheme was a composite of self-contradiction between a bulk commodity on the one hand and preferential measures to 120 or more fish farmers on the other. We have seen that Shinejai Co. kept apart ‘exports’ from ‘contract farming’ during implementation of the export scheme so as to avoid contradictions evolving into a deep cleavage. However, in hindsight, we know that the ’cross-strait milkfish assemblage’ did not last long. If the work of consolidation failed, would it have been possible for this milkfish assemblage to turn to adapt to local circumstances in Shanghai instead? As the Philippines exporter, Jim, said, his company had a production line for cultivating small milkfish from 180g to 200g specifically for export, considering that not all people consumed milkfish, let alone full-size ones.

We can distinguish two kinds of milkfish, *industrial* and *market fish* (Coles and Hallett IV 2013). Industrial milkfish require a network for fish-processing. A whole fish has to be filleted into portions (such as belly) so that it can be sold. Thus, the fish need to be reared as big ones. By contrast, market milkfish are sold and consumed as pieces of fish; milkfish in the age of shallow-water farming are this kind of fish. However, the milkfish exported to China were industrial fish and excluded from the network of fish-processing. Rather, milkfish in China were treated and consumed as market fish.

If the current version of milkfish is too thick and too big for local preferred recipes in Shanghai, it may be possible for those under 300g that could be raised and exported to China. However, in this way, the revenue from milkfish contact farming would seem unattractive, since the pricing scale for fish under 300g sees 50% deducted (from 41 NTD to 20.5 in the case of 2014), and thus the regular spot price could be better than the contract price. Or, the contract would have to be remade based on a size of 300g per fish. However, this size is not regarded as qualifying for the rest of the milkfish assemblage. Both Shinejai Co. and fish farmers might have ventured to deal with these specifications for fish's lack of transferability exclusive to the uncertain Chinese market. More important was that this adaptation would not be counted as 'doing a favour' to fish farmers or as continuation of the given status of a bulk commodity, since fish farmers and the practices of fish farming had to change in response to changes in the shape of milkfish correspondingly.

Moreover, in order to materialise the full measure of a bulk commodity for export, milkfish production had to be brought under control. Thus, there could be no more preferential measures provided to fish farmers. The conditions of the contract, like taste tests for an off-flavour, would have needed to be enforced rigidly, even when fish farmers encountered emergencies. Thus, adaptation on one side would have caused a re-assemblage on the other side. This would be no longer be the contract farming that fish farmers had experienced.

What Shinejai Co. did was to keep apart two entities that were supposed to interrelate—exports and a scheme for contract farming—so as to keep the export scheme going regardless of the market figures for milkfish in China. More clearly, the market side and the production side were enacted to be only *partially connected*. Market sales in China could partially affect the production side, so that although the contract price was falling, contract fish farmers could continue with the given way of milkfish production, and milkfish could stay the shape they were; thus, remaining intact is a resulting effect that requires a large amount of effort. Therefore, whoever or whatever could hold this partial connectedness together as long as possible would be enacted as a 'hero' that held an impossible assemblage together. Even if the Chinese collaborator would have liked to pay premium prices for those ‘unqualified’ sizes of milkfish, say 30 NTD for fish under 300g, this favour would only have shaped the who and what that kept the export scheme going into a ‘hero’.

In the mid-2016, several fish farmers from Xuejia contacted the media to announce that they were going to protest against the newly-elected administration of Taiwan. The export scheme for milkfish contract farming had been closed down because, apparently, the new administration had not accepted the so-called ‘1992 Consensus’ that recognised both Taiwan and mainland China being part of the same ‘One China’. However apparent the link may seem between the denial of the ‘1992 Consensus’ and termination of the export scheme, there was an unprecedented and devastating cold front that caused the temperature to fall far below 10º C in January 2016, which destroyed most of the milkfish, including fingerlings and overwintering fish. Another consequence was that the price of fingerlings skyrocketed; 15 cm fingerlings (four months at least required to grow to market size) that used to cost 5 NTD each went up to 18 NTD. As such, the spot price of milkfish that year was expected to soar. If the contract price of the export scheme was still 41 NTD per 600g, it is likely that few fish farmers would like to make such a contract.

Before 2011, when the export scheme had not yet begun, there was no evident connection between fish farmers, milkfish and the Chinese market. However, this connection became self-evident after implementation of the export scheme. In the interim, milkfish were exported to China in bulk. Although the fish rarely interested local consumers, the export scheme did not collapse. This disconnection between the demand for and export of milkfish was interpreted as the result of the presence of the ‘1992 Consensus’. Even without ‘demand’, both exports and the scheme for contract farming could go on. Consequently, we can suggest that the weaker was the demand for milkfish in the Chinese market, the stronger was the need for an export scheme. As the export scheme became necessary, Chairperson Wang correspondingly became a spokesperson for the fish farmers. Since the connection between milkfish exports and the scheme had now become self-evident, doubts about closing down the export scheme in 2016 moved towards ignorance about the '1992 Consensus', but not a contradiction between a bulk commodity and preferential measures, or the inflexibility of the milkfish assemblage targeting the production of a bulk commodity as well. Despite this, there have been no milkfish for export to China from this scheme since 2015, though there was still the '1992 Consensus' across the Strait.

What I am suggesting from the above is not using 'cross-strait politics' as a frame to explain implementation of the export scheme. Rather, the reason why cross-strait politics has a place in explaining the export scheme is because of the way the export scheme was enacted. Silencing voices of dissent is as important as purifying milkfish into a bulk commodity; one cannot challenge the One China 'consensus', as much as milkfish cannot be other than a bulk commodity. In this sense, the export scheme is cross-strait politics by other means, as much as continuation of the milkfish assemblage targets the production of a bulk commodity by other means.

Chapter 8
Conclusion

This study starts with the ANT quandary of how heterogeneous assemblages of science and technology and numerous actors are assembled so as to travel well and last a long time. There are two modes of assemblage under examination in this study. First, the mode of *consolidation* suggests that heterogeneous assemblages consolidate newly encountered actors into a network of relations so that these latter actors become assemblages that travel and endure. Second, the mode of *fluidification* suggests that heterogeneous assemblages adapt to those newly encountered actors and places of arrival, just as fluids conform to their containers, so that they become facilitators for assemblages traveling far and lasting a long time, despite being in a different shape.

