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ARTICLE

Index insurance and climate risk management: Addressing social equity

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Abstract

Fair distribution of benefits from index insurance matters. Lack of attention to social equity can reinforce inequalities and undermine the potential index insurance holds as a tool for climate risk management that is also pro-poor. The aims of this article are to: (a) examine social equity concerns raised by index insurance in the context of climate risk management, (b) consider how greater attention can be paid to social equity in index insurance initiatives, and (c) reflect on the policy challenges raised by taking social equity into account as a mechanism for climate risk reduction. The article draws on learning from the CGIAR's Research Program on Climate Change, Agriculture and Food Security (CCAFS) and presents the cases of the Index Based Livelihoods Insurance (IBLI) and Agriculture and Climate Risk Enterprise Ltd. (ACRE) in East Africa. It proposes a framework for unpacking social equity related to equitable access, procedures, representation and distribution within index insurance schemes. The framework facilitates identification of opportunities for building outcomes that are more equitable, with greater potential for inclusion and fairer distribution of benefits related to index insurance. The article argues that systematically addressing social equity raises hard policy choices for index insurance initiatives without straightforward solutions. Attention to how benefits and burdens of index insurance are distributed, suggests the

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unpalatable truth for development policy that the poorest members of rural society can be excluded. Nevertheless, a focus on social equity—facilitated by the framework—opens up opportunities to ensure index insurance is linked to more socially just climate risk management. At the very least, it may prevent index insurance from generating greater inequality. Taking social equity into account, thus, shifts the focus from agricultural systems in transition per se to systems with potential to incorporate societal transformation through distributive justice.

KEYWORDS

agriculture, climate risk management, index insurance, inequality, social equity

1 | INTRODUCTION

Interventions designed to manage climate risk bring issues of social equity to the fore, both with respect to how outcomes are distributed across society and to how consequences will play out for future generations. Nevertheless, a focus on social equity is not inherent within the design of climate adaptation strategies, and therefore needs to be deliberately addressed (Eriksen & Brown, 2011; Collins, 2018). Climate change emerges from vast inequities in the division of responsibilities for its causes and in the distribution of impacts around the globe. The brunt of these impacts is disproportionately borne by poor and vulnerable people, especially considering the relatively small contribution that they make to the factors driving climate change.

A focus on social equity—namely fairness in how people are treated in society, taking into account the social determinants and distribution of advantage or disadvantage, including ways the latter can be overcome—focuses attention on the social dynamics of interventions designed to tackle climate risk. This requires an understanding of how people's access to and uptake of climate risk-management interventions is shaped by existing inequalities, including those related to the uneven distribution of climate risk. In this context, the pursuit of equitable outcomes may involve trade-offs with other components of an intervention (e.g. between rapid scaling up vs longer-term strategies to incorporate more impoverished farmers) or wider policy demands. These processes expose relations of power, as the politics of distribution are negotiated. Thus, addressing social equity is not simply a technical concern.

Against this broader debate, our article focuses on index insurance as a way to facilitate farmer adoption of climate-smart agricultural practices, and hence help smallholder farmers in developing countries manage losses due to risks associated with climate change. We recognize that linking index insurance to questions of social equity risks snaring climate risk management in debates over the politics of resource access and distribution. We suggest, however, that failing to pay attention to issues of social equity can result in distortions and inefficiencies that threaten the sustainability of climate adaptation and the broader contribution of agriculture to the achievement of the Sustainable Development Goals (SDGs). As Haddad (2015) argues, ignoring questions of equity is both a moral issue and a practical concern, given a body of evidence suggesting that disparities rising out of inequality can impede development outcomes. He further adds that given equal costs of action, development returns

can be greatest when those with the least are targeted. A key issue, however, is whether these returns will be realized in practice, particularly if the costs of working with the most vulnerable and poorer groups of people are high, and if the wider public policy context presents challenges for development (Glaesener-Nasr, 2017).

Attention to the role of insurance for tackling some of the negative repercussions of risk aversion and unstable farm incomes is not new (Hazell, Pomareda, & Valdes (Eds.), 1986). However, industry innovation has generated renewed interest in the potential that micro-insurance holds for climate risk management by smallholder farmers in developing countries (Bogale, 2015; Carter, 2017; Carter, Cheng, & Sarris, 2016; Carter, Janzen, & Stoeffler, 2018; Hess & Hazell, 2015; Janzen & Carter, 2013; Jensen & Barrett, 2017; Miranda & Farrin, 2012; Schaefer & Waters, 2016). Unlike conventional indemnity insurance, which relies on direct measurement of the loss or damage suffered, index insurance provides a payment for loss based on a predetermined index, for example rainfall levels, average area yield or livestock mortality rates. Advocates of index insurance argue that with the advantages of cost reduction, timely payouts and the use of an objective index to minimize adverse selection and moral hazard, it can overcome costly or unfeasible loss assessment by conventional means, particularly where there are a large number of small-scale farmers or where insurance markets are underdeveloped (World Bank, 2015).

Supply of micro-insurance by the private sector has been given significant impetus by the commitment of donors and governments, including through public and philanthropic funds, to develop inclusive insurance markets (Hess & Hazell, 2015; World Bank, 2015; USAID, 2013). As Wanczeck, McCord, Wiedmaier-Pfister, and Biese (2017) identify, a significant driver of this commitment is the way "inclusive insurance" can form part of wider development agendas, for example to realize the SDGs and/or to address climate change. In this respect, insurance is deemed to have the potential to contribute to at least six SDGs.[1] Similarly, there is growing emphasis on insurance in the United Nations Framework Convention on Climate Change (UNFCCC) processes. In 2015, climate risk transfer was given a significant boost by the Sendai Framework for Disaster Risk Reduction, the COP21 Paris Agreement, and the Group of Seven (G7) InsuResilience initiative aiming to insure an additional 400 million vulnerable individuals against climate risks by 2020, supported by G7 commitment of USD 550 million.

Much of the literature on index insurance addresses the virtues of the product, technical considerations and difficulties in scaling up. Less attention has been paid to how farmers' access to index insurance interfaces with inequalities already present in farming populations, or of the differential social impact of index insurance schemes upon an already heterogeneous rural population. Studies exploring socioeconomic and welfare issues include Bageant and Barrett (2017), Chantarat, Mude, Barrett, and Turvey (2017), Janzen and Carter (2013), Jensen, Barrett, and Mude (2015), Jensen, Mude, and Barrett (2018), Jensen and Barrett (2017), Peterson and Osgood (2016) and Taylor (2016). While studies increasingly explore socioeconomic dynamics, including those related to inequality and unequal power relations, debate on index insurance and social equity per se is limited, although research is starting to highlight the need for more attention to be directed towards equity dimensions (Müller, Johnson, & Kreuer, 2017; Reeves, 2017).

