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Exploring the sustainable food security approach in relation to agricultural and multi-sectoral interventions: A review of cross-disciplinary perspectives

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ABSTRACT

Agricultural interventions alone will fail to achieve sustainable food security outcomes. Hence, it is important to investigate multi-sectoral linkages, especially the role of rural women and trade. Many have studied available evidence of ways in which agricultural interventions can be leveraged to achieve food security; however, none of them have employed a cross-disciplinary pathways approach that ensure internal and external validity. This study fills this gap by exploring sustainable food security approaches employing a DFID framework. The review analysis shows that agricultural interventions and multi-sectoral linkages have the potential to enhance food security. The study then draws on the implications for Pakistan, whose contemporary food security challenges demand a well-designed integrated approach to bridge the gap between scale and disciplines of analysis. In the end, this study advocates a mixed-methods approach for strengthening policy recommendations for Pakistan. The integrated dataset can also be useful in providing empirical insights into the food security outcomes at the national, household and individual level.

1. Introduction

Pakistan is among the sixth most populated nations in the world, with 208 million people, and the GOP (2018) has set a future goal of reducing poverty and hunger in all forms by 2025. Around 37% and 63% of its population live in urban and rural parts of the country, respectively, where the primary source of earnings of rural households is activities related to agriculture. About 54% of the rural population currently suffers from multidimensional poverty and hunger in Pakistan (UNDP Report, 2016; Azeem et al., 2016). The agricultural sector alone may not be able to accomplish food security outcomes, unless a multi-sectoral approach is implemented to tackle hunger and malnutrition (Pandey et al, 2016; FAO, 2014). The concept of "food alone" has been proven to be inadequate for ensuring food security and therefore this concept should be widened.

There is a vast body of evidence investigating different pathways in relation to agricultural interventions and food security outcomes (Tomich et al., 2018; Shankar et al., 2018; Rao et al., 2018; Maestre et al, 2017; Riahi et al., 2017; Pandey et al., 2016; Khan and Khan, 2009). The issue is, therefore, not the absence of empirical research but rather, that research is scattered and one dimensional across different disciplines (Johnston et al., 2018). Since the body of relevant evidence is large, the first and most important step is to determine the scope of our study. This review uses a cross-disciplinary approach to examine the multifaceted and complex nature of food security. To our best knowledge, this research is the pioneer study to conduct a systematic review by using cross-disciplinary framework that ties agricultural and multi- sectoral interventions together to explore a sustainable approach for ensuring inclusive food security in Pakistan.

2. The pathways framework: conceptual linkages

This study employs a cross-disciplinary pathways framework to assess the effectiveness of agricultural and multi-sectoral linkages on inclusive food security (Fig. 1). We systematically review six distinct pathways from the range of different disciplines. Pathways 1–3 review the effectiveness of agricultural interventions for improving overall food security (availability, access, affordability). Pathways 4–5 examine multi-sectoral interventions, e.g., the impact of trade, foreign direct/ indirect investment and remittances relation to food security. Pathway 6, examine most neglected perspective of women's agricultural work and their returns (income) for rural household food security (see Fig. 2)

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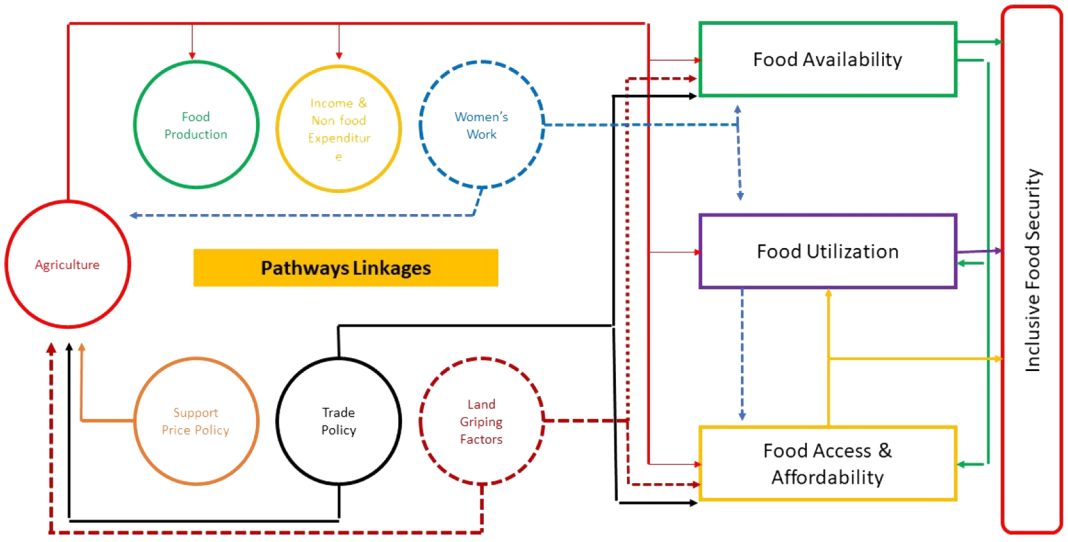

Fig. 1. Framework of pathways (Source: Author's own analysis).