In previous chapters, we have seen how these two modes of assemblage hybridise, and get rid of each other in the making of milkfish assemblages, whether it is just the milkfish assemblage in Taiwan or the one across the Strait. This study reveals a constant tension between consolidation and fluidification within the formation of heterogeneous assemblages. However, this constant tension is far from being symmetric but is enacted to be *asymmetric* instead. That is, the fluid shape of milkfish assemblages is treated as an object needing to be handled by some kind of network consolidation, even though the long-lasting milkfish assemblage in Taiwan and the one across the Strait are never a singular result of 'pure' consolidation. This asymmetry is achieved by making some characteristics of the milkfish assemblage regarding a bulk commodity more discernible than others, and thus these characteristics hold a pivotal place in shaping feasible options for the milkfish assemblage. Specifically, the undifferentiatedness of a bulk commodity is regarded as the 'essence' of milkfish in both knowledge and practice, and thus exports become the most viable option for mass-produced milkfish and its producers. Since we are now more discerned about both the agency of the farmed food-fish and the indeterminacy of human-fish relations, non-humans such as milkfish should never be excluded from the discussion about the destiny of the very milkfish assemblage. Neither is a 'network' the single order that heterogeneous assemblages should take the form of. Let me reiterate the main findings of the preceding chapters.

8.1 The Restatement of Previous Chapters

Although it is now identified as a 'home of milkfish', that is a given, Chapter 4 argues that Xuejia was incompatible with milkfish farming until the late 1980s, for aquaculture practices of milkfish were not suitable for Xuejia. In the past, the practice of milkfish farming was dominated by shallow-water farming. This practice required a wide range of pond areas to stock milkfish and cultivate corresponding amounts of seaweed for the fish in stock. What were called 'milkfish farms' in the age of shallow-water farming were located close to a coastline where seawater could periodically reach them and retreat each day so as to oxygenate and refresh the pond water. These milkfish farms were more like 'milkfish ranches' on which respective joint-stock companies of milkfish farming had dozens of stockholders of land though just a few employed hands oversaw and handled hundreds of hectares of fish farms.

In contrast, Xuejia was a marginal land which inhabitants sought to convert into farmland for staple crops for their own use, and later for economic crops for the export market. With the establishment of a water canal system in the 1920s, the difference in land use between Xuejia and coastal regions with milkfish aquaculture could only widen rather than converge. At the time of shallow-water farming, milkfish was enacted in a heterogeneous network composed of sunlight, seaweed, seawater, wide spaces, shallow water levels and weather variances, as shy, active, better for saltwater, vegetarian and 300g market-size fish at most; only joint-stock companies could afford to engage in milkfish farming in this way. In other words, both the milkfish and the chairpersons of joint-stock companies were effects of the same heterogeneous network.

Chapter 5 makes visible the traces of Xuejia converted for milkfish farming by showing the blurring of the separation between farmland and fishponds through the re-assemblage of milkfish shallow-water farming into deep-water farming. Both milkfish in the sense of 'physical reality' and the human actors who engaged with it have changed meanwhile with the adoption of deep-water farming. Milkfish are now regarded as more suitable for freshwater, omnivorous, docile and of 600g market size because they are enacted in another heterogeneous network composed of deep water levels, freshwater, paddlewheel aerators, pellet feed and feed delivery machines running in parallel with sunlight and weather variances. The consequences of deep-water farming include the landward movement of milkfish farming, the coastward movement of freshwater ponds, the re-assemblage of joint-stock companies into individual and family-holding fish farms, plus the 'overproduction' of milkfish as well.

On the one hand, these changes can be attributed to the consolidation effects of aquaculture science and technology. A series of experimental conditions contingent on a few sites are translated into necessary conditions that must be in place to fulfil the promise of pelleted feed and better revenues than shallow-water farming permitted. On the other hand, the re-assemblage of milkfish aquaculture can be attributed to the fluid arrangement of deep-water farming. Pond water can be rainwater, groundwater or irrigation water; pelleted feed removes the need for the cultivation of algal beds. In a word, the set of milkfish deep-water farming could not care less about the environment where it is located. Therefore, rearrangement of the milkfish assemblage cannot be regarded as only the result of the effects of consolidation, but also of fluidification.

Chapter 6 turns to the multiplicities and uncertainties implicated in the formation of milkfish as a bulk commodity. Although deep-water farming tends to be described as a seamless web of heterogeneous relations, the practice of milkfish farming in the field does not work like that. Rather, there are occasions when milkfish kept in ponds slip through the web. Primary questions such as ‘are they eating?’, ‘how many fish are in the ponds?’, and ‘what is the feed conversion rate for the same fish feed?’ may be complicated. These uncertainties suggest that the adoption of deep-water farming is not as simple as the adoption of the practices and techniques of deep-water farming. Rather, the practice of deep-water farming is concentrated at one site (a fish farm) as well as distributed among many (feed manufacturers and others). However, this escape from fish farmers’ sight and calculations creates friction. The refusal to stay in the heterogeneous network of milkfish production becomes a threat to fish farmers’ cost-control.

One is clear that the whole milkfish assemblage is dominated by something as small as the lining of belly fat. A contradiction is that the more efficient the way of producing belly is, the greater is the chance that milkfish will go off in flavour and other qualities. Milkfish as a bulk commodity is enacted by collecting ponds of fish and purifying them from the various ponds where they used to live. One critical practice is taste tests. Market professionals make efforts to filter out bad-tasting fish. In this way, milkfish as a bulk commodity takes shape, and thus a stable supply can be assured. However, the work of purification (pre-tasting and harvesting) is rarely fully achieved. Sometimes, pre-tasting fails to capture an off-flavour near the qualification boundary, or professional tasters mean this to happen in order to keep the supply stable in the off season. Or, at other times, the work of purification is itself an intervention in the quality of milkfish. Ironically, the practices that facilitate milkfish being an undifferentiated bulk commodity undermine this state at the same time.

Then, I turn to the multiplicity of modes of practising milkfish as a bulk commodity. There are at least four modes of practice in interaction with the mode of cost-control that spreads over the whole milkfish assemblage. Far from being mutually exclusive, their interaction is more like a patchwork. Sometimes they co-operate with each while at other times they are in conflict. Overall, Chapter 6 argues that it is within the patchwork of differences between the 'same' fish out of various fishponds and between different modes of practising milkfish as a bulk commodity that the milkfish assemblage takes shape and endures.