In this article, we suggest that as a form of micro-insurance, more attention needs to be directed to issues of social equity if index insurance is to be considered a socially sustainable climate change

[1]Namely: SDG 1: End poverty in all its forms everywhere; SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture; SDG 3: Ensure healthy lives and promote well-being for all at all ages; SDG 5: Achieve gender equality and empower all women and girls; SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; SDG 13: Take urgent action to combat climate change and its impacts (Wanczeck et al., 2017).

adaptation tool tailored to the needs of the poor. An oft-repeated dictum is that poor people in developing countries carry the burden of impacts from climate change while contributing little to its causes. Considering index insurance from an equity perspective raises the moral proposition that farmers ought not to pay an insurance premium to adapt to climate risks they have not created. We do not dismiss this proposition. Rather, operating as we do on projects and research within countries where index insurance is being rolled out to millions of farmers (often combined with other products and services that farmers may or may not pay for themselves), we seek to stimulate discussion over whether and how attention to social equity can increase fair access to opportunities afforded by index insurance. For us, this opens up the potential to ensure climate change adaptation is linked to more equitable social transformation. We recognize that index insurance cannot be a panacea to generate fair outcomes beyond the scope of the intervention, but at the very least there is a need to avoid making existing inequalities worse.

To explore issues of social equity in the context of index insurance and climate risk management, we draw on learning from CGIAR's[2] research programme on Climate Change Agriculture and Food Security (CCAFS) (CCAFS, n.d.).[3] Some of this learning is captured in Greatrex et al. (2015). It is also informed by our participation in international meetings[4] that reflect increasing interest in the role of index insurance in agricultural development (e.g. the Global Index Insurance Facility managed by the World Bank Group). Linked to this specialized background, we explore social equity issues in the context of two index insurance schemes in East Africa: Index-based Livestock Insurance (IBLI) and Agriculture and Climate Risk Enterprise Ltd. (ACRE). The schemes were selected to provide contextually specific comparison and contrast to demonstrate processes shaping distributional outcomes. The examples draw on published information, but are also informed by the authors' first-hand engagement with these schemes (Greatrex et al., 2015; Hellin, Hansen, Rose, & Braun, 2017; Jensen et al., 2014, 2015; Jensen & Barrett, 2017).

We examine the following questions: first, what are the social equity implications of index insurance in the context of climate risk management? Second, how can greater attention be paid to social equity considerations within index insurance initiatives? And, third, what policy challenges are raised by taking social equity into account as a mechanism for climate risk reduction? To address these questions, the article is structured as follows. Section 2 introduces index insurance. Section 3 turns to definitional issues on social equity as a basis for Section 4, which presents an equity assessment framework for index insurance and illustrates our argument with the cases of IBLI and ACRE. Sections 5 and 6 are our discussion and conclusions.

[2]The CGIAR was formerly known as The Consultative Group on International Agricultural Research. It was established in 1971 and engages in research for a food-secure future.

[3]This article draws on learning from two CCAFS research projects led by the authors: (a) Develop index insurance for drought-prone maize-based farming systems in East and West Africa to enhance farmer adoption of climate-adapted germplasm, and (b) Capacitating African smallholders with climate advisories and insurance development (CASCAID).

[4]International meetings include: (a) Agricultural Insurance Conference: How Can We Make It Work to Contribute to Food Security, Berlin, 27–28 November 2014, hosted by the German Federal Ministry for Economic Cooperation and Development (BMZ) in conjunction with GIIF and implemented by Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) Gmbh; and (b) The World Bank Group's Global Index Insurance Facility (GIIF), in collaboration with AXA Corporate Solutions, Grameen Credit Agricole Microfinance Foundation, Swiss Re Corporate Solutions, and the Impact Insurance Facility of the International Labour Organization conference on Building Innovative Solutions for the Insurance Industry, September 14–16, 2015, Paris.

2 | AGRICULTURAL INSURANCE AND INDEX INSURANCE

For countries where smallholder farming dominates the agricultural sector and where rural poverty levels are high, significant technological innovation is considered a prerequisite for agricultural transformation in the face of climate change (FAO, 2015). This is especially the case for so-called climate-smart agriculture; namely, agricultural practices and technologies that contribute to increased food security, as well as climate change adaptation (and mitigation) in a sustainable way (Neufeldt et al., 2013; Hansen et al., 2019). Decades of research have, however, identified risk and risk aversion as key impediments to farmer adoption of improved agricultural technologies and promotion of market-based development (Dercon, 2005; Carter et al., 2016). Advocates of agricultural index insurance herald it as a mechanism to manage this risk and to improve smallholder production.

Harvest failure due to climatic events, economic fluctuations and illness are prominent among the risks faced by rural households. Such risks may be idiosyncratic, affecting an individual or household, or aggregate, affecting a community or region (Dercon, 2005). Index insurance, which protects farmers from a clearly identified hazard, is designed for aggregate risk that covers a large area and therefore many farming households (e.g. area yield assessment) or a specific climate risk that negatively impacts farmer livelihoods in a given location (e.g. weather-based index insurance) (Greatrex et al., 2015). Payouts are triggered not by observed crop losses, but rather when a proxy (index)—such as the amount of rain during a certain period or the average yield over a larger area—falls above or below a pre-specified threshold. An index can be based on any objective data source for which there is an historical record and that closely correlates to the loss that is the subject of concern.

An agricultural insurance product will never remove all of the risks faced by a farmer, and many programmes are "single peril," covering a specific risk. Index insurance is therefore most effective at mitigating the impacts of risk in locations where there is an overriding, externally measurable peril, which is causing substantial negative impact. It also works best where losses are homogenous in a defined area and highly correlated with the indexed peril (Elabed, Bellemare, Carter, & Guirkinger, 2013). To date, most index insurance efforts have focused on the risk of rainfall deficit, i.e. drought, although other indices are available (Dick & Stoppa, 2011; Greatrex et al., 2015).

Index insurance against yield loss allows specific risks to be transferred to agricultural insurance markets. It is posited that this can increase farmers' access to credit: by taking up insurance, climate risk can be addressed and, hence, banks and other lenders are encouraged to make loans to farmers which, in turn, facilitate farmer' investment in productivity, including the use of new agricultural technologies, such as drought tolerant crop varieties (Bobojonov, Aw-Hassan, & Sommer, 2014; World Bank, 2015), that have medium- and long-term climate adaptation implications. Hence, insurance can increase resilience not only by providing a payout in bad years, thus helping farmers to protect their assets, but also by enabling farmers to improve production in better years (Greatrex et al., 2015; Hellmuth, Osgood, Hess, Moorhead, & Bhojwani, 2009; GIIF, 2015a).

