



Financial inclusion in the Global South: an analysis of index-based agricultural insurance and farmer food security in India

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Index-based agricultural insurance (IBAI) is presented by several development organisations as a highly effective way of mitigating climate change-related risks and improving farmer food security. However, critics doubt the effectiveness of the instrument and regard it as a new frontier for capital accumulation. Linking to this debate, this research uses a qualitative design to investigate how IBAI affects the food production and consumption of farmers in the Indian state of Karnataka. It finds that the proposed benefits of the instrument are overestimated. Most of the major issues reported by farmers cannot be addressed by insurance. Moreover, using the alternative concept of food sovereignty, the research suggests that several problems reported by interviewees, such as unstable market prices, unequal land distribution and missing irrigation, require political action rather than financial inclusion.

1. Introduction

As numerous scholars point out, financial inclusion in the Global South has increasingly become the focus of development and international financial institutions over the last few years (Breger Bush, 2012; Mader, 2018; Soederberg, 2013). Financial inclusion is understood as opening access to financial services to people who have previously been excluded from them (World Bank, 2018).

Supporters of micro-finance see insurances as an untapped potential for financial inclusion. According to the Micro Insurance Network (2017), a coalition of development institutions and businesses aiming to promote micro-insurances, the Global South has an "...enormous potential for growth" (p. 3). One widely advocated insurance form for financial inclusion is index-based agricultural insurance (IBAI), where a data-driven index serves as a proxy for developments in

the field and determines whether farmers receive indemnities. Proponents see this as a cost-efficient way of managing payouts, thus allowing more farmers to gain access to insurance at a reasonable price (Isaksson, 2015a).

India has the largest market for IBAI in the world (Grettrex et al., 2015, p. 9). With the government-sponsored Pradhan Mantri Fasal Bima Yojana (PMFBY) and Weather Based Crop Insurance Scheme (WB-CIS), tens of millions of farmers use insurance products. The agricultural sector plays an essential role in the economy and employs more than 50 per cent of the population. Poverty and food insecurity are widespread, with around 30 per cent of the population living below the poverty line (International Food Policy Research Institute, n. d.). These characteristics make the country a suitable case study.



The goal of this paper is to research how farmers make use of insurance to secure their livelihoods and food security. Its central argument is that IBAI cannot deliver the proposed benefits because it does not address the underlying causes of farmer's food insecurity. The methodology includes qualitative research that facilitates an in-depth study of the issue at hand. The analysis additionally introduces the concept of food sovereignty to evaluate if it can serve as an alternative paradigm for rural development.

2. Literature review

Giné et al. (2010) pointed out the potential advantages of index-based insurance: risk mitigation and improved access to credits and inputs. In a quantitative study on index insurance in Kenya, Isaboke et al. (2016) found that uptake of index-based insurance had a positive effect on farmer food security and dietary diversity. Among other factors, insurance customers were more likely to ask for agricultural credit. This claim is contradicted by findings from Giné and Yang (2009), who conducted an experimental study in Malawi. They reported that farmers who were offered insurance were less likely to take out loans. Their explanation for this was that insurance costs made loans more expensive, comparable to a higher interest rate. Carter et al. (2016) maintained that the effect of index-insurance on uptake of new technologies is highly context-specific and that positive impacts of IBAI cannot be generalised.

Carter et al. (2018) used quantitative data from livestock insurance for cattle herders in Kenya and Ethiopia. They acknowledged the instrument's potential in mitigating climate change related to food insecurity but argued that success depended on insurance design.

In a randomised control study in India, Cole et al. (2017) found that farmers with index-insurance were more likely to plant high-risk, high-return cash crops. However, this shift in farming practices was limited to farmers with a higher level of education. Furthermore, while the survey found a change in farming practices, it did not draw any conclusions on the effects of these changes on farmer income and food security.

Isakson (2015a) concluded that IBAI is a way to deal with the consequences of increased risks rather than

its origins. He maintained that IBAI does not address the root causes of vulnerability, which are growing financialisation and debt relations caused by farmer integration into agricultural value chains.

Based on a case study in Mongolia, Taylor (2016) found that index-insurance ignores the specific social structures which make certain groups more vulnerable to weather-related risks than others. Taylor maintained that insurance was a technical solution that did not consider how risk depended on an individual's social position.