Chapter 7 focuses on the practice of the export scheme of milkfish contract- farming across the Strait. It argues that the export scheme was a continuation of milkfish as a bulk commodity by other means. Despite this, however, the export scheme was the comprehensive embodiment of the contradictions between a bulk commodity and the multiplicity of milkfish. Under the export scheme, harvesting was not engaged in as work of purification (Chapter 6) but as hybridization with 'favours' and 'preferential measures' towards contract fish farmers. Furthermore, the fish exported to China were a bulk commodity of *industrial fish* that required processing. Meanwhile the Chinese 'market' was expecting *market fish* that suited local recipes and other needs. Thus, the export scheme was divided into two, and the gap was widening gradually. Chapter 7 also comments on the *heroism* enacted in the implementation of the export scheme. As milkfish encountered difficulties in the Chinese market, whomsoever or whatsoever could hold together this cross-strait milkfish assemblage and prevent that widening gap from breaking up would be considered a 'hero'. Therefore, I argue that the more weakly milkfish performed in China, the stronger was the need for the export scheme under the auspices of the Chinese government. Under this circumstance, so-called 'cross-strait politics' was enacted into being, along with the continuation of milkfish as a bulk commodity.

8.2 Discussion

8.2.1 More-than-human Ethnography

This study draws on actor-network approaches to the heterogeneous assemblage of milkfish. In Chapter 3, I mention in passing that the approach this study undertakes can be summarised as 'more-than-human' ethnography. By this, what I denote is a way of doing ethnography in which, although the interlocutors are humans, the non-humans that humans work on and work with are subject to ethnographic examination, and meanwhile those interlocutors' words are treated as an effect of the assemblage of these heterogeneous ingredients and relational practices. In what follows, I recap and reflect on the more-than-human ethnography undertaken in this study.

The ANT method can be summarised as 'following the actors', which include both humans and non-humans; or, at least, the question of who or what are 'actors' should be left open for analysis (Callon 1986a; Callon 1986b; Latour 1987). Latour (2005) suggests ANT research should never employ a theoretical frame external to 'actors' to account for their acts but should, rather, describe what they do so as to connect with unexpected entities across different domains. It is researchers who should draw inspiration from 'actors' rather than impose a priori interpretations or distinctions on them.

Ethnographers are characterised by immersing in 'cultural settings' which are used as data sources (Mason 2002, p.55). In this regard, the ANT method shares its methodological foundations with ethnography of socio-technical assemblages (Baiocchi et al. 2013; e.g. Latour & Woolgar 1979; Law 1994; Latour 1993; 2005), although part of ANT work relies on document analysis (e.g. Latour 1988b; Law 1986; 1987a). But a significant difference is that ANT extends the observation of ‘cultural settings’ to practical settings in which humans and non-humans are entangled, and in which humans are not the only source of action (Latour 2005; Pickering 1995).

Throughout the fieldwork of this study, however, I found it difficult to attend simultaneously to two of the ANT methodological claims that take what human actors say seriously whilst admitting 'objects too have agency' that can make a difference to the results for a human and non-human assemblage (Latour 2005). This is mostly because the interlocutors I interacted with—whether they were scientists and technologists, fish farmers, fish workers, middle buyers, processors or fishmongers—did not explicitly see non-humans as any kind of 'actors' that were acting on the same footing as them. In their words, it is always humans (themselves or other people), rather than the fish (dead or alive), who dominate mutual encounters. Thus, how can researchers hold the view that ‘objects too have agency’ whilst taking interlocutors’ words seriously? It is under this consideration that I draw on Lien’s (2015) methodological concept of more-than-human ethnography to conduct this study.

What more-than-human ethnography means in Lien’s (2015) study of Norwegian salmon farming is an expansion of the ethnographic toolkit to worlds beyond words[13]. Although words remain important ethnographic tools, there are, nevertheless, phenomena that ‘do not map themselves smoothly onto an available and shared linguistic repertoire’ (Lien 2015, p.19). When it comes to aquaculture, it is often understood as an extension of terrestrial farming. In this regard, Lien draws on theoretical resources of material semiotics, including ANT, to shed new light on the term 'domestication'. ‘Domestication’ often implies humans’ control (culture) over non-humans (nature), and that way of thinking is often involved in accounts of the development of Norwegian salmon

[13] Similar ‘more-than-human’ approaches can refer to Tsing (2013), Whatmore (2006) and Pyyhtinen (2016).

farming. She argues that the boundaries between nature and culture are *ever-emergent* through heterogeneous relational practices in the making of salmon.

I view this ethnography 'beyond words' as crucial to this study. I came to realise that what I learnt from interlocutors is not only interpretations of their work but also, first, the effects of heterogeneous ingredients and relational practices involved in the making of milkfish. The practice of milkfish farming could have stayed as it was (Chapter 4). But given that it has converted to the bulk production of industrial fish instead (Chapter 5), fish farmers look forward to an export market fully realising the potential of the bulk production of industrial fish (Chapters 6 &7), while some of them redirect their own produce towards differentiation from industrial milkfish (Chapter 6). And since industrial milkfish needs multiple hands to fillet bones from flesh, and adjust to market demands as well, the activities and practices of processors, exporters, bulk buyers, fishmongers, chefs and others within the milkfish assemblage are more or less shaped and reshaped by this industrial version of milkfish.

Secondly, the aforementioned effects are far from being stabilised once and for all, even now that the making of milkfish has been directed towards the bulk commodity of industrial fish. Rather, they are constantly enacted. The notion of constant enactment is where this thesis distances itself from the ANT methodological claims underpinned by the early ANT literature (e.g. Latour 1987; Callon 1986a; Callon 1986b; Callon et al. 1986). Although the early ANT insists on the use of the same vocabulary to account for both the success and failure of socio-technical assemblages and the activities of both humans and non-humans, this 'symmetry' does, nevertheless, lean towards 'network consolidation' of heterogeneous assemblage, which this study views as a subject of analysis. Against that, more-than-human ethnography, along with post-ANT studies (e.g. Law 2002; Mol & Law

2004; Mol 2002), remains open to how a heterogeneous assemblage is constantly enacted or ‘ever-emergent’ in practice (Lien 2015), however ordinary its heterogeneous composition appears to be.