Fig. 2. Flowchart of systematic screening process.

3. Review methodology

3.1. Search strategy

The characteristics of the data sets, targeted paths and quality marks affecting the accuracy of the findings are provided in Table 1A. The following steps were followed to conduct the systematic screening process.

3.2. Quality evaluation and data mining

This study performs a DFID systematic review of food security related research in Pakistan. The DFID (2014) formwork, like systematic review, uses a transparent and consistent protocol approach (Table 1A). It is more robust, unbiased and transparent method to collect and identify relevant articles to a research question that provides the quality and quantity of available evidence for policy. The articles included were based on the internal and external validity, which is usually ignored particularly for a country-specific review analysis (Kadiyala et al., 2014). We reviewed 340 abstracts of studies, of which 192 studies were excluded because they did not address the research question, 41 studies were discarded because they were review papers, and 32 studies were excluded due to the mismatch in geographical coverage. The remaining 75 research studies were reviewed in detail, resulting in 31 research studies being discarded because they were not published in peer-reviewed journals or their publication source could not be identified. A total of 44 research studies were finally included in the systematic review.

4. Results

4.1. Pathway 1: Agriculture as a source of food

Ten studies out of 44 explored the role of agriculture as a main source of food production and consumption in Pakistan, and they strongly demonstrated that dietary intake of rural households is greatly dependent on the supply of food from their own farming (Elahi et al., 2018; Kirby et al., 2017; Bashir et al., 2013). This was linked to low productivity and limited purchasing power. A significant and positive relationship is found between increase in agriculture output and food/nutritional security (Qasim et al., 2015). Similarly, the increase in food production has a decisive role in improving the dietary intake and food security outcome. High nutritious food, such as pulses, fruits and vegetables, have shown a positive contribution to increased dietary intake of targeted populations (Ali and Erenstein, 2017; Hassan et al., 2005). Moreover, Rehman et al. (2017) found that a sustainable supply of food

supports food diversity and improves the calorie intake that is essential to achieve auspicious food security outcomes. However, findings of some studies at household and individual levels reveal a weak connection between calorie consumption and food security outcomes in Pakistan (Amir et al., 2013; Bashir et al., 2013).

4.2. Pathway 2: Agriculture as a source of income and non-food outlays

Agriculture is a pathway to achieve food security outcomes at national, household and individual levels indirectly by using income and non-food outlay. It was observed in 10 out of 44 studies that although agricultural GDP growth contributed greatly in reducing stunting rates, it was not sufficient to eliminate the issue of chronic food insecurity and malnutrition, because the initiative failed to reach vulnerable groups at a large scale level. Household occupation may play a significant role on food security. The income and food security relationship, disaggregated by rural households' occupation, indicates that stunting, wasting and chronic food insecurity are related to high income inequality. However, non-income factors, such as education and skills have greater influence on improving food security outcome, as compared to the income pathway (Ali and Khan, 2013; Malik, 2008). Ahmad et al. (2017) and Bashir et al. (2012b) have found a positive relationship between household livestock and per capita income on food intake and food security, which indicates that income is not the only contributor to food security. Other non-income factors, such as household education, and skills, also play an important role in bringing sustainable solutions.

4.3. Pathway 3: Support price policies affecting food security

Five out of 44 selected articles have examined the impact of support price polices on domestic food supply and affordability. It is hypothesized that these interventions for sustaining internal supply of food crops have substantial impact on food availability and access (Hussain and Akram, 2008; Raza and Siddiqui, 2014). Bashir et al. (2012a, 2012b) showed that increase in food price has little influence on food consumption because poor households mitigate the price shock by overlooking education and health expenditures. As a result, education and health status of rural households may be negatively affected by food price shocks. Therefore, these policy interventions enable access to food and improve the purchasing power of people (Ahmad, 2009). Some studies found that support price interventions provide temporary relief to food availability (Bashir and Schilizzi, 2012; Dorosh, 2008).