Climate change adaptation can be achieved either through bundling of farm inputs with insurance, or through including insurance within a larger risk-management portfolio. Examples of the former include ACRE (Wills, de Chorivit, Pshenichnaya, Morain, & Khadar, 2015), and insurance linked with credit in Zambia (GIIF, 2015b). The R4 Rural Resilience Initiative is an example of the latter approach whereby farmers can pay for the insurance through labour on climate-smart agricultural projects (Food for Assets), alongside access to credit and savings (Madajewicz, Tsegay, & Lee, 2017). Insurance contracts are increasingly "bundled" with other products (on a mandatory or voluntary basis), including productivity-enhancing inputs and credit to improve farmer uptake of technologies and to increase financial institutions' willingness to lend. However, despite popularity, rigorous

evidence of the impact of "bundling," such as combining insurance and credit, is limited to date (Marr, Winkel, van Asseldonk, Lensink, & Bulte, 2016).

2.1 | Expanding Index Insurance

Since emerging in the 1980s, index insurance is now reaching millions of farmers. Hess and Hazell (2016) estimate that in 2014 there were approximately 198 million farmers insured: approximately 650,000 in Africa, 3.3 million in Latin America and the Caribbean, 194.2 million in Asia. Coverage on this scale is achieved by different levels of index insurance, which implies different approaches to insurance provision (Thorburn, 2017).[5]

At the micro-level are programmes to promote policies purchased by individuals or groups, like livestock herders in Mongolia or East Africa (Hellmuth et al., 2009; World Bank, 2015) or rice farmers in Haiti (Bélanger, 2016). At meso-level are so-called risk aggregators, insuring entities rather than individuals (banks, microfinance institutions, agri-businesses or national export companies), like ACRE, described in Section 4. Straddling meso- and macro-level are schemes being scaled-up countrywide, such as the Zambian Government incorporating weather index insurance into its Farmer Input Support Programme using a dataset generated at the University of Reading (Maidment et al., 2017; GIIF, 2015b). At macro-level, insurance involves sovereign cover, examples include budget support to the Government of Malawi in the case of drought (Hess & Syroka, 2005) and the Africa Risk Capacity (ARC), a pan-African drought risk facility building a shared safety net between African nations (ARC, 2016).

There are technicalities that effect both scaling and reliability of index insurance. An important aspect relates to the existence and reliability of relevant data. Index insurance lowers transaction costs compared to indemnity insurance, but also introduces basis risk, which is the difference between actual loss and the payout on an insurance contract. For index insurance targeted at individual farmers (i.e. micro-level) basis risk can result in a farmer experiencing yield loss, but not receiving a payout, or in a payout being triggered without any loss being experienced (Dick & Stoppa, 2011). As Thorburn (2017) highlights, micro-level stakeholders—for whom potential for basis risk is greatest—are least able to withstand adverse basis risk, compared to those within meso- and macro-level schemes. Even at a macro-level, however, there is criticism of the assumptions built into an insurance model having a negative impact on the poorest farmers and reinforcing existing inequalities (Reeves, 2017).

Characterized as the "Achilles heel" of index insurance (Jensen et al., 2018), basis risk has implications for farmer demand for the product, the value that insurance policies hold for clients, and for the cost to insurance companies. If basis risk and price elasticity are correlated, mechanisms to lower basis risk are vital for increasing demand (Marr et al., 2016). In this regard, new modelling, for example based on advances in remote-sensing and on proxy-based climate reconstructions, is extending instrumental records by hundreds of years and/or providing increasingly greater accuracy for climate information at high temporal resolution (Bell et al., 2013).

Many index insurance schemes (micro, meso and macro) rely on public support to facilitate greater involvement of private insurers and to enhance farmer uptake. This ranges from high public sector intervention, led by government, to public-private partnerships (PPPs), or private system led interventions (Varangis, 2017). State (and donor) involvement is varied, ranging from provision of an enabling regulatory environment; incorporating financial incentives; developing information systems; ensuring consumer protection; investing in farmer education, weather stations and agro-meteorological research and data systems; and facilitating international reinsurance or subsidies to correct initial

[5]For examples see the Index Insurance Forum: https://indexinsuranceforum.org/climate-insurance.

market failures and externalities that hold back the development of markets for index insurance products (GIIF, 2015a). Public support can also include a subsidy for the cost of the premium to make it affordable for farmers; such subsidies are controversial and subject to ongoing debate (Hazell, Sberro-Kessler, & Varangis, 2017; Ricome et al., 2017). Nevertheless, when index insurance aims to achieve development objectives, these subsidies may be used to ensure a pro-poor focus, targeting poorer categories of farmers (Hellmuth et al., 2009). In this context, affordability for poor and vulnerable people helps respond to questions of social equity (Schaefer & Waters, 2016).

Discussions surrounding index insurance tend to focus on how the field is market-led and driven by the insurance and reinsurance industries that are motivated by business opportunities and the ability to make a profit. An understandable, but in our view overly simplistic, conclusion is that there is little opportunity to introduce consideration of social equity. This stance may be underpinned by concerns over the morality of making poor farmers in developing countries pay for climate change risks generated by the developed world. However, we caution against quick judgements. With a multiplicity of stakeholders engaged in the promotion of index insurance,[6] there are those for whom questions over the distribution of benefits and burdens, and of differential social impact—in short concerns over fair allocation—are highly pertinent. These stakeholders include farming communities and their representatives, but national governments, public donors and NGOs, namely those seeking to reduce poverty while also being answerable to taxpayers and gift-givers.

3 | EQUITY AND EQUALITY

Social equity is concerned with fairness and justice in how people are treated in society (Guy & McCandless, 2012). This implies considering how things—e.g. power, rights, resources, opportunities—are socially distributed, agreeing on principles for distribution and ensuring distribution is consistent with these principles (Jones, 2009). Focusing on social equity helps us to consider how social difference and associated inequalities may affect poor people's access to index insurance, and how processes of programme design and implementation can contribute to the distribution of fair outcomes.

There are crucial differences between equality and (social) equity. Equality refers to being the same or being treated equally. However, while equity also relates to equivalence, it may mean treating people differently to overcome barriers that can impede the realization of equal outcomes. As Sen (1992) emphasizes, societies are diverse and human diversity is not a secondary complication to be ignored or introduced "later on." Inequality is always present and is fundamental to a concern over equity. If principles of distribution address barriers that disadvantage some social groups more than others then seeking equality of outcomes, in terms of fairness and justice, may be a valid goal. For example, gender barriers may require differential targeting of women to ensure equal outcomes with men.

