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CAPACITY BUILDING FOR AGRICULTURE INSURANCE: LESSONS FROM DEVELOPED ECONOMIES

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Purpose: Agricultural insurance has been offered in some developed economies for more than a century. In contrast, the sector remains underserviced in low and middle-income economies. Penetration of agricultural insurance exceeds 1 percent in developed economies but in low and middle- income countries, the agricultural insurance penetration is less than 0.3 percent. The gap between the penetration of non–life insurance and agricultural insurance increases as development status decreases. The purpose of this research work is to outline lessons from developed economies on how capacity building for agriculture insurance is done.

Methodology: Relevant books references and journal articles for the study were identified using Google Scholar. The inclusion criteria entailed papers that were not over five years old.

Findings: The study findings showed that insurance company' in enveloped economies sell crop insurance policies through financial institutions or cooperatives, which are particularly important in marketing crop hail insurance. It was also found that in the developed economies, there is a national climate change policy as a means of capacity building for agriculture insurance. This policy helps the government to plan for training of staff and policymakers on how to advise farmers to take agricultural insurance. This policy also help in enhancement of the administrative and technical capacity of government institutions responsible for handling climate change related issues that affect agriculture insurance

Recommendations: The study recommend policymakers in developing countries to focus on imperfections on the pricing of agricultural insurance products. This will help policymakers designing public support programs aimed at reducing the cost of insurance thus developing insurance products that are attractive and affordable to farmers and financially viable and sustainable for insurers. The study also recommend developing countries to embrace modern insurance pricing approaches that are based on the credibility theory such as the experience-based approach. This approach has been promoted in several developed countries to cover systemic risks because it allows for the adjustment of the expected loss based on additional credible information such as insured losses of other products. The study further recommend developing countries to promote insurer- insured partnerships.

Keywords: *Capacity Building, Agriculture Insurance, Lessons, Developed Economies*

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INTRODUCTION

Agricultural insurance takes a long time to take off. The United States and many European countries have had some form of crop or livestock insurance for more than a century and are mature markets with high penetration rates. In contrast, in many developing countries, agricultural insurance has been operating for only 5–10 years even and agricultural insurance demand and uptake have yet to take off. The history of delivering agricultural services to smallholder farmers is one of approaches and capacities that worked well in one country but failed miserably when replicated in others. Alternatively, approaches and capacities may have worked at a certain point in time, but gradually become less effective as the agricultural sector landscape evolved. This was particularly true of agricultural extension (Vera, Saa, Mínguez, & Colmenero, 2017). No amount of training, retraining and new incentives improved service delivery in several developing countries. Successive best practice models suffered a similar fate. What started to change thinking on capacity building was the move to approach the challenge of better service delivery from a totally different direction. Instead of taking service delivery mechanisms as the starting point, there is now a view that it is better to start by first asking what needs to be achieved.

Economies in developing countries are predominantly dependent on agriculture in terms of contribution to the Gross Domestic Product, employment, provision of raw materials and foreign exchange earnings. There should be efforts aiming at accelerating the growth of agriculture sector in order to improve the standard of living of citizens in these developing countries as well as substantially improving their food and nutritional security. The agriculture sector is however, increasingly becoming vulnerable to vagaries of weather related risks that adversely affect the sector and the general economy. Assisting countries to meet the challenges of globalization and sustainable development places increasing demands on capacity building for agriculture insurance (Vera et al., 2017). Despite recognition by the international community of the need for enhanced capacity building efforts, progress has been modest and current efforts are unable to satisfy the demand. In order to develop a more effective approach to capacity building for the development of mutually supportive environment, trade and economic policies, there is a need for capacity building service providers and beneficiaries to reassess current approaches.

Agricultural based enterprises engage in learning opportunities to build capacity, improve performance and enhance the quality of working environments in order to advance productivity goals. Capacity building is necessary to support effective agricultural practice. Mejías, Bellas, Pardo, and Paz (2019) defines capacity building as the development of knowledge, skills, commitment, structures, systems, and leadership to enable efficient productivity. In addition to focusing on developing individual and organizational capacity, capacity building consists of acquiring and applying new or enhanced capabilities to promote agriculture and engage in evidence-informed interventions (Mejías et al., 2019). The aim of capacity building is to improve practices and infrastructure by creating new approaches, structures or values which sustain and enhance the abilities of practitioners and their organizations to address local agricultural issues (Loboguerrero Rodriguez et al., 2018). It also involves engaging in a series of relationships with others within and outside of an organization to build agricultural knowledge and skills (Grover, Chiang, Liang, & Zhang, 2018).