4.4. Pathway 4: Foreign direct investment, workers' remittances and food security

Majority of the selected studies have directly focused on the impact of foreign direct investment (FDI) and workers' remittances on food security outcomes (Santangelo, 2018; Slimane et al., 2015; Liu, 2014). Although FDI and remittance inflow play an important role in improving the gross domestic product (GDP) growth in Pakistan, it has a very limited outreach in food security because FDI and remittances were creating a land grabbing phenomena (Abdullah et al., in press). Land grabbing has both short- and long-term dynamics on all dimensions of food security. A recent study claims that FDI in agricultural land has positive effects on the food security of developed countries through increasing land utilization for food production (Santangelo, 2018). However, it has negative effects on the food security of developing countries by encouraging the switching of crop cultivation land into commercial land (housing, business, etc.). There was a risk of an increase in land grabbing particularly in local communities in the countries where state institutions and their regulations are weak and land rights are not properly defined, thus endangering food security of (Liu, 2014). Combes et al. (2014) draws two further important conclusions: firstly, foreign inflow and remittance have negative influence on host country food prices; secondly, low remittance to GDP ratio is required to stabilize the domestic prices and food accessibility. Although, there has been vast discussion on risk and potential returns of FDI and remittances on host country, yet there is lack of empirical research.

4.5. Pathway 5: Trade openness and food security

The significance of trade openness in food security is examined in eight other studies. They disclose that many developing countries have initiated to reform trade policies to increase the economic integration and reduce trade and non-trade barriers. These reforms contributed massively to growth and food availability at domestic and global level (Martin, 2017). Trade openness is justified by expected improvement in specialization and efficiency, especially in resource distribution, food availability and poverty alleviation (FAO, 2003; Kershen, 2010). It is observed that the role of trade openness has been quite asymmetric as agriculture production has not been benefited directly, while the allied sectors have earned most of the paybacks (Martin, 2017; Dithmer and Abdulai, 2017; Dorosh, 2008). Another study found that increase in the market access and removal of the trade restrictions and export subsidies could be "good" policy options to attain the food security (Chand, 2006).

4.6. Pathway 6: Women's work in agriculture and food security.

Six studies have focused on the question of whether women's work in agriculture helps or hinders the food security outcomes in Pakistan. Women's working activities in agriculture may improve their livelihood and nutritional status, but could also have adverse impact on their health status due to overwork (Balagamwala et al., 2015; Butt et al., 2010). Therefore, inclusion of women in the food security programs, especially in livestock and crops, needs a gender sensitive method (Andaleeb et al, 2017). Women's literacy, especially mothers', about healthy food has a significant effect on food expenditure and consumption, which is important for food security outcome (Amin et al., 2009).

5. Conclusion

The existing food security literature predominantly focused on agricultural intervention. This systematic review reveals that agricultural growth is not a sufficient condition for reducing food insecurity because its impact is limited in scope and scale. The myth of "food alone" will improve food security has been proven an inadequate approach. The problem of food security is multi-dimensional and requires a more diversified approach dynamic (Pandey et al., 2016).

Existing evidence has largely examined the way in which agricultural interventions can be leveraged for food security; however, none of them have employed cross-disciplinary pathways approach. This study found that agricultural interventions and multi-sectorial linkages have a potential to enhance food security. The contemporary food security challenges faced by Pakistan demands a well-designed integrated approach to bridge the gap between scale and disciplines of analysis. None of the existing studies have addressed the issue of land grabbing specifically for food security. These land grabbing phenomena, such as the CPEC investment in Pakistan's agricultural land needs to be empirically examined, particularly its food security dynamics. In the end, this study advocates a mixed-methods approach for strengthening policy recommendations in Pakistan. Using integrated dataset covering multi-dimensional aspects of food security can be useful in providing empirical insights into the food security outcomes at national, household and individual level.

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Appendix

See Table 1A.

Table 1A
Quality valuation criterion as proposed by Yosef et al. (2015) and Rao et al., 2018).

Does Literature cover? (Total Points 27P)			
Q 1: Acknowledge existing literature?	P 1	Q 9: Well-suited indicator/driver?	P 1
Q 2: Conceptual framework?	P 1	Q 10: Reported results are generalizable?	P 1
Q 3: Have a strong hypothesis?	P 1	Q 11: Have logical conclusion?	P 1
Q 4: Having link to raw data?	P 1	Q 12: Is research internally valid?	P 1
Q 5: Identify limitations or constraints?	P 1	Q 13: Cross-sectional studies?	P 1
Q 6: Research framework or design?	P 1	Q 14: Longitudinal studies:	P 2
Q 7: Research methodology?	P 1	Q 15: Randomized controlled trials?	P 4
Q 8: Justified used research method?	P 1	Q 16: Quasi-experimental?	P 3
Q 17: Use indicators which are reliable estimating food security?			P 1
This study considers the following to generally reliable: (7 days recall method, 24 h recall, BMI method, micro & macronutrients and anthropometry)			
Q 18: Is the study internally valid?			P 4
(The criteria to determine the Internal validity is based on use of research design)			

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