Our approach is informed by thinking on distributive justice (Walzer, 1983; Rawls, 1971; Frederickson, 2010) as developed within work addressing equity with respect to—variously—ecosystem services, fair trade and biofuels (Blaber-Wegg, Hodbod, & Tomei, 2015; Howard, Tallontire, Stringer, & Marchant, 2016; McDermott, Mahanty, & Schreckenberg, 2013; Pascual et al., 2014; Sikor, 2013). Like these studies, we treat social equity as multidimensional and relating to both

[6]Index insurance stakeholders include farmers, farmer groups, extension officers, agricultural input suppliers, insurers, insurance pools, insurance intermediaries, reinsurers, governments and public institutions, international and local non-governmental organizations (NGOs), bilateral and multilateral donors, national meteorological agencies, remote-sensing bodies, research institutions, banks, and multilateral finance institutions, among others.

processes and outcomes. Furthermore, our emphasis is on how considerations of social equity emerge in specific contexts, as claims over resources, responsibilities and distribution are made and contested (Sikor, Fisher, Few, Martin, & Zeitoun, 2013). This contrasts with a normative approach that applies universal principles to an empirical context (following Rawls, 1971). A strength of a contextually grounded approach is that it facilitates understanding of the dynamics of social equity in practice, including potential tensions between competing claims at different scales (Howard et al., 2016).

4 | INDEX INSURANCE THROUGH THE LENS OF SOCIAL EQUITY

To ensure index insurance is as fair as possible raises the question of how issues relevant to social equity can be incorporated into the design and implementation of index insurance interventions. We present a social equity assessment framework to help "unpack" these equity issues.

Table 1 identifies four components of social equity, building the parameters that shape the scope for fair distribution: equitable access, equitable procedures, equitable representation and equitable distribution. To illustrate our argument we turn to the cases of IBLI and ACRE in East Africa, whose key features are summarized in Table 2.

4.1 | Social equity: Delineating the parameters

The Kyoto Protocol (UNFCCC, 1998: Article 3.14) stimulated donor interest in climate insurance. One way this came about was through the Global Index Insurance Facility (IFC GIIF), initiated in 2009 to "expand the use of index insurance as a risk management tool … because it helps farmers and households reduce their risks and protect their assets and livelihoods" (World Bank, 2015, p. 5). IBLI and ACRE's precursors were started as pilots in 2009/2010 and received support from IFC GIIF, among other donors. Comparison between IBLI and ACRE highlights how different approaches have shaped social equity parameters, even given this background of a shared source of funding and time period.

Key questions identified in Table 1 include: *In what ways does the intervention give scope for social equity concerns? Which stakeholders have interests, power and/or influence in driving social equity? What opportunities and barriers exist for generating fair(er) outcomes?* We return to these questions after elaborating on the two schemes summarized in Table 2.

IBLI was developed as a risk-management tool by research institutions (ILRI, Cornell University and University of California, Davis). It aims to mitigate the effects of drought on the welfare of pastoralists in the arid and semi-arid rangelands of northern Kenya and southern Ethiopia by extending access to formal insurance cover. In essence, when there is severe lack of forage according to an index, registered pastoralists receive a payout.[7] In these rangelands, prolonged periods of abnormally low rainfall give rise to droughts, which account for in the region of 75% of livestock deaths in the Horn of Africa. With significant poverty and vulnerability, repeated drought stimulates negative coping strategies, including distress sales of livestock and reduced food consumption.

[7]The original index developed for Kenya was based on predicted livestock mortality calculated according to pasture availability as recorded by satellite data (the Normalized Difference Vegetation Index [NDVI]) coupled with data on livestock mortality that had been collected since 2000). Since 2014, IBLI no longer ties its indices (including those in Kenya) to livestock mortality. The index now uses statistics to standardize observations in relation to historic observations. The index has also been disaggregated so households in different locations can receive more tailored contracts, reducing the effect of idiosyncratic shocks (Jensen et al., 2018).

TABLE 1 Social Equity Assessment Framework for Index Insurance

THE PARAMETERS: WHAT COUNTS FOR SOCIAL EQUITY?	
In what ways does the intervention give scope for social equity concerns? Which stakeholders have interests, power and/or influence in driving social equity? What opportunities and/or barriers exist for generating fair(er) outcomes?	
⇳	
Equity dimension	Key issue/examples of relevant questions
Access	Whether and how farmers are able to obtain index insurance, taking into account differences based on power, social characteristics (gender, ethnicity, etc.), wealth, resources and vulnerability to climate risk. • *Which farmers are most vulnerable to climate risks and do they have access to index insurance? Are these farmers those who are being targeted? Are any social groups excluded?* • *How inclusive is the intervention? What barriers, if any, prevent take-up of index insurance by specific groups of farmers? (e.g. social, political, economic, institutional or geographical barriers). Do barriers relate to existing (historically rooted) inequalities?* • *What opportunities exist to enhance take-up of index insurance?* • *Are there gender inequalities in the: (a) Impact of climate risks? (b) Access to index insurance? (c) Distribution of benefits? Can action be taken to address gender-related barriers?*
Procedures	Whether and how farmers and related stakeholders are able to participate in index insurance scheme decision-making and/or implementation, as well as in establishing rules and procedures themselves. • *Is decision-making transparent and accountable (and perceived to be so)?* • *Which stakeholders are involved in decision-making? Are processes inclusive?* • *Do women have equal opportunities to participate? (also taking into account opportunities for different groups of women—young/old, poor/wealthy, ethnic/religious divisions, etc.)* • *Are there effective mechanisms for dispute resolution and consumer protection?*
Representation	Whether and how farmers and related stakeholders are able to have their knowledge, norms and values taken into account. • *How are social equity and fairness understood by different stakeholders?* • *What are farmer/stakeholder understandings of climate risk in relation to their practices? Are these understandings gender differentiated?* • *Do the experiences of farmers/stakeholders regarding the impact of climate risk accord with assumptions embedded in insurance models?* • *What knowledge and values are held regarding investment in insurance products? How do they relate to other formal and informal risk-management/coping strategies engaged in by men and women?*
Distribution	Whether and how farmers and related stakeholders are able to benefit from index insurance, including the distribution of benefits across a farming population. • *How are burdens and benefits distributed?* • *Are benefits equitably distributed in current form (including for women)? If not, are there ways to improve fair distribution?* • *If specific groups of people are excluded from the intervention, are they able to access risk-management measures more appropriate to their circumstances? E.g. social protection through cash transfers.* • *Are there unintended (and negative) social impacts? Are they mitigated?*

Source: Authors, drawing on Howard et al. (2016) and McDermott et al. (2013).

