

Agricultural insurance: A strategic tool for climate change adaptation in the agricultural sector

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ABSTRACT

Agriculture is a major economic sector and a critical source of livelihood in many developing countries. It is particularly exposed to adverse natural events, such as droughts or floods, and the economic costs of major disasters may even increase further in the future because of climate change. This unexpected event can lead farmers to poverty if unchecked. Agricultural insurance is a veritable tool that agricultural producers can potentially use to adapt and even mitigate the risks associated with adverse natural events. This paper describes the importance of agriculture in developing countries, how agricultural insurance can complement and enhance risk management activities. This topic becomes imperative because the traditional adaptation practices alone cannot sustain the farmers in the face of changing climatic scenarios, especially in Nigeria where no formal adaptation blueprint is in place. It outlines the various agricultural insurance products available to farmers and the regular perils that insurance policy could cover. It summarizes with the role government play in assisting agricultural producers cope with climate variability.

Keywords: Agriculture, insurance, climate, adaptation, risk, disaster.

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INTRODUCTION

Agriculture remains an important economic sector in many developing countries. It is a source of growth and a potential source of investment opportunities for the private sector. Two-thirds of the world's agricultural value added is estimated to be created in developing countries (World Bank 2008). In agriculture-based economies, which include most of Sub-Saharan Africa, agriculture generates 29% of GDP on average. In transforming countries — countries in which agriculture is no longer a major source of economic growth, which include most of South and East Asia and the Middle East and North Africa — the contribution of agriculture to GDP is much lower (Mahul and Stutley, 2010).

Nearly half of the world's population, some 2.9 billion people, lives in rural areas. Agriculture is a source of livelihood for an estimated 86% of these people (World Bank, 2008). Agriculture provides employment to 68% of the population in agriculture-based countries and 48% in

transforming economies. About 94% of rural households live from their agricultural activities in agriculture-based countries; this proportion falls to 76% in transforming economies.

Many developing countries have seen major shifts in their agricultural policies toward the modernization of the agricultural sector over the past two decades. The change in policy contributed to more sustainable growth of the sector, although growth was slower than in nonagricultural sectors, except in agriculture-based countries.

Agriculture can contribute to spurring growth, reducing poverty and sustaining the environment. GDP growth in agriculture is at least twice as effective in reducing poverty as non agricultural GDP growth (World Bank, 2008). Agriculture remains the dominant sector in a large number of developing economies. It accounts for a major share of the gross national product and is still the main

source of employment. Moreover, agricultural products are often an important export item. Productivity gains in agriculture are necessary for self sustaining economic development in most developing countries (UNCTAD, 1994; Mahul, 2010).

Despite the importance of agriculture in the developing countries, the various initiatives taken for its development have often failed to deliver full benefits. Low levels of income, low capital-labour ratios, and the general precariousness of agricultural production still characterize this sector in many countries. There is often a dichotomy between the urban and rural sectors of the economy, not only in terms of technology but, more importantly, in terms of access to services, for example, transportation, medical and educational facilities and credit and insurance (UNCTAD, 1994). For an orderly growth of the agricultural, and, more broadly, the rural sector, it is necessary to establish a comprehensive package programme of support services. Agricultural Insurance is a part of this package.

Agriculture has always been a risky business. Unlike the industrial sector, it is subject to the vagaries of weather. The variations in productivity induced by nature cannot be fully accommodated by farmers. It is true that since time immemorial farmers have devised measures to limit these risks: crop rotation and diversification, intercropping, use of low yield but stress tolerant varieties, tillage systems, share tenancy, contractual inter-linking, development of non-farm sources of income such as handicrafts and handlooms, socio-cultural strategies which distribute risks within the extended family, and informal financial arrangements. However, while these measures continue to be helpful, the problem of residual risks remains. In addition, the farmers are subject to the common risk of a catastrophe and the aggregate group risk has still to be confronted. This co-variability of risks reduces the efficacy of traditional measures. The modern insurance sector can play a major role here, and considerably strengthen the security of farmers (UNCTAD, 1994; World Bank, 2005).

The growth strategy for most agriculture-based economies should therefore be anchored in improving the productivity of the agricultural sector, particularly of food staples. Agricultural risk management, including agricultural insurance, can contribute to raising the productivity of agriculture by helping farmers and herders invest in more productive, but sometimes riskier, agricultural business activities

WHAT IS AGRICULTURAL INSURANCE?

In general, insurance is a form of risk management used to hedge against a contingent loss. The conventional definition is the equitable transfer of a risk of loss from one entity to another in exchange for a premium or a guaranteed and quantifiable small loss to prevent a large

and possibly devastating loss. Agricultural insurance is a special line of property insurance applied to agricultural firms. In recognition of the specialized nature of this type of insurance, insurance companies operating in the market either have dedicated agribusiness units or outsource the underwriting to agencies that specialize in it. There are several features of this type of insurance that validate it being treated as a special line of business. Difficulties in achieving adequate diversification because of the nature of the risk, asymmetries of information in underwriting, the geographical dispersion of agricultural production and the complexity of the biological processes of production, which requires skilled and expert underwriting justify it being considered a special business line (Iturrioz, 2009).

Basically, agricultural insurance is designed to provide covers for financial losses incurred due to reduction in expected outputs from agricultural products. The major products are crops and livestock. Others include fisheries and forestry. Crop insurance and livestock insurance provide the two broad categories for which commercial insurance covers are designed. Because of the complexities brought to agricultural ventures due to mechanization, a broad range of traditional policies, namely personal accident, fire, vehicles, machinery and public liability covers are made essential parts of a comprehensive agricultural insurance package (Iturrioz, 2009).