Overall, index-insurance remains a comparatively under-researched area (Da Costa, 2013; Greatrex et al., 2015). Most of the existing empirical studies use quantitative data. Qualitative studies that allow an in-depth analysis of how index-insurance affects farmer's livelihood strategies and food security are largely missing, with Taylor's (2016) study on Mongolia being an exception.

3. Theoretical framework

3.1. The concept of Food Security

The concept of food security appeared on the international scene as a consequence of the food price crisis of 1972 – 1974 (Jarosz, 2014, p. 171). It has since then been an object of constant debate, which has led to several shifts in its definition and focus (Coates, 2013, p. 189). Jarosz (2011, p. 122) points out that conceptualisations of food security in the 1970s emphasised a need to secure sufficient food availability on the national or regional level. Food security policies focused on adequate national food production and national stocks for emergencies. The concept was production-centred and linked to the thinking of the "Green Revolution".

However, with the publication of Amartya Sen's work on famines in 1981, focus moved towards questions of access to food (Coates, 2013, p. 189). As Sen (1981, p. 433) points out in his work, food availability is not sufficient to ensure food security. In many cases, people starve even when there is adequate food available regionally. The reason for hunger often is not the lack of availability but the missing access to food.

Further research into the concept added a temporal dimension to the framework because it showed that



people are faced with situations in which they have to trade current food security against food security in the future (Maxwell, 1996, p. 158). Another critical addition to the concept has been the dimension of food utilisation (Coates, 2013, p. 189). Food utilisation includes access to clean water, appropriate storage facilities and the intra-household distribution of food. These aspects are important for assessing the food security of individuals when the unit of measurement is the household (FAO, 2008, p. 1).

3.2. The concept of Food Sovereignty

The food security concept remains a contested framework that continues to be criticised from various angles (Hayes-Conroy & Sweet, 2015, p. 375). One of the most notable results of these critiques has been the emergence of the food sovereignty concept. Since its first formulation by the global peasant organisation La Via Campesina in 1996, it has gained importance and is now part of the FAO's public deliberations as well as background for food legislation in several countries (Lawrence & McMichael, 2012, p. 135).

Advocates of food sovereignty criticise food security as apolitical and negligent on questions of origin and production of food. They see trade liberalisation and the increasing importance of markets and transnational corporations in agriculture as one of the main obstacles to fighting hunger and malnutrition (Patel, 2009, p. 665). They argue that economic liberalisation has deprived national governments of their authority of protecting their markets, with detrimental results to smallholders in the Global South. Thus, the food sovereignty movement aims to establish a stronger political control of the agricultural sector (Beuchelt & Virchow, 2012) and reorganise power in the global food system (Alonso-Fradejas, Borrás, Holmes, Holt-Giménez, & Robbins, 2015, p. 439).

3.3. IBAI and Food Security

Advocates of IBAI see it as a useful tool for climate change adaptation and rural development. They argue that IBAI can improve farmer food security through access to high-value markets or contract farming arrangements (Hazell et al., 2010, p. 24). IBAI shall encourage farmers to take out credits to invest in new farming technologies and inputs. According to Hazell et al. (2010), this "...can lead to game-changing in-

creases in farm productivity and income" (pp. 24-25). As Carter et al. (2014, p. 3) point out, farmers often rely on on-farm and off-farm employment to diversify income and minimise risks. Farmers with insurance can rely on insurance as a risk-mitigating strategy, which allows them to increase their farming income through specialisation.

Concerning food security, this means that IBAI potentially affects its temporal, availability and access dimension. IBAI should lead to more stable incomes that enable steady food consumption in terms of the temporal dimension. Regarding the access dimension, it can be expected that IBAI leads to a shift from a production-based entitlement structure towards a focus on trade-based entitlements. Additionally, households should be able to gain sufficient trade-based entitlements through their farming alone.