IBLI's potential has prompted development of a separate product, KLIP, a macro-level insurance product within the Government of Kenya's social protection programme. KLIP's objective is to protect the livestock of the poor and vulnerable, targeting non-beneficiaries of the Hunger Safety Net Programme (HSNP) that own a minimum of five TLUs (Table 2). With the region's human population being 3.2 million, and assuming an average household size of 4.4 members, KLIP covers approximately 2% (14,000) of households (Kenya National Bureau of Statistics).

Since inception in 2012, IBLI's philosophy has evolved from emphasis on asset replacement to asset protection (Carter et al., 2018). Technical and product design and implementation has also changed, with contracts adjusted to improve accuracy, to generate indemnity payments earlier, and to make the drought indices more generalizable and scalable. Nevertheless, basis risk and insurance product quality remain key challenges, as do implementation mechanisms and financing (Carter et al., 2018).

In contrast to the research institution/donor-led makeup of IBLI, ACRE represents itself as the largest private sector-led index-based insurance programme in Africa, although it too has received World Bank/IFC GIIF funding. ACRE aims to mitigate risk of weather shock on agricultural production, its target is smallholder farmers in general, with insurance "bundled" with other products (Table 2).

Between 2013 and 2016, estimates suggest that 579,669 (Kenya), 377,859 (Rwanda), and 168,427 (Tanzania) farmers were insured through ACRE (IIF, 2017). It is among the first schemes offering insurance protection to smallholders via mobile phones. ACRE began as Kilimo Salama in 2009—a collaboration between Syngenta Foundation,[8] UAP Insurance and Swiss Re backed by IFC GIIF. In 2014, it became the company ACRE. ACRE's most popular product is a replacement guarantee scheme for maize seed, but it also covers other crops, loans and dairy insurance (Ribeiro, 2017). In 2017 ACRE piloted "top-up" cover to extend coverage for the entire season, not only the germination phase, but farmers need to pay the additional premium themselves.

ACRE's design incorporates five key partners: farmers and/or farmer groups, the micro-insurance provider (insurers/reinsurers), seed companies and distributors, mobile network operators, and agrovets who give information and supplies (Wills et al., 2015). In 2017, an agreement was signed with the Kenya Agriculture and Livestock Research Organization (KALRO) to exploit so-called synergies, signalling a move to incorporate a state institution as a further partner.

For small-scale farmers, an organization/company ("farmer aggregator") is insured on their behalf (co-operative bank, agribusiness/seed company, etc.); large-scale farmers buy directly. The aggregator pays for a percentage of the insurance cost and subsequent payout, a donor pays the remainder based on a subsidy model (Wills et al., 2015). The aggregator is held to benefit through return customers and information about farmer practices. For the maize seed guarantee scheme, a farmer buys a bag of seed containing a card code active for 21 days, they register through SMS and the location is noted; satellite imagery and automated weather stations monitor rainfall and, if insufficient, there is an automatic reimbursement.

4.2 | Equitable access, procedures, representation and outcomes

We turn to outline different social equity dimensions of IBLI and ACRE, summarized in Table 3.

IBLI

The chief objective of IBLI is to extend insurance to a marginalized population with little access to modern financial tools; by implication, it was developed with social equity in mind. Equity of access is factored into IBLI contracts in four ways: first, because calculations are based on standardized TLU, different livestock types can be insured. Second, any herd size can be covered, from as little as

[8]Syngenta is a large agri-business company based in Switzerland.

one goat or sheep held by the poorest families. This is important in a region where herd composition, plus access to and control over different types of livestock assets, often correlates with socioeconomic status, ethnic background and/or gender. Third, in 2014, Takaful Insurance of Africa (TIA) developed a sharia-compliant variant of IBLI that is available to both Muslims and non-Muslims, which has met with relatively high uptake and is expanding at a rate greater than its secular counterpart.

That IBLI has been led by research organizations and donor funding has been a driver for procedural equity. Indeed, without consistent support from development partners, it is unlikely that IBLI would have become well established in marginalized areas. This has challenges. IBLI was conceived as a commercially sustainable scheme. Early on, however, it was realized that a public subsidy was needed to build demand and cover marketing and investment, with an economic case that it was cheaper for government/donors than welfare subsidies (Dror et al., 2015). There was, however, concern over market distortions detrimental to long-term sustainability.

The IBLI products have generated unintended consequences concerned with procedural equity connected to insurance markets. One consequence relates to targeting IBLI coverage towards remote rangelands inhabited by the most vulnerable herders. Two insurance companies stopped selling IBLI products because they preferred to operate in more accessible areas but the IBLI Team and donors were not prepared to support insurance companies in these areas (personal correspondence communication, A. Mude, IBLI project leader, June 2017). Moreover, in a move towards commercialization, ILO-funded subsidies were withdrawn from "Village Insurance Promoters" causing many to stop working (Dror et al., 2015). Research also finds—marginal—procedural issues related to gender, in which female-headed households purchase at an equal rate to men, but may be more vulnerable to pressure from sales agents (Bangeant & Barrett, 2017).

KLIP has also created procedural tensions between government-supported social protection and the functioning of insurance markets. Unintentionally, inequity has been built into the system through a strategy of providing free insurance, which carries the danger of undermining the fragile private insurance market. Ironically, given the objective of providing a mechanism for social protection, this may be a threat to equity in terms of limiting access to insurance. Such fears have led commercial providers and other stakeholders to push KLIP to replace free insurance with targeted insurance subsidies.

Issues of representation are apparent in relation to demand for insurance. Assertions regarding pastoralists' weak understanding of insurance products highlight substantial differences in knowledge and values, both about risk and about insurance. They can also be played out in pastoralists' experiences of basis risk, when on-the-ground impact of idiosyncratic climate risk differs from the index. Issues of representation are recognized insofar as emphasis is placed on the need to "educate": insurance simulation games, edutainment videos, plays and cartoon-strips have all been deployed (Dror et al., 2015). Research by Takahashi, Ikegami, Sheahan, and Barrett (2016) in Ethiopia cautions against the assumption that this will increase uptake; it was found that "Learning Kits" improved understanding but not purchases, which instead rose when discount coupons were distributed.