In developed countries, governments have identified agriculture insurance as one of the ways to de-risk the agriculture sector and reduce vulnerability of farmers and other value chain actors. However, the adoption of agriculture insurance in most developing countries as a risk mitigation measure has failed to reach scale due to many challenges (Aditya, Kishore & Khan, 2020). These include inadequate risk assessment and profiling; inadequate capacity for risk assessment and profiling, inadequate and unreliable data for agriculture insurance. In addition, there exist low levels of agriculture insurance market infrastructure development, inappropriate product distribution channels, and inadequate capacity by underwriters to cover risks. Furthermore, there is high cost of insurance premiums, inadequate incentives by governments, and weak legal and regulatory framework that does not respond to industry needs.

In addition, the agriculture insurance has been operating without a comprehensive policy to guide its growth and development and this informs the government's quest to have one in place. The agriculture insurance policy forms the conceptual framework that provides guidelines for addressing the challenges in the agriculture insurance sub sector and exploiting the opportunities to bring greater competitiveness and spur economic growth (Gannon, Crick, Atela, & Conway, 2021). The overall objective of the agriculture insurance policy is therefore to foster growth and development of agriculture insurance industry and thus adequately remunerates all value chain actors. Further, climate change has aggravated the vagaries of weather resulting in extreme events such as droughts, floods and, increased incidences of pests and diseases (Gannon e al., 2021). In some developing countries, governments have consequently identified and adopted agriculture insurance as one of the ways to de-risk the agriculture sector and reduce vulnerability of farmers. However, the private sector undertaking agricultural insurance has been reluctant to fully embrace the sector due to attendant risks. The reduction of the farmers' exposure to agricultural risk is compounded by low uptake of insurance by farmers.

In the Fisheries sub-sector, as stated by Pomeroy, Arango, Lomboy, and Box (2020), the risks experienced mainly take the form of damage to production units such as ponds and cages, drying up of water sources for aquaculture, loss of fish stocks, fishing craft/gears, fishing grounds and fish landing and handling facilities, high post-harvest losses and loss of market access threatening the livelihoods of artisanal fisherfolks. As an example, Kenyan fish and fish products were denied market access to the European Union between 1997 and 2000 due to loss of fish handling facilities. This occasioned the closure of 13 local fish processing factories and the associated business in the lake Basin towns and its environs. In addition, long rains season of the year 2020 caused flooding in various parts of the country resulting in the destruction of 149,600 ponds countrywide (Pomeroy et al., 2020). Consequently, seven million pieces of fish valued at KSh. 777 Million were lost. For the farmers involved in cage culture in Lake Victoria, the entire loss was estimated to be KSh. 500 Million. These risks continue to impact the society and therefore all possible measures should be taken to prepare actors along the agriculture value chain and improve readiness for effective and fast response, and plan for rapid recovery.

Many capacity building service providers have not sufficiently coordinated their programmes to inter alia, ensure a consistent, cost-effective, and long-term approach to capacity building. In many cases, services have been, and continue to be, delivered on an uncoordinated, adhoc basis by different institutions. There is a need to enhance coordination and share best practices, information and experience (Santana, 2018). The provision of capacity building assistance has generally been

based on a flow of services from North to South and West to East, without encouraging the active involvement of regional, sub-regional and national institutions in their design and delivery. This has entailed lost opportunities for enhancing South-South and East-East cooperation. Funding in recent years for capacity building in support of integrated policy design and implementation has been unpredictable. Current levels fall far short of meeting the growing demand for these capacity building services. In some instances, resources for capacity building exist but the major obstacle is the delay in obtaining the funds.

LITERATURE REVIEW

Capacity Building for Agriculture Insurance in Developed Economies

In a study conducted in Austria by Jensen and Barrett (2017), index insurance is promoted as a low-cost alternative for conventional agriculture insurance. With index insurance products, payments are based on an independent measure regarded as highly correlated with farm-level yield or revenue outcomes. Unlike traditional crop insurance that attempts to measure individual farm yield loss or revenue loss, index insurance makes use variables exogenous to the individual policyholder such as temperature or rainfall measurement that have a strong correlation to farm-level losses. The index can also be an average in an outcome related to loss over a small area, such as average crop yield or livestock mortality rate (Jensen et al., 2017). They are estimated using statistical sampling such as random crop cuttings or average pasture damage based on satellite observations. An example of a typical weather index insurance product is the one to insure Belgian barley farmers against excessive unseasonal rains (Kramer et al., 2021). The insurers use the maximum accumulated rain (in millimeters) over any two consecutive days during February through April as the index that could trigger a payment. And that happens when the index takes a value equal to or higher than a number called the index strike (Kramer et al., 2021). The higher the index value, the higher the compensation per acre to the farmer up to a maximum that reflects the cost of production per acre. The index value is computed using data from a local reference weather station.