Thus, from the viewpoint of more-than-human ethnography, the interlocutors’ understandings and interpretations of what they do to live off milkfish should be seen as a range of effects of both transformations and enactments of the milkfish assemblage. But note that this methodological standpoint is not about undermining the methodological claims that the early ANT studies make about an active role for non-humans but about trying to put them into practice so that mundane social-material assemblages, such as milkfish aquaculture, can be examined through the lens of ANT, especially when it comes to the subject of non-human ‘agency’: how humans understanding and act on states of affairs are shaped by the involvement of non-humans.

Thirdly, the other aspect of more-than-human ethnography employed here is to make visible the work of silent entities acting on the heterogeneous assemblage of milkfish, such as non-human entities of milkfish. A large part of the ANT methodology involves tracing the work of silencing actors so that a representative relationship in which a single actor speaks for the rest of others can be identified (e.g. Latour 1993c; Latour 1987; Latour 1988b; Callon 1986a). More-than-human ethnography acknowledges the importance of efforts taken to mute dissenting voices, but it does not assume that the workings of a heterogeneous assemblage hinges on the success or failure of those efforts to silence voices, particularly the voices of non-humans. Rather, it puts ink on the paper in situations when such a representative relationship is at stake, because these situations are revealing about the partial attribution of the workings of a heterogeneous assemblage to non-humans’ ‘co-work’.

That is to say, humans are not the only source of action in/ on a heterogeneous assemblage, nor do non-humans react only to humans' actions. For instance, the amounts of flesh growth and feed consumption may not add up, and this disproportionate result influences fish farmers' practices and shapes their understanding of the state of affairs (Chapter 6); when the fish shows signs of being in poor condition, some fish farmers would rather sell them early than wait for those signs to go away (Chapter 7). In such situations, it is more likely that human actors will give way to or adjust their practices to non-humans than that non-humans will adjust to humans' actions, although that is of course not to say that humans are more passive than non-humans. What more-than-human ethnography does is to describe how the work of humans and of non-humans is interwoven, despite frictions and interruptions, and the ethnography remains open to the possibility of quite different ways in which a socio-material assemblage can take shape or develop.

There are difficulties in practising more-than-human ethnography in the observation and description of the workings of a socio-material assemblage. In particular, there is the decision as to what should be included and what should be excluded from the extent of observation and description. Based on what criteria can such a judgement be made? It is, nevertheless, interlocutors' words and practice that come into researchers' focus and direct their attention, this is an undeniable fact. Despite this, what makes more-than-human ethnography feasible is that it can shed new light on 'objects' with which the 'social reality' is loaded, or on which it is based; they are far from being under humans' manipulation but rather actively engage in shaping the state of affairs, and understanding of the state of affairs as well; and it leaves open the question of how heterogeneous ingredients should be assembled.

I hope to have shown that the ethnographic toolkit can be extended to capture the interweaving of humans' and non-humans' co-work by noticing that there are actors other than humans that work upon the 'social reality', and to treat interlocutors' words both seriously *and* as an effect of how humans and non-humans are interwoven and how this interwoven assemblage is constantly enacted in practice.

8.2.2 The Matters of Initiators and Heroism

At various points in this thesis, some human figures appear to take on the roles of 'initiators' (perhaps even 'heroic' initiators, as in the case of innovators in the shallow- and deep-water farming in Chapters 4 &5, the quality milkfish producers in Chapter 6 and the organiser of the milkfish export scheme in Chapter 7). On the other hand, other 'actors' seem to disappear into the background, perhaps even to be dismissed as manifesting bureaucratic or traditional inertia. Given that some early ANT studies (e.g. Latour's work on Pasteur, 1988b) were criticised (e.g. de Laet & Mol 2000; Law 2003b; Michael 2000; Schaffer 1991) for seeming to adopt a 'heroic initiators' viewpoint, it is important to be clear that this thesis does not share that viewpoint. Rather, I view both 'initiation/ heroism' and 'inertia' as enacted within the network formation; they are co-produced.

This study explores how a shared belief in an export market for the milkfish farming industry takes shape. Rather than being self-evident, it argues that this shared belief comes about through the connection made between the milkfish 'overproduction' of official statistics, experience of fluctuating prices, the socio-material re-assemblage of milkfish farming and the practice of the bulk production of industrial milkfish (Chapters 5, 6 &7). It pays little attention to the putative 'initiator' of the export scheme—the Taiwan Affairs Office and scheme-related Chinese state-running enterprises—even though I do not deny the possibility that implementation of the export scheme had something to do with 'political campaigns'. Apart from the lack of access to insiders, I also have a concern that writing about implementation of the export scheme from the angle of revealing 'hidden facts' becomes a different kind of 'heroic' narrative (Law 1994), one about how effective the export scheme was, in that a political campaign in the guise of an export scheme won over the hearts of fish farmers.

Rather, I care more about how the export scheme was re-interpreted and enacted (Loconto 2014), and what effects implementation of the export scheme has. In terms of Latour (1988b), I care more about the enactment of Pasteur's achievements in hygienists' hands. Chapter 7 explores both enactments of the export scheme in Xuejia and that of milkfish in Shanghai. The export scheme becomes indispensable under the circumstance that contract-farming can be drawn into fish farmers' multiple programmes (Singleton & Michael 1993) regardless of 'consumers' appetite in China, whilst bulk production assemblage can go on as usual.

I am fully aware of de Laet and Mol's (2000) and others' resistance to a 'Machiavellian general' being a requisite for a socio-technical programme to 'succeed'. A 'fluid' socio-technical project may be better in that it also suggests a 'decentred' way of assembling humans and non-humans, in which differences co-exist or can at least be tolerated. But what draws my attention to the case of the export scheme is how a seemingly 'centralised' scheme appears to be so attractive to fish farmers. In Chapter 7, what becomes clear is that the seemingly centralised scheme is enacted to make it so flexible that fits into fish farmers' multiple programmes (Singleton & Michael 1993; de Laet & Mol 2000).