Regarding equitable distribution, IBLI/IBLT and KLIP are products targeted at poorer and vulnerable groups of pastoralists, with coverage across pastoral populations expanding, suggesting a strong distributive justice orientation from the outset. An estimate of total cumulative insured assets since the inception of IBLI is approximately USD 13 million. KLIP alone has insured approximately USD 9.8m. Nevertheless, while recognizing IBLI's distributive orientation, evidence suggests that IBLI is of most benefit as a risk-management tool for pastoralists who are vulnerable (20–30 TLU) and in danger of falling into poverty (10–20 TLU) (i.e. 47% of the population) but can realize the benefits of index insurance (Chantarat et al., 2017). It is of least benefit to the poorest with meagre asset endowments where drought leads to herd collapse (<10 TLU; 26% of the population); and not so vital for wealthier pastoralists (27% of the population).

TABLE 2 The Index Insurance Schemes, IBLI and ACRE

Country/ start year	Key actors	Risk/target	Index	Approach	Scale	Premiums & liability	Technology
Index-Based Livestock Insurance (IBLI) and (KLIP)							
Northern Kenya/ Southern Ethiopia IBLI: 2010[a]Products: IBLI/ IBLT, KLIP.	IBLI/IBLT: research organizations (ILRI/ Cornell University/ University of California) Donors (USAID; Aus-AID; DFID) Insurers/ reinsurers: OIC (Ethiopia); APA (Kenya); Takaful (Kenya, sharia compliant). KLIP: ILRI; World Bank; GoK; Swiss RE; local insurance companies.	Drought-related forage scarcity affecting marginalized pastoralists with high poverty levels. Four livestock types: camels, cattle, sheep and goats. Calculations based on the standardized TLU and a set price per TLU.[b]	NDVI/statistics to standardize observations in relation to historic observations; indemnity payments according to the severity of current conditions.	Area approach basis for insured livestock (administrative boundaries in Kenya & Ethiopia).	As of mid-2017, estimate of total insured assets by KLIP/ IBLI/IBT is approx. USD 10.8 m. Estimate of total cumulative insured assets since inception, approx. USD 13 m. KLIP insures approx. USD 9.8 m.	Variable, depending on the risk in the index region. Two potential payout periods at end of long and short dry seasons, with 2-month pre-season "buying window."	Remote sensing (contract). Mobile applications used agent training, client registration, premium payments and indemnity payments.

Continues

TABLE 2 (Continued)

Country/ start year	Key actors	Risk/target	Index	Approach	Scale	Premiums & liability	Technology
Agricultural Climate Risk Enterprise Africa (ACRE)							
Kenya (registered insurance surveyor) Rwanda/ Tanzania (insurance agent) 2014 (ACRE grew out of Kilimo Salama [2009], a partnership between Syngenta Foundation and UAP insurance, IFC GIIF-funded).	ACRE: service provider co-operatives/ out growers/banks seed company/seed distributor Ministry of Agriculture KALRO UAP Insurance Kenya CIC Insurance Grp. Ltd. APA Insurance UAP Insurance Tanzania Soras Insurance Rwanda.	Risk depends on the product, typically germination stress or average yield in district. Farmer aggregators (bank, agri-dealer) are insured. A farmer interested in a product buys from the agri-dealer as part of a "bundle" with other products.	Customer location data (by MNO)/satellite weather data—assess precipitation per area/planting date. A new hybrid product has been developed, combining a weather index and multi-peril crop insurance cover.	"Bundling" is integral to the product: a farmer purchases a bag of seeds with insurance attached; they register for free on their phones. If the index triggers, the farmers get their money back.	Since 2009, Kilimo Salama/ ACRE has insured 1 million farmers using the bundled insurance/ seed/loan/input model.	The farmer must commit to buying the bundled product; the premium may be paid by the seed company.	Standard mobile phones and mobile money are used for registration/payout.

Sources: IBLI: Dror, Maheshwari, and Mude (2015); Taye, Banerjee, Wandera, and Mude (2018). ACRE: Wills et al., 2015; Ribeiro, 2017.

[a]Acronyms: AusAID –the Australian Agency for International Development; CIC – CIC Insurance Group Ltd; DFID – Department for International Development; OIC – Oromia Insurance Company: APA – APA Insurance; IBLT – Index-Based Livestock Takaful (sharia compliant); IFC GIIF – International Finance Corporation Global Index Insurance Facility; ILRI – International Livestock Research Institute; KLIP – Kenya Livestock Insurance Programme; KALRO – Kenya Agriculture & Livestock Research Organization; m – million; MNO – Mobile Network Operator; NDVI – Normalized Difference Vegetation Index; TLU – Tropical Livestock Unit; UAP – UAP Insurance Tanzania; USAID – United States Agency for International Development.

[b]One cow = 1 TLU; one camel = 1.4 TLU; one goat/sheep = 0.1 TLU. Each TLU of insurance has a coverage value of USD 140 (USD 1=KSH 100).

TABLE 3 Social Equity Dimensions of IBLI and ACRE

Equity dimension	IBLI	ACRE
Access	Targets a pastoral population excluded from access to standard insurance products. Insures different livestock types based on TLU and any herd size facilitates access by the poor and by women. A sharia-compliant version enables sales to Islamic pastoralists. Donor finance plays a key role in IBLI, building access for pastoralists in remote regions through partnership with insurers/reinsurers. Government of Kenya has been instrumental in targeting poor and vulnerable groups through KLIP.	Targets smallholder and medium-scale farmers, distributing products through aggregators for mass reach (banks, co-operatives, outgrowers, etc.). Products are "bundled" and outlay, e.g. a bag of seeds with free insurance, makes it affordable for many. Smallholders are treated as homogeneous and must have access to a mobile phone and an agrovet; this may exclude some—poorer/marginal/less educated—farmers, reinforced by lack of incentivization for agrovets to promote the product in an inclusive fashion.
Procedures	Procedural issues come to the fore within insurance markets, and the challenges of developing a commercially sustainable scheme where difficulties in extending markets to remote, semi-literate pastoralists are apparent.	Agrovets build trust; mobile phones and mobile money payout extends insurance in rural areas and telesales call-back helps enrolment. Working through farming groups, influential farmers may control decisions, with potential for exclusion.
Representation	Debates over weak understanding of risk or the insurance product and of reluctant take-up hint at knowledge disjunctions, and at how pastoralists' experiences, values and beliefs related to livestock and climate risk are brought to bear on demand for index insurance in ways different from those intended by insurance programmes.	Agrovets may not understand the insurance product. Farmers and agrovets may believe the insurance card in the seed guarantee scheme is for seed certificate of authenticity not insurance. Card has been redesigned and field promotors (farmers) raise awareness.
Distribution	IBLI/IBTL/KLIP have an orientation towards distributive justice by carrying insurance benefits to vulnerable populations and expanding both population and geographical coverage. However, there is evidence that, like many insurance schemes, IBLI/IBLT are best targeted at vulnerable but not the poorest pastoralists. With close linkages to the national social protection system, KLIP is contributing to distributive gains from insurance products for poorer groups.	ACRE is driven by a theory of change that farmers are "better off" if insurance reduces climate risk enough to facilitate uptake of new technology (e.g. seeds). Benefits of insurance extended to smallholder farmers previously excluded from insurance markets, therefore arguably there is a distributive orientation. However, with no specific targeting of more vulnerable/poorer farmers (e.g. illiterate/without access to mobiles/agrovets) there is danger of exclusion.