Despite the potential benefits, IBAI has several weaknesses. One of its main weaknesses is basis risk (Greatrex et al., 2015; Hazell et al., 2010; Sandmark, Debar, & Tatin-Jaleran, 2013). Basis risk refers to the possibility that the index does not correlate with the actual situation of a farmer. A farmer may lose parts or all of the harvest without receiving an indemnity payment (Sandmark et al., 2013, p. 19). Another aspect is the difference between income and yield (Binswanger-Mkhize, 2012, p. 190). Since the ability to consume depends on income, not yield, farmers need to insure their income. However, this is a much more difficult task than insuring yields. Income depends on the fluctuating prices of crops on the market. Thus, insurance is not a safety net against market volatilities. Concerning the four pillars of food security, these weaknesses potentially impact the availability, access and stability pillar. The possible negative effects can lead farmers from production-based entitlements towards trade-based entitlements that do not materialise because of unfavourable market conditions, leaving farmers with debts they cannot repay.

3.4. IBAI and Food Sovereignty

IBAI is an instrument that aims to make farmers more competitive in agricultural markets and protect them against climate change risks. It, therefore, follows a market-centred logic that food sovereignty rejects. Rather than making farmers fit for a competitive market environment, food sovereignty aims to adjust the

economic environment of food producers to allow them to produce in an ecologically and socially sustainable way. While IBAI assumes that farmers need to adapt to the necessities of markets, food sovereignty takes the opposite logic and assumes that the economic conditions must adapt to make sustainable production possible.

3.5 Current insurance policies in India

There are currently two government-supported index-based crop insurance schemes in India, the WBCIS and the PMFBY scheme. While the WBCIS relies on weather-related data such as rainfall, temperature and wind speed to calculate the relevant index, the PMFBY scheme is based on a yield index. The payout of insurance coverage depends on the average expected yield in a given area. Government departments set the expected yield based on crop cutting experiments (Gulati, Terway, & Hussain, 2018).

Insurance is mandatory for farmers who take out a loan from a financial institution. In that case, the insurance premium is automatically deducted from the loan. In other cases, farmers can voluntarily insure their crops administered by private insurance companies and public bodies. While public bodies are responsible for providing weather data, private insurance companies handle the payout of indemnities (Indian Ministry of Agriculture and Farmers Welfare, n. d.).

4. Methodology

4.1. Study area

The study is based on data gathered through semi-structured interviews in the Indian state of Karnataka. Expert interviews were conducted in the city of Bangalore. Farmer interviews were conducted in five villages within an area of 70km around Bangalore. In Karnataka, only a small area of agricultural land is irrigated, which means that farmers are mainly dependent on weather conditions (Rajeev, Bhattacharjee, & Vani, 2015, p. 5). Agriculture is vulnerable to droughts, with 18 from 27 rural districts classified as drought-prone areas (Rajeev et al., 2015, p. 18). Next to weather-related risks, farmers are confronted with risks of unstable input prices as well as unpredictable

prices for selling their produce (Rajeev et al., 2015, p. 29). Index-based insurance can have particular importance under these conditions (Rajeev et al., 2015).

4.2. Methods

The research uses qualitative methods. It aims to explore and understand how index-based insurance affects the livelihood strategies of Indian farmers and how it shapes their strategies to achieve food security. The research uses semi-structured interviews with farmers and experts to collect data. In the framework of this research, experts are regarded as persons who possess exceptional knowledge about a topic that influences the practice and actions of others (Bogner, Littig, & Menz, 2014, p. 14).

4.3 Sampling

The sampling applied in this study is based on snowball sampling as a suitable way to access populations with specific characteristics that are difficult to reach (Berg, 2001, p. 33). The sample includes farmers with land holdings ranging from 2 hectares to 8 hectares. No difference has been made between users of the PMFBY and WBCIS schemes. Even though they are different policies, they both follow the same logic of index-based insurance (Global Index Insurance Facility, n. d.).

Experts with different backgrounds were interviewed to approach the topic from various angles, including insurance providers and representatives of farmer organisations. Overall, 15 interviews were conducted. Four were expert interviews, and 11 were interviews with policyholders in five villages within a 70 km range around Bangalore. All interviews were conducted under the condition of anonymity.

4.4. Data analysis

The expert interviews were transcribed based on the recordings made during the interviews. For farmer interviews, the data analysis was done based on extensive field notes.