Another research conducted by Reyes, Agbon, Mina, and Gloria (2017) showed that a few countries most notably Germany, offer epidemic disease insurance as a livestock insurance product. Insurance of government-ordered slaughter or quarantine is normally excluded. Livestock insurance products include traditional animal accident and mortality cover as well as an epidemic disease cover and a livestock index mortality product (Reyes et al., 2017). Named-peril accident and mortality insurance for individual animals is the basic traditional product for insuring livestock (Ateya, 2020). Cover includes death caused by natural perils such as fire, flood, lightning, and electrocution and it normally excludes diseases, specifically epidemic diseases. Premiums are set based on normal mortality rates within the permitted age range, plus risk and administrative margins (Ateya, 2020). As mortality is to a considerable extent influenced by management, the product suffers from adverse selection by the highest-risk farmers. Herd insurance is a variation on individual animal mortality cover for larger herds. This product includes a deductible, which is borne by the policyholder before an indemnity is paid.

A study in Malaysia by Alam et al., (2020) showed that greenhouse insurance is widely available to 88 percent of the respondent farmers. The study further showed that there are adequate insurance firms offering glasshouse and commercial growers insurance to farmers recognized by the

horticultural trades association. Greenhouse insurance addresses the specific risks facing commercial growers and glasshouse owners. Some respondents indicated that their greenhouse insurance covers storm damage if wind was above a certain speed such as 60 or 70 mph Alam et al., (2020). The insurers normally base their decision on data obtained from weather station to check the wind speed. A similar study by He and Faure (2017) in United Kingdom showed that there are multiple insurance companies specialized in the greenhouse sector and offers a professional programme of property damage and loss of income insurance. Such insurance package grants comprehensive cover to the horticultural sector throughout United Kingdom (He et al., 2017). These insurance firms insure horticultural producers and retail nurseries and offer support in the event of a claim depending on the plant, equipment and the risk situation. Furthermore, the study stated that insurance firms offering greenhouse insurance offer tailored insurance protection for different clients to cover the major hazards of hail, storm, flood, fire, earthquake, and landslide. They also offer on-site advice for tailored insurance to limit the risks of their clients' operation Kingdom (He et al., 2017).

A research by Vyas et al., (2021) in Portugal, Spain and Italy showed that developed insurance markets in high-income countries use a variety of distribution channels for crop insurance and livestock insurance. In developing countries, insurance is traditionally marketed through insurance agents or brokers. It was found that insurance companies in Portugal, Spain and Italy sell crop insurance policies through financial institutions or cooperatives, which are particularly important in marketing crop hail insurance. In these countries, sales agents and brokers play a much smaller role in marketing crop insurance with the two main channels being cooperatives or producer associations and banks or microfinance institutions (Vyas et al., 2021). Therefore, establishing and sustaining an agricultural co-operative is an effective means for farmer to save various type of transaction costs or to create additional value through better coordination (Lopulisa, Ramlan & Suryani, 2018). Aggregation of farmer may improve bargaining power such as access to tailor-made insurance programs, inputs, technology, investment and enables small and medium farmers to exploit emerging opportunities. In addition, marketing an agricultural insurance through co-operative allows the insurer to mitigate adverse selection. It also enables underwriters to achieve a viable portfolio size and a balanced spread of risk and to reduce administrative costs per insured (Lopulisa et al., 2018).

As per study by Capitanio and De Pin (2018) in Italy, majority of agricultural insurance programs are operated by centralized marketing organizations where premiums are deducted at the source. This means that these centralized marketing organizations deducts crop insurance premiums from the sales revenue owed to farmers and directly pays the premiums to the insurer. Communication by these centralized marketing organizations with member farmers is quick and easy, and payments of indemnity are made quickly. Centralized marketing organizations also facilitates effective targeting of subsidies to farmers and aggregated platforms for efficient delivery of agro-inputs, insurance, etc for climate change coping mechanisms and risk mitigation. Centralized marketing organizations also help in eliminating adverse selection which results in inaccurate premium rates that in turn make high-risk individuals more likely to purchase insurance (Chen, 2021). Adverse selection can lead any insurance plan to be unprofitable and eventually fail. Avoiding adverse selection may require crop insurance programs to identify, acquire, and use data that discriminate among risks. Identifying homogeneous risk groups is a prerequisite for a

successful contract. The centralized marketing organizations may have a comparative advantage in providing additional information to help insurers discriminate their risks and price them accordingly (Capitanio et al., 2018).