From this case, what I attempt to stress is not that a socio-material project hinges upon a 'Machiavellian hero'; rather, this study explains how 'heroism' is so attractive that it does not wither alongside the disappearance of its mundane incarnation—the export scheme. The answer cannot be attributed to a 'Machiavellian hero', whose own strategy may be littered with mistakes, but to a 'mass' that comprises both humans and non-humans. It is how these heterogeneous ingredients are assembled that, sometimes, enacts a ‘hero’ and shapes what the most feasible option is for the assemblage to continue. Thus, the reason why the analysis of ‘heroism/ initiators’ still matters is not that ‘heroes’ are actually needed, but rather that a belief in ‘heroes’ can be extensively shared, and this shared belief can persist even though the mundane incarnation of ‘heroism’ breaks down time and time again.

8.2.3 Sameness/ Difference, Conventional/ Alternative Food and Ontological Politics

This study explores multiple ingredients that assemble what is recognised as the industry of milkfish farming in its entirety. It is indicated that although the assemblage ingredients are different for shallow- and deep-water farming, there is, nevertheless, a common thread that connects the two, i.e. the bulk production of milkfish (Chapters 4 &5). Also, the differences between conventional bulk producers and alternative ones may not be fundamental; rather, they share a common interest in the bulk production of milkfish of different kinds (Chapter 6). Underlying the accounts of these phenomena of continuity and change within the milkfish assemblage is the notion of sameness/ difference. The notion of sameness/ difference in this thesis has three connections: first, with the constructive criticism (e.g. Mol 2002; de Laet & Mol 2000; Law & Singleton 2004; Law 1999; Dugdale 1998) of the early ANT studies; second, with the heterogeneous assemblage studies of humans and food(-fish) (e.g. Lien 2015; Paxson 2012; Asdal 2015; Teil 2012); and third, with the relation between conventional and alternative foods and networks (e.g. Miele & Murdoch 2004; Mansfield 2004; Whatmore & Thorne 1997; Le Velly & Dufeu 2016). In what follows, I will first recap on these connections with the notion of sameness/ difference and then turn to highlight the issue of the ontological politics implied in this study.

First, the early ANT studies may convey an impression that the work of network formation (and the work of 'following actors' as well) ends at a stage in which differences (multiplicity) turn into sameness (singularity) (Dugdale 1998; e.g. Callon 1986a; Latour 1988b; Law 1986; in the context of agro-food studies: e.g. Busch & Juska 1997). That is, the ingredients involved in the making of networks acquire stable identities along with stabilisation of the networks. However, multiplicity may not cease to exist, even if 'objects' are finally constructed, but is constantly entangled and enacted in practice (de Laet & Mol 2000; Mol 2002; Law & Singleton 2004; Law & Mol 2011b). And this multiplicity may contribute to, rather than undermine, the stability or durability of a heterogeneous network (Singleton & Michael 1993). As mentioned earlier, the constant enactment of the bulk commodity of industrial milkfish, even if farmed milkfish and milkfish farming reach the stage of bulk production of industrial fish, it is still necessary to allow differences in quality of this singular version of milkfish to exist—only by so doing can the 'same' milkfish be provided regardless of seasonality (see below). Thus, what this thesis suggests is that the multiplicity of an object and the object-related assemblage seldom turns into a singularity because of the 'stabilised' arrangement of heterogeneous ingredients and relational practices.

However, this suggestion is not a refutation of the early ANT way of explaining socio-material assemblages by 'network', but rather it treats the 'network' as an effect of constantly being enacted and entangled in practice, and thus needing to be explained. In this thesis, both milkfish and the milkfish assemblage enact each other, but in partially connected ways so that the assemblage ingredients may not entirely mesh (Law 2003b; Mol 2002; Mol & Law 2004). As shown in Chapter 6, various bulk commodity actors share a common interest in industrial milkfish but, nevertheless, diverge from each other sometimes because industrial milkfish are enacted differently by these actors. Thus, the socio-material assemblage that looks like a whole may be assembled in a more partially connected way than is apparent (Mol & Law 2004; Mol 2002; Law 1999; Law 2003b), but this is perhaps why such an assemblage looks like a 'ready-made' industry (Latour 1987). By assembling in partially connected ways, this thesis suggests that this is another way to explain how socio-material assemblages are seen as a 'network'.

Secondly, the notion of 'sameness' employed in this thesis is inspired by Lien's (2015) study of Norwegian salmon farming and others' studies of heterogeneous assemblage of humans and food(-fish) making (Asdal 2015; Paxson 2012; Hébert 2010; Hébert 2014; Teil 2012; Coles & Hallett IV 2013). The study of Norwegian salmon shows that producers have little incentive to differentiate qualities of salmon because the aim of Norwegian farmed salmon, set by the industry, is to become a global bulk commodity, unlike value-adding products such as cheese and wine for which difference is something to be cultivated or emphasised (Fourcade 2012; Paxson 2012; Teil 2012). In this regard, food products are separated into two kinds: bulk food on one side where differences between variants of one food cannot be stressed any less, and value-adding food on the other side where differences cannot be stressed any more. I am particularly interested in the phenomenon of the bulk commodity of milkfish in terms of how it 'constructed', as well as 'enacted' across various circumstances, because I also notice that the making of a bulk commodity comprising milkfish is not taken as a given but rather an effect subject to analysis.

Thus, the sameness/ difference of milkfish is presented as a practical matter in the day-to-day milkfish making (Chapter 6). For bulk commodity actors, whether a pond of fish is the 'milkfish' that these actors require and acknowledge remains open to negotiation according to specific situations, involving the seasonality of production, the need for a stable supply and the practice of milkfish farming, as well as the taste of a pond of fish. Due to a combination of these circumstances, ‘no flavour’ for the fish is a pragmatic standard to include as many milkfish as possible in the same category, even though it is acknowledged that the circumstances in which milkfish live make a difference to the outcome of milkfish produce. Hence, however different these circumstances may be, it is not a given that milkfish sourced under different circumstances cannot be counted as the ‘same’ milkfish as bulk actors require. Meanwhile, however similar those circumstances are, it is not guaranteed that milkfish can be counted as ‘the same’.

The third connection of the notion of sameness/ difference is with the relationship between conventional and alternative networks debated in agro-food studies. Chapter 6 explores non-conventional milkfish producers who try to differentiate themselves and their produce from bulk milkfish so as to stabilise their market share and valorise their products (Paxson & Helmreich 2013). However, it is revealed that non-conventional producers adopt more or less the same logic as bulk commodity production to pursue differences in milkfish products. This is mainly subject to the issue of a stable and scalable supply of the ‘same’ milkfish different from ‘conventional’ ones. Thus, the analysis in Chapter 6 argues that there is no fundamental difference between these two actors with respect to how they pursue their respective goals. Rather, they share the logic of making different milkfish products in the same bulk production way.