For the coding, categories based on the four dimensions of food security were developed into which the data was organised. In the second round of data anal-



ysis, In-Vivo coding was used. Saldana (2016, p. 105) refers to In-Vivo coding as a method to use the words of participants themselves to generate coding categories. This kind of coding has been used for findings that are significant for the research question but do not fit into the preconceived categories.

5. Results

5.1. IBAI and Food Security

Following the arguments of IBAI proponents, one should observe an increased willingness of farmers who use IBAI to invest in farming operations with higher risks. However, the interviews indicate that insurance has almost no influence on the way farmers are operating. Irrespective of farm size, none of the interviewed farmers reported that the availability of insurance had influenced their decision to take out credit or motivated investments. The principal reason given was that insurances only cover a small part of agricultural credits. Therefore, the risk for loan default mainly remains with the farmer and can cause substantial financial difficulties. As one of the interviewed experts expressed:

The availability of crop insurance claim is very little; it is very little amount. It doesn't cover the whole expenditure that they have done on the crop rising. To a little extent, it may help (Anonymous, personal communication, August 14, 2019).

Another interviewed expert described farmers' actions to avoid loan defaults with the following:

If they need the cash right now, they will knock on each and every door, whether that is formal or informal, from first to last, hope is everybody. If it is delivered at a formal institution, perfectly fine, if it is settled at an informal institution that is also fine. So, in the sequence of priority they will move down across structures of society; they can take it from a formal institution or a family or a distant relative or an informal institution, they will knock on everywhere (Anonymous, personal communication, August 12, 2019).

The farmers mentioned the importance of informal sources of credit as a coping strategy for losses. There was a general agreement among them that they would rather rely on informal sources of money than on the banking system or insurance. One of the farmers ex-

pressed his opinion on formal credit sources as follows:

If you go to the bank, they will ask for a lot of documents, and it will take a lot of time. It can take six months to receive credit. So, we prefer to borrow from our neighbours or friends because it is easier (Anonymous, personal communication, September 12, 2019). Six interviewees noted increasingly unstable rain and missing irrigation facilities as obstacles to diversifying their production. Nine interviewees indicated that they had switched from cultivating a diverse range of crops and vegetables towards a focus on Ragi (finger millet), which is more drought resistant. One of the interviewees stated:

With a bore well, we could also grow vegetables, but now we are dependent on Ragi because that is the only thing that we can grow here (Anonymous, personal communication, September 11, 2019).

As farmers and experts observed, climate change, increased construction activities, and the spatial expansion of Bangalore as an important economic centre are leading causes of insufficient water supply and irrigation. Receding groundwater levels make bore wells more and more challenging to drill and costly to maintain.

Another claim from IBAI proponents is that it can support farmer specialization, making it unnecessary to seek other employment for income diversification. However, interviewees with small plot sizes underlined the importance of additional off-farm employment to stabilize their incomes. Two other interviewees mentioned that while they did not seek off-farm employment because of limited qualifications, they would like to do so if there were employment opportunities available to them. Farmers with larger farms (around 8 hectares) did not usually mention off-farm employment as important because they stated that they could make a living based on farming alone.

A problem that came up in almost all farmer and expert interviews is basis-risk. Seven farmers reported that they had faced losses and did not receive a payout. One farmer mentioned that he had not incurred a loss; however, he received money from the insurance (Anonymous, personal communication, September 11, 2019). Experts maintained that basis-risk was a problem that could not be adequately met without



changing the insurance design.

Next to the unpredictability of insurance due to basis-risk, many experts mentioned delayed payouts as an obstacle for the functioning of the insurance. Thus, even in cases where the insurance would step in, many farmers would still be reliant on informal sources of credit in the interim.

5.2. IBAI and Food Sovereignty

Many interviewees shared the sentiment of having little or no control over their economic environment. The majority of farmers complained about rising costs for fertiliser and incalculable produce prices. Many saw this kind of uncertainty as the most pressing problem. One of the farmers described his situation as follows:

The costs have gone up a lot, but you cannot know what you can receive [for your produce]. Prices go up and down all the time. But costs keep going up, up, up. But nobody listens to us farmers (Anonymous, personal communication, September 13, 2019).