According to a study by Thornton et al., (2017) Australia, the government has a national climate change policy as a means of capacity building for agriculture insurance. This policy helps the government to plan for training of staff and policymakers on how to advise farmers to take agricultural insurance. This policy also help in enhancement of the administrative and technical capacity of government institutions responsible for handling climate change related issues that affect agriculture insurance. Thornton et al., (2017) further showed that climate change policy has enabled Australian government to invest in capacity-building infrastructure for climate risk modelling, vulnerability assessment and early warning systems. These infrastructure helps insurance firms offering agricultural programs to have a national inventory of vulnerability by region. In Australia, vulnerability and risk assessment is already undertaken and incorporated into adaptation plans for the agriculture, water, livestock and fisheries sectors making it easier for insurance companies to assess farmers' risks.

As noted by Susskind and Kim (2022) there is continuous education and raising awareness of agriculture insurance to farmers in Poland. The government of Poland has invested in educating and training local governments and their staff on climate change issues that necessitates farmers to take agricultural insurance. Continuous education and raising awareness of agriculture insurance has increased access to information as much of the information is digitized and provided in English and other major languages (Susskind et al., 2022). In addition, the Polish government has leveraged on regional and international networks for information sharing and cooperation to help farmers' better tackle agricultural insurance related issues that are experienced across borders. According to Susskind et al., (2022) networks and websites for agricultural insurance knowledge exchange and information sharing have been established in Poland.

A research by Nguyen (2020) in Finland showed that the Finnish government has intensively supported the enhancement of capacity-building in agriculture and resilient infrastructure through various bilateral and multilateral mechanisms. The country has developed market-based agricultural crop and livestock insurance programs, including both traditional indemnity-based and new index-based insurance products. The Finnish government has established a task force to advice farmers on the best way to adopt agricultural insurance (Nguyen, 2020). The task force also advice on the most appropriate institutional framework, and the specific roles that governments can or should play in promoting the widespread adoption of agricultural insurance. These programs rely mainly on PPPs and are included in broader efforts of agricultural risk management. They are often connected to agricultural finance support efforts and tied to complementary efforts in agricultural extension. The government of Finland provides technical assistance for agricultural insurance in almost all crops (Nguyen, 2020). The government has also been successful in promoting agricultural insurance moving from small-scale pilots to large-scale agricultural insurance programs, mainly through the provision of agricultural premium subsidies.

A research by Obraztsova and Agibalov (2022) in Russia showed that capacity building in agricultural insurance involving systemic risk must be promoted by government intervention in terms of provision, administration, and oversight of agricultural insurance programs. According to

Kaurivi et al., (2020) systemic risk are widespread that affect a large number of farmers simultaneously though perhaps infrequent. Many of the crop-yield risks faced by farmers come from the randomness induced by weather and natural growing conditions. Because such risks are typically realized over a large geographic area, catastrophic risks may be significant and difficult for insurers to diversify. Likewise, widespread animal epidemic diseases can simultaneously affect a large number of herders, generating major losses Kaurivi et al., (2020). The systemic component of agricultural risks can generate major losses in the portfolio of agricultural insurers. The Russian uses government intervention to insure against such losses because no private reinsurer or pool of reinsurers has the capacity to cover such large liability when the risks occur. Because private reinsurance markets may not be able to absorb the catastrophic risks associated with crops or livestock, the government should assume the role of a reinsurer of last resort.