However, here I want to complete the comparison between ‘conventional’ and non-conventional producers. As much as the bulk commodity of industrial milkfish is not simply achieved by reduction of differences (consolidation mode), different milkfish (‘quality-oriented’) are not achieved by simply multiplying differences (fluidification mode). Rather, ‘quality milkfish’ are achieved, in part, via consolidation in terms of the certification and aggregation of milkfish under the same banner (Chapter 6). Hence, it suffices to say that bulk and ‘quality’ producers both want to produce milkfish that can count as ‘the same’, even though what counts as ‘the same’ differs between them. Paradoxically, while conventional actors’ practice is associated with the mode of fluidification (e.g. multiplying differences), quality actors’ practice is associated, in no small part, with that of consolidation (e.g. reducing differences). Thus, regarding how they relate to each other, this thesis suggests that they are neither in opposition to nor inclusive of each other, but are related in a partially-connected way so that each can draw upon parts of the other to tackle problems that respective networks encounter (e.g. consumers’ risk awareness of industrial food and food sectors Goodman 2001; alternative’ producers’ struggles to survive in competition with ‘conventional’ food sectors: Le Velly & Dufeu 2016; Loconto 2014; Paxson 2012; Hébert 2010).

What the term ‘partial connectedness’ suggests here is that the understanding of ‘alternative’ food and networks should not be taken in a way that separates the ‘alternative’ networks from ‘conventional’ ones (Le Velly & Dufeu 2016; Mansfield 2004) or parts networks ‘in the making’ from others that are ‘ready-made’ (Friedland 2001). Rather, both food and networks are constantly enacted in ways that complicate each other. Thus, being similar to ‘conventional’ networks may not weaken 'alternative' food sectors (as the ‘conventionalisation’ thesis suggests; as noted by Mansfield 2004; Lockie & Halpin 2005) but rather maintain its workings (Le Velly & Dufeu 2016). Likewise, keeping the ‘alternative’ different from the ‘conventional’ may not achieve the aim of ‘alternative’ networks to realise ‘multiple values’ other than simply economic value (Loconto 2014) but rather preclude others’ (producers, consumers and other humans and non-humans) participation (Mansfield 2004).

Although the question of how ‘alternative’ networks can be properly assembled remains open, it is noteworthy that the materialisation of ‘alternative’ foods and networks is not necessarily in conflict with an economic value, while multiple values (environment, ecology, fairness, sustainability etc.) are not always in accord with each other in the materialisation of ‘alternative’ foods and networks. ‘Alternative’ foods and networks are not a single object but are, rather, enacted to be multiplied in entangled ways (Mol 2002; Law & Singleton 2003; Loconto 2014) through which what is ‘environment-friendly’ or ‘sustainability’ is also changeable. Thus, a pure, singular and disentangled ‘alternative’ food and network may not be as feasible as it seems.

Finally, I want to discuss matter of ontological politics that this study involves. Briefly, to retrieve the main points of ontological politics (Mol 1999; Mol 2002; Law & Singleton 2004; Law & Singleton 2004; Law & Mol 2011b), first, different practices enact different versions of the reality. Second, these multiple versions co-exist but are partially connected; they co-ordinate and co-operate on some places and on some occasions but conflict in other situations and at other times. Third, among these multiple versions, some versions are made more visible and thus seemingly more feasible than others (Loconto 2014; Moser 2008; Law & Mol 2011b).

This study concerns the ontological politics of the implementation of the export scheme, not because of ‘cross-strait politics’, but rather because both what milkfish are and what milkfish farming is never become ‘matters of concern’ (Latour 2005). In this way, the status quo of milkfish farming industry —organised according to bulk commodity production—becomes the only feasible version of the reality. The problem with the export scheme is not that it failed to fit into fish farmers’ programmes, quite the opposite in fact, it fitted so well—especially in the part of contract-farming that provided fish farmers with some sense of security that had rarely been seen—that it was considered ‘there is no alternative’ (Law 2003b). Also, the pragmatic tasting standard of 'no flavour' milkfish, along with other ways of doing a bulk commodity (measuring, calculating, dosing and harvesting), is a device for doing ontological politics, by which other versions of both milkfish and the related assemblage are made hard to contemplate.

In Loconto's (2014) study of the enactment of sustainable tea on production sites, it is argued that a singular version of sustainability, namely economic sustainability, emerges from tea producers' practice and dominates other versions of it. Similarly, in the practice of the milkfish export scheme, the cost-awareness of production and purchase prices, as well as the bulk commodity of milkfish, dominated the production site, while other 'ingredients' involved were made invisible and silent. This is mostly because the export scheme well suited fish farmers' programmes of bulk production. Plus, the 'partial separation' (or partial connection) between the production and consumption of milkfish across the Strait also strengthened the tendency towards bulk production even though there was little appetite for this fish at the consumption site. The export scheme became the most 'viable' option (Sheller 2013) for fish farmers' livelihoods because it allowed the mode of bulk production to continue to exist.

By considering the ontological politics of the milkfish assemblage, this thesis suggests that how fish farmers can get support for their livelihoods cannot be separated from a discussion of how milkfish farming is done and what milkfish are farmed. The answers to these questions remain open but, to address them, we must consider how the socio-material assemblage of milkfish takes shape as it appears, what is included as well as excluded from it, how it is enacted as well as what it enacts, and what effects there will be on the assemblage if 'supportive' measures are introduced. If the current way of enacting milkfish as a bulk commodity is not satisfying to the main characters—fish farmers—that this thesis is concerned with, neither is a way of continuing and even strengthening it.

8.2.4 Rethinking the Relation between Consolidation and Fluidification

This thesis is a reflective construction of ANT. On the one hand, ANT insights are used to shed light on the case of milkfish, but on the other hand, a distance is kept from describing heterogenous assemblages as a process of network-building. As Law and others (Law 2009; Law & Singleton 2004; Law & Mol 2011a; Law 2003b) suggest, a 'network' is only one of many ways in which entanglements of humans and non-humans take shape. Latour (1999a) once suggested 'recalling' ANT because its main components—actor, network, theory and hyphen—are misunderstood and misused. That is, the strength of technoscience should be understood as being sourced from 'hybridisation', and the term to understand this hybridisation is 'network'.