Another finding of the research is that the question of land ownership is a central issue for the discussion of IBAI. In many cases, the holders of insurance policies are landowners who have migrated to Bangalore and rented out their land to tenant farmers. The tenant farmers who work the land are unable to apply for insurance coverage because a land title is required for this. According to one of the interviewed experts, this situation has become increasingly common as more landowners migrate to the cities and

leave their land behind unoccupied or rent it out to smallholders (Anonymous, personal communication, August 28, 2019). The rapid economic development of Bangalore as a major IT centre speeds up this development. However, as the government subsidises the PMFBY and WBCIS, this means that the public money invested into the insurance does not benefit most smallholders, which are the ones that are most food insecure.

6. Discussion

Index-based insurance is presented as an instrument of financial inclusion that protects smallholders from climate change-related risks and allows them to enjoy the benefits of liberalised markets. The results of this research indicate that farmers do not generally experience IBAI as beneficial for their livelihoods. There is no evidence that the availability of insurance increases farmer investment into new seed varieties or external inputs. Instead, most interviewees noted other factors such as missing irrigation and water supply as the most important influence for their decision on what to grow. Another major concern was the unstable economic situation and the high fluctuation of prices. However, financial inclusion does address these issues. They are an outcome of rural development policies that have focused on the marketisation of agriculture (Daftary, 2020) and the removal of public investment into rural infrastructure such as irrigation facilities (Daftary, 2014). Efforts to modernise agriculture focusing on high-value produce have left out many smallholders (Douwe van der Ploeg, 2010).

Table 1. Overview of results

Food Security	Food Sovereignty
- No increased investments into new seed varieties or external inputs because insurance payouts are low and not reliable, thus no impact on food security	- Farmers face an increasingly insecure economic environment with decreasing prices for their produce and increasing input prices
- No specialisation on farming – off-farm employment remains important for income diversification, especially for farmers with small farms	- Farmers feel a lack of influence over their economic environment
- Insurance does not address the problem of unstable rain and receding levels of water supply	- Insurance reproduces inequality as farmers without land title are excluded from it



In the specific context of Bangalore, this situation is aggravated by rapid urban extension and resource competition (Ramachandra, Sellers, Bharath, & Seturu, 2020).

As payouts are not reliable, IBAI does not help farmers in situations where their crops fail. Incidents where basis-risk prevented farmers from receiving payouts have been found frequently in the research. Basis-risk is inherent in the design of IBAI. Thus, the failure of the insurance to adequately support farmers cannot be attributed to a bad administration of the instrument. It is inherent in the product design.

Rather than relying on IBAI as a protection mechanism, farmers rely on informal ways of obtaining credit, such as friends and neighbours. These findings contrast with the expectations of its proponents that IBAI "...can lead to game-changing increases in farm productivity and income" (Hazell et al. pp. 24-25). Off-farm employment remains an essential source of income that helps farmers cope with the market's uncertainties.

Moreover, access to IBAI is highly unequal, as many smallholders who do not own land do not have access to insurance. At the same time, smallholders are the most food insecure. This shows that structural inequalities play a more prominent role than instruments for financial inclusion. However, these structural inequalities can only be addressed through adequate policies. In that context, the concept of food sovereignty offers a promising alternative to the mainstream approach of food security that generally neglects political factors. Despite the relatively clear-cut results of the research, it needs to be mentioned that the data have been gathered in a relatively small geographical area. Because PMFBY and WBCIS are national schemes and other parts of India are subject to similar dynamics regarding rural development, it seems plausible that the results indicate general dynamics of financial inclusion in the country. However, this is a tentative suggestion that the data cannot directly substantiate.

7. Conclusion

Financial inclusion of smallholders through index-based insurances cannot improve farmer food security for two reasons: First, the instrument does

not meet the high expectations of its proponents. Payouts are unreliable, and the payouts are too small to bring financial security to farmers. Secondly, the most pressing issues for farmers are an outcome of rural development policies that have left behind many smallholders. An alternative approach to this failed approach to agricultural modernisation needs to take these policy failures into account rather than to apply a technical fix in the form of a financial instrument.

Conflict of interest

The author declares no conflict of interest. Besides, the funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

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