According to a study done by Carlisle et al., (2019) in Sweden, agricultural data is one of the key inputs required for successful agriculture insurance programmes. Data is required in sufficient, reliable and verifiable form to support various stages of risk assessment, product design, costing, loss assessment, and payout determination. In addition, data is critical for enhancing transparency and dispute resolution that may arise from either basis risk or moral hazards (Carlisle et al., 2019). Sustainability of agricultural insurance programmes therefore depends on ability of the involved agencies to generate and utilize reliable data. In Sweden, stakeholders' are expected to observe the existing laws and regulations while collecting and using agricultural insurance data (Hudson et al., 2020). The government is responsible for preparation and enforcement of relevant regulations and guidelines to ensure stakeholders' conformity with the laws. The government is responsible for collection and provision of most of the agricultural insurance data as a public good. The bulk of such data is collected by agricultural departments, agricultural state corporations, local and international research organizations, universities, development partners, farmer organizations and others by private sector agencies (Hudson et al., 2020)

Another research done by (Costa et al., (2019) in Portugal showed that adequate funding, staffing and training of data management capacity is very important for agriculture insurance capacity building. Data collection and dissemination in developed countries such as Portugal is mostly digital and integrated. In Portugal, the government has the mandate to oversee the quality of agricultural data, including provision of guidelines and standards for data collection and dissemination as well as enforcement of laws and data regulations on data management. As stated by Saiz-Rubio and Rovira-Más (2020) besides the primary yields data, ancillary data related to production such as agro-meteorological data and early warning data are required for monitoring the situation to enable trigger the desired action. Where production and yields data are not reliable, the ancillary data such as rainfall or normalized difference vegetation index (NDVI) have also been used as proxy commodity yields indicators to deliver various types of weather index-based insurance products. In developed countries, management of such ancillary data is undertaken by several agencies responsible for weather, geospatial and remote sensing (Saiz-Rubio et al., 2020).

A research by Müller, Johnson and Kreuer (2017) in England indicated that sustainable agricultural insurance requires adequate risk financing. The challenges contributing to inadequate agricultural risk financing in developing economies can hinder sustainable agricultural insurance. In England, the challenge of inadequate capacity by underwriters to cover risks occasioned by lack of financial capacity by insurers to underwrite agricultural insurance is well handled. There exist reinsurance

markets with adequate capacities minimizing the challenges in terms of skills transfer hence the market remains developed. In addition, risk financing is achieved through lowering cost of agriculture insurance premiums (Müller et al., 2017). Challenges such as multiple perils, high cost of collecting data, risk assessment and distribution make agricultural insurance premium to be costly hence discouraging investments. Government in England invests in development especially for index insurance where high claims assessment costs render agricultural risk financing an expensive venture for insurers.

A study conducted by Ward and Shively (2017) in Denmark showed that developed countries have low frequency of catastrophic risk. In Denmark, agricultural sector faces low losses that are does not strain the capacities of local insurance companies. Risks are low and less frequent leading to low loss ratios hence less expensive to insure. Because the majority of Denmark farmers are large scale farmers, their uptake of agriculture insurance is less dependent on a range of interventions and incentive structures. The situation is more pronounced in high-risk areas. In situations where there is no premium support to adequately stimulate uptake of agricultural insurance, farmers tend to remain generally included in benefiting from agricultural insurance programs (Aerts et al., 2020). Further, insurers and other providers along the value chain tend to continue venturing into agricultural insurance due to its high-reward nature.

According to research by Bigelow and Borchers (2017) in United States, legal and regulatory framework provides for agriculture insurance in same class with other insurance packages but not a subclass. In some developing economies, agriculture insurance is provided as a subclass of miscellaneous insurance class under general insurance business. The classification for agriculture insurance in same class with other insurance packages makes it easy to specifically target interventions in agriculture insurance. This legal and regulatory framework is therefore adequate to foster growth and development of Agriculture insurance (Bigelow et al., 2017). There are specific legislations in United States to specifically support development of agricultural insurance despite its unique nature from product development, distribution and claims management. This is a major incentive for private insurers to venture into agricultural insurance given its risky nature. Due to existence of various legislations, the operating environment has been sufficiently enabling for development of agriculture insurance. For this reason, agricultural insurance remains developed with unlimited participation of private insurers as farmers continue to be less exposed to agricultural risks

As noted by Nnadi (2013), agricultural insurance can facilitate access to credit, because it increases the creditworthiness of farmers and other agents in the agricultural sector. To the extent that agricultural insurance contributes to the overall financial stability of the agribusiness sector, indirect benefits in terms of credit availability may be realized at other levels of the agribusiness marketing chain. Financial instability at the farm level arising from yield or price shocks may lead to instabilities at other levels of the processing and marketing chain. In this way, instruments that contribute to stability at the farm level may ease credit constraints for agents at other levels of the agribusiness complex. Government-sponsored agricultural programs in developing countries are usually linked to credit, as in India or Morocco.