However, a 'network' is largely understood as something prior to 'networking' (such as social networks), and the strength of technoscience and social entities is understood as being sourced from the 'concentration, purity, and unity' (Latour 1996, p.3) of heterogeneous assemblages. This 'misunderstanding' may arise from the asymmetric weight given to the work of hybridisation and to that of purification. While hybridisation is much stressed, purification is relatively underexamined in terms of 'network-building'. In fact, it is relatively straightforward to reach an understanding of social, technical and natural entities as some kind of 'hybrids'. The crux of the matter is rather how such a hybrid can become something or someone definite and independent of others.

This study bypasses both the 'recalling' of ANT and the 'correction of misunderstandings' of ANT. Rather, it argues for co-existence between the two modes of assemblage while still in constant tension. 'Network consolidation' is used more often than fluids spreading to account for the shaping of heterogeneous assemblages, no matter how heterogeneous are the materials drawn and interwoven together, and thus how uncertain are the situations and indeterminate results that are brought about. This is because changes or improvements to the state of affairs are usually taken as the result that some kind of control or order is put in place. However, this approach to exploring heterogeneous assemblages has a problem of preferring the mode of consolidation to that of fluidification.

There are two ways of reaching a more symmetric view on the interaction between the two modes of assemblage. First is the metaphor of camera focus (Singleton & Michael 1993), i.e. ANT researchers' focus should be wide enough and adjusted to include activities which take place in the margins of network-building. These marginal activities—sometimes ambivalent about major activities of network-building—may unexpectedly contribute to the formation of networks. Or, conversely, the major activities of network-building may in fact undermine network-building. Likewise, ANT insights should be adjusted to including the attempts, efforts, practices and activities of consolidation on the one hand, and others that fluidify the major activities of network-building, without the assumption that marginal activities may be a threat to the network-building, on the other. In this regard, heterogeneous assemblages are an effect of multiple networks being interwoven. Seen from inside the activities of network-building, a 'network' of heterogeneous assemblages may be based upon 'fluids' in the margins of network-building. Seen from the outside, the 'fluids' may be based upon a 'network' connected to the centre of heterogeneous assemblages. This is one way we can understand the co-existence of the two modes of assemblage.

Second is to take into account the activities of hybridisation and purification, both separately and interactively. The present study argues that, on the one hand, we take actors' understandings of sources of strength that come from the ‘concentration, purity, and unity’ of heterogeneous networks seriously. On the other hand, we should recognise that efforts to consolidate heterogeneous materials into a coherent network do include elements of hybridisation (arranging heterogeneous materials in a regimented fashion) and purification (attributing a course of action to a single source) as well. It is only when these two works are neatly separated and perform their respective tasks that ‘network consolidation’ can be thoroughly achieved, which is, however, something that very few see.

Despite the stocks of milkfish collected from various ponds, Chapter 6 suggests that the state of a bulk commodity is, first, enacted in entanglements of a series of humans and non-humans stretched to and fro on the production and market sides. Secondly, the work of purification, including both pre-tasting and harvesting, is part of an effort to materialise the state of milkfish as a homogeneous bulk commodity. Ideally, by conducting works of hybridisation and purification in separate stages, fluids are supposed to gradually become networks. However, Chapter also 6 suggests that both the separation between stages of hybridisation and purification and the linear simplification from fluids to networks are arduous and rare achievements. Furthermore, Chapter 7 reveals that the phases of hybridisation and purification are interwoven whilst kept apart so as not to interfere with each other, and thus ‘heroes’ begin to form by holding together this partial connectedness and the unfinished state of milkfish as a bulk commodity. Therefore, what heaves into sight is a blurred boundary between hybridisation and purification as well as striving for the unattainable goal of milkfish being a bulk commodity.

If an exclusive focus on either consolidation or fluidification should be abandoned, this is because the achievements of purification work are taken for granted. On the one hand, the mode of consolidation tends to overestimate the work of purification as if the attribution of the achievement of holding together a heterogeneous assemblage to form a single entity can be done straightforwardly. On the other hand, the mode of fluidification underestimates the work of purification, as if the attribution of achievements can be distributed and dispersed like spreading fluids. This study suggests that neither is bound to be the shape of things to come but remains open to enquiry. Moreover, the work of purification is not only an empirical matter but also a theoretical one. When things unfold by hybridising with the mode of consolidation as well as of fluidification, we have no reason to purify them and separate them from one another to have a purified theory. Rather, keeping a theoretical tension between the two modes of assemblage may work better to capture the making of reality in tension as well.

8.3 Contribution, Limitations, and Recommendations for Future Research

Scholars from the realms of STS and others have engaged with this topic on ways of heterogeneous assemblages for a long time. Law and others (e.g. Law & Singleton 2004; Law & Mol 2001; Mol & Law 1994) have noticed multiple modes for objects and object-related collectives taking shape to remind us of the fact that there is more than one way that entanglements of humans and non-humans take shape, travel and endure. This thesis recognises these efforts and deliberatively picks up the modes of both networks (consolidation) and fluids (fluidification) to examine the empirical case of milkfish. This thesis contributes to this debate by making salient the part of the work of *purification* that plays in the shaping of heterogeneous assemblages. By purification, heterogeneous assemblages are tended towards the network consolidation while other possibilities of how they could be assembled are placed under shadow.

However, these two modes do not exhaust the possibilities of how things can be assembled. For instance, the metaphor of *fire* (Law & Mol 2001; Law & Singleton 2004)—that suggests that ontological continuity is dependent upon the discontinuity of a series of other things that are kept in the background but cannot be overlooked in the formation of objects—is not yet included in examinations of the implementation of the export scheme. But this irreducible tension between presence and absence is partly noticed in the analysis of a bulk commodity and stocks of fish collected from various ponds (Chapters 6 and 7).

Secondly, this study contributes to the knowledge about the notion of the dynamic relation between sameness and difference implicit in studies of heterogeneous assemblages of humans and food(-fish) (Lien 2015; Teil 2012; Paxson 2012; Hébert 2010, 2014; Asdal 2015; Coles & Hallett IV 2013) by exploring the enactment of the bulk commodity of industrial milkfish in practice. This thesis argues that the making of a bulk commodity is achieved through the mode of fluidification no less than that of consolidation. Furthermore, this view can be extended to reconsider the knowledge about the relationship between 'conventional' and 'alternative' foods and networks, and the 'conventionalisation' thesis discussed in agro-food studies as well.