Sources: IBLI: Bageant and Barrett (2017), Chantarat et al. (2017), Dror et al. (2015), Jensen et al. (2015). ACRE: Goslinga (2012), Wills et al. (2015), IIF (2017).

In this respect, cash transfers, such as through the HSNP, may act as better social protection for the poorest households, and with asset-building capacity (Fisher et al., 2017). Comparison between IBLI and HSNP leads Jensen, Barrett, and Mude (2014) to conclude that beneficial impacts flow from both programmes; they do, however, highlight how their different cost structures mean that IBLI's impact per unit cost are higher than HSNP's. We reflect on the public policy implications of these equity issues below.

ACRE

Social equity parameters within ACRE's approach flow from a business model predicated on the volume of registrations, "the more, the better" (Wills et al., 2015, p. 19). Volume is needed to diversify insurance risk exposure and to reduce premiums. ACRE identifies low uptake as a challenge, alongside reliable long-term data for indices, coupled with poor farmer financial literacy (IIF, 2017).

Through ACRE, smallholder farmers previously excluded from formal insurance gain access to insurance; this carries the potential to stimulate greater equity, especially as products are also tailored to their purchasing capacity. For example, with the "replanting guarantee," farmers can purchase protection for a single bag of seed or fertilizer, with money reimbursed if there is poor rainfall; they do not have to make a substantial outlay. Nevertheless, unlike IBLI, there is no formal effort to target marginalized groups (geographically/socially) beyond a general theory of change that smallholder farmers are "better off" if insurance reduces the climate risk enough to enable the uptake of new technology.

The scope for equitable procedures flows from product design. Kenya was chosen as the initial location for the programme, partly because it had a developed mobile money economy, thus reducing costs. Premiums and payments can be paid by M-PESA (a mobile money transfer service). This enhanced access for farmers in rural locations because registration could be conducted by mobile phone and a farmers' location remotely identified for the insurance contract. Trust in the product was also built by selling through agrovets (enabled through links to the Syngenta Foundation).

As with experiences in other index insurance schemes, there can be significant gaps in understanding between farmer knowledge of climate risk and intervention assumptions, further aggravated by poor financial literacy. Agrovets, too, misunderstand the product. This raises questions as to how farmers' and local stakeholders' knowledge is represented to ensure the product is appropriate. These issues are apparent in difficulties experienced by ACRE, although often implicit and put down to the need for consumer education. Wills et al. (2015) report that, for insurance bundled within the seed guarantee scheme, both farmers and agrovets assumed the insurance card in seed bags was a certificate of authenticity or guarantee. Thus, as Ribeiro (2017) highlights, many farmers did not access free insurance from the card available with their seed purchase. The card was redesigned to make it clearer; field promoters were also hired to raise farmer awareness. Finally, telesales operators were instructed to call farmers back to help with registration if an error occurred during enrolment.

ACRE's design and implementation carries the potential to exclude access of the poorest smallholders. Initially, Kilimo Salama had a clear internal focus on reaching the poorest farmers, offering a free product in trials (personal communication, R. Goslinga, Agricultural Insurance Initiative co-ordinator, Kilimo Salama, September 2017). Working with farmer groups also proved effective and proved a way to enrol poorer farmers and more women. For example, according to Goslinga (2012) in 2009, 185 individual farmers (1–2 acres) acquired insurance, and by 2012 this had risen to 7,000. By 2010, 8,000 members of farmer groups (0.5–1 acre) acquired insurance, and by 2012 this had risen to 65,000. Of individual farmers, 65% were male, while of group members 60% were female. Nevertheless, despite some success, there was low trust in the product, the fact it was free was apparently greeted with suspicion (Goslinga, 2012). Demand was lowest from the poorest farmers (personal communication, R. Goslinga, Agricultural Insurance Initiative co-ordinator, Kilimo Salama, September 2017).

As the initiative expanded, the focus of the product moved to farmers who visit agrovets and have access to a mobile phone. This also linked to the approach of the Syngenta Foundation, which aims to improve productivity and value chain access for "pre-commercial" farmers, often in semi-arid areas, who display potential for agricultural growth, enabling them to become "more professional growers" (Syngenta, n.d.). There is little evidence to suggest whether (or not) the insurance product attracted new farmers to purchase inputs from these agrovets. Evidence from ACRE's work in Rwanda suggests that insurance is most likely to be purchased by households that either own a house or have the

capacity to rent, and which have some food security, and at least one person in the household earns wage income from casual labour (Ashimwe, 2016). For such households it is estimated that insurance has a positive impact on farmer income of between USD 90–105 (Ashimwe, 2016). In Kenya, ACRE's work has also been found to increase wealth, but again to "better-off" poor households (e.g. owners of 1-2 ha of land), with assets and a degree of food security, not the poorest (Sibiko, 2016).

5 | DISCUSSION

The cases of IBLI and ACRE provide insight into the parameters of social equity concerns. "Unpacking" different dimensions of social equity—access, procedures, representation and distribution—gives a nuanced view of how social equity considerations are played out and helps to identify relevant policy dilemmas.

Both interventions seek to extend micro-insurance to smallholder farming/pastoral populations previously excluded from access to insurance. Thus, as a climate risk-management tool, their orientation carries the potential to build greater fairness in access to benefits from insurance and related products. At face value IBLI products have greater potential for targeting the poorest and most vulnerable within pastoral populations, given that this has been an overarching goal when compared to ACRE's approach. Nonetheless, in different ways, both grapple with similar difficulties that challenge how to incorporate fair distribution into design and implementation. Foremost is the need to build a commercially viable product at a premium that farmers/pastoralists can afford. Linked to this is the need for confidence in the product, primarily through minimization of basis risk, alongside aspects relevant to good product design and customer financial literacy. Both IBLI and ACRE products receive premium subsidies and, in this respect, donors have played a significant role in driving social equity goals through both premium subsidy and wider targeting decisions. Government uptake of KLIP, linking to social protection, has also facilitated distributive functions of IBLI.