As noted by Di Marcantonio and Kayitakire (2017), the regulatory frameworks governing insurance markets in many developed economies tend to be advanced. As a result, short-term

market incentives and regulatory constraints cannot inhibit increased penetration of insurance, including agricultural insurance. In most developed countries, agricultural insurance is not treated as part of the nonlife insurance business and therefore it is not subject to the same regulatory requirements as, for example, automobile insurance. Innovative agricultural insurance products, such as index-based crop insurance or parametric (weather-based) crop insurance, require an enabling regulatory framework. This new type of insurance, in which indemnity payments are based on an index (such as average yield in a given geographical area or rainfall levels) rather than actual individual losses, can challenge the basic requirements of insurable interest (Di Marcantonio et al., 2017). Business interruption insurance covers firms experiencing insurable revenue losses that may not be associated with the loss of a physical asset. Formulating weather-based insurance as a special class of business interruption, which protects against losses and extra costs as a result of an insured event, may facilitate the regulation and supervision of weather-based insurance.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the study findings, capacity building through creating enabling environment fosters the growth and development of agricultural insurance, improved development of affordable and accessible agriculture insurance, enhanced agricultural value chain actors, generation and use of data to support agriculture insurance and promote research and development, innovation and knowledge management in agriculture insurance. These Policy implementation require proper coordination of institutions and stakeholders in the industry to implement the outlined policy intervention measures. To achieve a vibrant agriculture insurance, an enabling legal and regulatory framework and fiscal measures such as public premium support and other incentives should be provided.

The study also concluded that Risk assessment is generally quite expensive, requiring heavy investment. In most cases the government and private sector organizations carry out risk assessment on a minimal scale. This information is not easily accessible since the private sector does it for their own consumption. This means farmers, pastoralist and fisher folk remain unaware of intensity of the risks and are unable to transfer the risks or mitigate against their effect on their agricultural activities. Further, there is inadequate capacity among government, insurers and other stakeholder to undertake risk assessment and profiling. This makes the farmers, pastoralist and fisher folk unable to make informed decisions on the choice and uptake of insurance products. It is expected that the implementation of capacity will unlock the potential of the subsector and lead to a highly competitive and thriving agriculture subsector able to enhance uptake of agriculture as one of the options to mitigate on agricultural shocks and thus build resilience amongst the farmers.

It was also concluded that pricing agricultural insurance products is a critical stage in designing products that are attractive and affordable to farmers and herders and financially viable and sustainable for insurers. It requires a long series of high-quality historical agricultural/weather data. The price of agricultural insurance in competitive markets depends ultimately on the demand for and supply of insurance. Prices tend to increase when the demand exceeds the supply, and they tend to decrease when the supply of insurance exceeds the demand. However, the price of agricultural insurance (or insurance premium) is driven by some key factors, which can be identified by decomposing the technical insurance premium. Governments can play an important

role in promoting an enabling legal and regulatory framework. This framework should allow for the development of both traditional indemnity-based and innovative agricultural insurance products, such as index-based insurance; crowd in insurance and reinsurance companies; and protect farmers against potential insurers' malpractice such as nonpayment of valid claims.

Recommendations

The study recommend policymakers in developing countries to focus on imperfections on the pricing of agricultural insurance products. This will help policymakers designing public support programs aimed at reducing the cost of insurance thus developing insurance products that are attractive and affordable to farmers and financially viable and sustainable for insurers. The study also recommend developing countries to embrace modern insurance pricing approaches that are based on the credibility theory such as the experience-based approach. This approach has been promoted in several developed countries to cover systemic risks because it allows for the adjustment of the expected loss based on additional credible information such as insured losses of other products. The study further recommend developing countries to promote insurer- insured partnerships. In France, for example, self-help groups, under the insurer's supervision, handle some operational tasks of a livestock insurance program, including premium collection and loss adjustment of small claims. The farmers groups in USA also rely on their members to perform some insurance tasks on behalf of the insurer. Relying on insured in this manner requires training and closely supervising them, but such models work relatively well in the long term, because both the insured and insurers have incentives to keep administrative and operating costs at a minimum. Finally, the study recommend governments in developing countries to embrace market-enhancing insurance subsidies. The subsidies should aim at creating and supporting healthy and sustainable competition among insurance and reinsurance companies by reducing frictional costs, informational costs, and entry barriers. Financing through public subsidies can allow insurers and reinsurers to develop innovative insurance products, such as index-based insurance.

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