On the one hand, what are seen as 'conventional' foods and networks should be examined through a lens that takes into account non-human entities. The cases that this thesis covers are mainly so-called 'conventional' actors (humans and milkfish). These actors are far more flexible and uncertain in their practice of coordinating with each other than what the term 'conventional' may express as if they were acting in a 'rigid' or 'definite' way. This study suggests that the key to reopening the enquiry into the 'conventional' is to highlight the part concerned with how non-human entities shape a socio-material assemblage (Lien 2015). Although 'conventional' actors tend to view non-human entities as passive and take their own practice of manipulating these objects as granted, this study draws upon actor-network approaches to shed new light on their practices involved with non-humans, and further views their understandings of the passivity of non-humans and of states of affairs as an effect of their assemblage with the non-human entities 'under their manipulation'.

On the other hand, this study suggests rethinking the dichotomy between 'conventional' and 'alternative' foods and networks. Many agro-food studies are dedicated to identifying the ontological differences between 'conventional' and 'alternative' food networks (e.g. Murdoch & Miele 1999; Murdoch et al. 2000; Goodman 2001). As a result, the term 'conventionalisation' is applied to suggest a phenomenon whereby the 'alternative' becomes more like and subject to mainstream food sectors (as noted by: Lockie & Halpin 2005; Mansfield 2004; Le Velly & Dufeu 2016). However, this thesis argues that both 'conventional' and 'alternative' networks are not fundamentally different but partially connected instead. Thus, the phenomenon of 'conventionalisation' may not undermine the 'alternative' network, but rather sustain its workings in a provisionally and locally appropriated way (Le Velly & Dufeu 2016; Loconto 2014).

Furthermore, despite the emphasis on convergence, the term 'conventionalisation' overlooks a degree of differentiation between 'conventional' and 'alternative' networks. From the perspective of a dichotomy, the two networks are either different or similar to each other, but that is no longer the case when looking through the lens of how heterogeneous ingredients are interwoven so as to travel and endure. The 'alternative' network that weaves together 'multiple values' with heterogeneous materials in a relational practice of food-making is more in line with the mode of consolidation than the 'conventional' one is. This further invites us to pose a question about the ontological politics of 'alternative' food and networks: how are their heterogeneous ingredients (e.g. humans, materials and values) assembled so that they fall short of the mutual adaptability that the mode of fluidification suggests?

Thirdly, this study draws upon an ANT-based symmetric approach to the development of milkfish aquaculture, which has long been regarded as one-way adaptation from humans to 'nature'. Rather than viewing nature as a whole, this study takes this adaption as two-way movements between humans and non-humans. Also, this study notices multiple entanglements of life-forms between humans and non-humans. The life-cycle of milkfish is rearranged according to, for instance, market, algae (feed), water and seasons, while humans are also enacted as specific actors, for instance householders or joint-stock companies, in this rearrangement. This echoes Lien's and Law's (2012) concept of 'architexture' and Lien's (2015) more-than-human view of domestication.

Fourthly, this study contributes to the discussion about the ontological politics of food-making (Lien 2015; Sheller 2013; Loconto 2014). Food-making is not only a matter of objects. Rather, it has to do with how a collective of humans and non-humans has to be arranged and re-arranged so as to materialise a particular version of objects. Therefore, this study enriches the dialogue on the export scheme of Taiwanese produce to China by extending the implications of politics to the world of non-humans. Some arrangements are made more visible than others so that some versions of objects and thus some versions of reality are more feasible than others.

There are several issues around the industry of milkfish farming that deserve future research. First is an international (transnational) comparison of milkfish aquaculture between Taiwan and the Philippines. Taiwan and the Philippines have different 'cultural backgrounds', but they endured similar histories as Japanese colonies and the post-war influence of the U.S. More importantly, being a major food-fish in both countries, milkfish aquaculture unfolds in very different ways. The Philippines has a corporation-led milkfish farming industry, while it is another shape in Taiwan. And there are much Taiwanese investment and technology and many staff involved in the current operation of milkfish aquaculture and farming of other marine species in the Philippines. Swanson (2013) notices that export of the technology of salmon-farming from Japan to south America could be a Japanese version of a modernised dream. Lien (2009; 2007) also notices the transnational mobility of staff, expertise, technology and capital of salmon-farming between Norway and Tasmania. Thus, how the differences and connections between Taiwan and the Philippines are made possible deserves future research.

Second is the achievements of the artificial and natural breeding of milkfish. This achievement is regarded as the first ever success on a commercial scale for artificial breeding of marine fish. This technology is critical to the division of milkfish farms into multiple sectors between fry breeders, fingerlings growers and adult fish growers, but this thesis has not paid enough attention to this technology. Besides, the development of this technology is a case counter to centralised technoscience. Although government-funded laboratories and aquaculture scientists were dedicated to working in artificial breeding of milkfish fry, this achievement was in a civilian expert's hands in 1984. Later, this technology was applied to other farmed fish popular in China, Hong Kong and Taiwan as well, like *groupers*. To what extent does the technology of artificial breeding of farmed fish re-shape the sector of aquaculture? This question deserves future research.

Third, finally, is a call for social studies of aquaculture science and technology. Callon (1986) uses the case of scallop recovery in which social-technical devices were imported from Japan to France to illustrate the principles of ANT. A question raised by Swanson (2013) is what happened on the Japanese side afterwards. My concern is that

ANT or, more broadly, STS has not paid much attention to the development of aquaculture. Since aquaculture has long been regarded as a means for meeting the demands for animal protein from growing populations, a great deal of research and investment is put into this realm; transnational aquaculture corporations move globally, and the worlds of humans and non-humans are shaped and reshaped simultaneously, so we have no reason to put the realm of aquaculture aside. Moreover, a salient feature of aquaculture is that 'breakthroughs' in aquaculture science and laboratories cannot be easily applied to the field of fish farming. Thus, as 'breakthroughs' come into use, the situation in the field has to be reshaped or rearranged accordingly. This reshaping and rearrangement trigger issues of ontological politics and the ANT dilemma between networks and fluids.

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