While recognizing overarching challenges, both interventions have sought to capture opportunities for generating (more) equitable outcomes: for example IBLI by use of TLUs, such that small livestock can be covered, and by providing cover to any herd size; also through a sharia-compliant product, and through refining the insurance index for greater accuracy and reduction of basis risk. For ACRE, working with aggregators facilitates coverage to farming groups whose members have small landholdings, and through innovative forms of farmer-accessible "bundling"; farmers can "try out insurance" by insuring as little as one bag of seed with any payout transferred to the farmer's "mobile phone wallet" (IIF, 2017). For both IBLI and ACRE products, implementation with regard to sales mechanisms highlights weaknesses with respect to social equity. For IBLI/IBLT, the sales agent structure and incentive scheme introduces weaknesses: sales agents are usually recruited from local populations and provided with commissions for sales; the result is variability in sales, some of which is likely to be associated with the quality of the sales agents (Chelang'a, Banerjee, & Mude, 2015). Importantly, it is likely that agent quality is correlated to access to services, and thus living standards. Thus, one might expect that a region with relatively higher rates of poverty has less educated sales agents, which could lead to poorer insurance extension. Commission-based pay may compound the issue, providing little motivation for strong extension campaigns in regions where one might expect demand to be low (e.g. because poverty rates are high, because residents are unlikely to understand the product). Moreover, Bageant and Barrett (2017) highlight how the influence of sales agents may have gender dimensions, due to women being vulnerable to pressure by sales agents.

In contrast to IBLI, whose direct customers are pastoralists, for ACRE's products it is the seed/input companies who sell to farmers that are the direct customers. This has an impact on how the

product is marketed, what the educational campaigns are and how the product is integrated into farmer decision-making. The internal debate is often less about "subsidies for the poorest," but rather who pays and why. Social equity becomes a question of improving market access; the social impact is therefore inextricably tied to the bundled product.

A second weakness of both interventions has been that levelled at insurance as a development tool per se (Binswanger-Mkhize, 2012). Essentially, those with sufficient liquidity to afford premiums probably have the greatest access to substitutes and may not need insurance, while those who need it may lack liquidity. For IBLI this argument is further nuanced: only wealthier pastoralists may be able to afford full IBLI insurance premiums, but a middle category of vulnerable non-poor may stand to benefit from index insurance, as opposed to the poorest for whom asset-building social protection is more appropriate. This leads Chantrat et al. (2017) to conclude that the public policy implications are for subsidy support to be targeted at the vulnerable non-poor, although this may be politically unpalatable.

For IBLI, it is also possible that the timing of the insurance sales windows exacerbates liquidity-related differences because those windows are during historically lean months, for example, at the end of the dry season. There is limited evidence of this specific to IBLI, but HSNP cash transfers to the poorest seem to cause increased demand for IBLI (Jensen et al., 2014). It is possible that cash transfers release a liquidity constraint and that evidence of increased insurance uptake is due to the increased income.

For ACRE, there is evidence that farmers chose to buy the bundled insurance/seed products because the insurance is an additional statement about seed authenticity rather than because of the climate protection (Wills et al., 2015). Often, reaching different groups of farmers comes as a by-product of expanding market access. For example, it is logistically easiest to attach insurance to 10 kg bags of seed (restricting access to farmers who need that amount and can transport it to their fields). Insurance companies are now pushing for insurance to be added to smaller seed bags in order to increase their market, in effect enabling more disadvantaged farmers to buy the product. A social equity lens has to take this complexity into account.

6 | CONCLUSIONS

If agricultural index insurance is to be a climate change adaptation tool that is tailored to the needs of the poor in developing countries, attention needs to be paid to issues of social equity. The allure of index insurance can mask issues of power, social inequality and differential impact in rural communities. The need to be cognizant of the danger of implicitly reinforcing inequality through the design and delivery of index insurance underlines how more consideration needs to be given to the way uptake of index insurance is shaped by existing inequalities and, in turn, how these inequalities contribute to differential development outcomes for smallholder farmers/pastoralists. To this end, we have presented an equity assessment framework to unpack different dimensions of social equity in order to facilitate debate on whether and how a fair(er) distribution of benefits can be achieved.

We acknowledge that bringing social equity to the fore poses moral and practical dilemmas for those engaged in the design and promotion of index insurance. Indeed the cases of IBLI and ACRE highlight the balancing acts and unintended consequences of integrating social equity with both commercial sustainability and wider policy goals on climate risk reduction and social protection. For policy-makers there are no simple solutions. A long-standing debate within index insurance circles is whether insurance should be subsidized to make it more accessible to poorer farmers. This is echoed within social equity concerns, for example, subsidizing the insurance premium could ensure that the

benefits of the index insurance are shared across the farming population. However, such an approach can also distort the market.

Do we need to acknowledge that the main target group for index insurance is actually a "better off" category of nevertheless vulnerable farmers? If so, does it, therefore, make more sense to focus on effective interventions for this group at the expense of the distribution of benefits to the poorest and most vulnerable farmers? Or can more judicious targeting and innovative mechanisms be encouraged that ensure greater access to index insurance for a larger group of poor farmers, including marginalized categories such as poor women or single-headed households? If the poorest, most asset-constrained farmers/pastoralists are to benefit from climate risk reduction, a conclusion is the need to integrate index insurance within a wider social protection system providing cash, assets or food transfers. But this is no panacea given difficulties of developing effective synergies between programmes that actually work to support farmers, particularly in sub-Saharan Africa.

Expert debate about index insurance tends to treat farmers as a homogeneous group and largely ignores issues of equity. Answers to each of the aforementioned questions challenges researchers, development practitioners and policy-makers to address the issues of differential access to index insurance and how burdens and benefits are distributed across rural society. By so doing, the focus of the debate expands from one on agricultural systems in transition to a broader—and we acknowledge more complicated—debate on agricultural systems and social transformation, which inevitably opens up issues of power and politics.

Given the will, we contend that paying attention to the parameters of social equity within index insurance interventions, may help to ensure that outcomes are more equitable, with greater potential for inclusion and fairer distribution. We recognize there are no simple solutions, but suggest that debate over social equity will lead to greater clarity over the development contribution that can be made by index insurance, together with refinement of the evidence base for assessing outcomes. This is especially important in light of the millions of dollars that donors and governments are targeting at index insurance and the arguments that these investments will contribute to the realization of some of the SDGs, including no poverty and gender equality.

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