Agricultural investments unfortunately are among the most risky economic ventures one can embark upon. The absolute dependence on unpredictable weather conditions like hailstorm, flood, drought and other natural hazards, make income from crop production to be very unstable. Other agricultural products like livestock, poultry and dairies are exposed to the risks of which occur in catastrophic proportions. The recent cases of flooding, bird flu and pig swine in Nigeria comes readily to mind.

Agricultural insurance policies protect the farmer against these unforeseen circumstances by way of indemnification. It also serves as securities for banks as indemnification for financial losses suffered farmers from damages to their products and will provide funds for servicing such loans.

HISTORICAL BACKGROUND OF AGRICULTURAL INSURANCE IN NIGERIA

Agricultural insurance as an alternative for risk management actually started as crop hail insurance in Europe more than 100 years ago and spread to the United State at the beginning of the century. It has since been embraced by a lot of developed and developing countries of the World viz: USA, Canada, Japan, Mexico, Brazil, Bolivia, Coast Rica, Panama, Mauritius, India, Australia, Iran, Sri Lanka, Zambia, Philippine, Israel, Chile,

Jamaica, Egypt, Cyprus, Sweden, Bangladesh and Venezuela, with varying degrees of successes and failures.

In Nigeria, commercial agricultural insurance scheme was pioneered by Niger Insurance in May 1987. The National Insurance Corporation of Nigeria (NICON) fully owned by the Federal Government and the National Cooperative Insurance Society of Nigeria (NCISN) were also known to have operated insurance schemes with agricultural implication on a limited commercial scale. Similarly, some banks such as the United Bank for Africa (UBA) and Union Bank of Nigeria which were actively involved in giving credit facilities to the agricultural sector had to raise the sum assured of life assurance of loan applicants to qualify as suitable collateral for providing loan. Agricultural Insurance Scheme (NAIS), which was formerly launched on the 15 of December 1987 was later followed by the incorporation of the Nigeria Agricultural Insurance Company (NAIC) in 1988 to implement the scheme (Aina and Omonona, 2012).

Objectives of Nigeria Agricultural Insurance Scheme

The broad objective of the Nigeria Agricultural Insurance Scheme (NAIS) is to offer protection to the farmer from the effects of natural disasters and to ensure payment of appropriate compensation sufficient to keep the farmer in business after suffering a loss.

The scheme was designed specifically to:

- a) Promote agricultural production since it would enhance greater confidence in adopting new and improved farm practices and in making greater investments in the agricultural sector of the Nigeria economy, thereby increasing the total production;
- b) Provide financial support to farmers in the event of losses arising from natural disasters;
- c) Increase the flow of agricultural credit from lending institutions to the farmers;
- d) Minimize or eliminate the need or emergency assistance provided by Government during period of agricultural disasters.

AGRICULTURAL INSURANCE PRODUCTS IN NIGERIA

Crop insurance

Crop outputs are affected by weather conditions which in many cases are unpredictable both in terms of frequency of occurrence and severity. The most serious hazards to which crops are exposed include drought, flood, wind-storms and pest infection. Others include fire, particularly in the northern part of the country. Crops in this part also exposed to fire which spread from bush fires during the

dry season. Flood and excessive rainfall ruin crops in the riverside areas seasonally. Each year, the country's farmers lose millions of naira as a result of the effect of these undesirable factors on crops. A crop insurance policy guarantees indemnity for insured losses resulting from these factors.

At the beginning of each season the insured takes a policy with sum insured as the value of expected revenue from his anticipated harvest at the end of the season. Premiums are then calculated using his expected income. In the present of a claim, the proportion of damage is estimated. At the end of the crop season, the rest of the crops are harvested and sold. Claims are then settled using the average price of the proportion sold to estimate the revenue that would have been generated from the damaged portion; this done, the premium for the year is then adjusted on the basis of the revenue from sales and the claims settled.

Crop insurance policies

“All Risk” insurance policy

The “All Risks” policy as the terminology implies is a policy that covers all risks of physical loss or damage to the crop caused by the insured perils. The most common risks to which crops are susceptible are fire, flood, wind, drought and pests. For crop insurance to be meaningful to the Nigerian farmer, it should be free from excess at least for the first ten years of its operation. Thereafter experience will tell us what excess to apply.

Harvest policy

A harvest policy will cover loss up to the value of the expected harvest. Usually the unit price of the crop is specified as a percentage of the expected yield. Unlike the “All Risks” policy where the indemnity is related to the actual loss suffered by the farmer, the harvest policy could be likened to the “agreed value” policy of marine insurance which stipulates what the insurer has agreed to pay in the event of a claim under the policy.

Credit policy

Crop credit insurance covers the amount of loan given to the farmer. The sum insured under the policy is limited to the farmer's production costs upon which the loan is based. The Credit Policy, unlike the “All Risks” Policy and Harvest Policy is ascertainable in terms of the measure of indemnity at the time the insurance is contracted. Another major distinction is that the credit policy is provided as part of a broader credit programmes in the promotion of agriculture.

A crop credit programme has as one of its goals the mitigation of the risk magnifying effect of increasing the debt/equity ratio. Therefore, a crop credit insurance must be evaluated in the context of the goals of the overall agricultural credit programme and specifically in terms of the contribution which it makes to the functioning of the credit system. Premium rates, as usual, are expected to be based on loss experience, which in the case of crops is very unstable. A reasonably accepted rate can only be arrived at if the climatic and meteorological data of the area are known over a long period of time. A multi-peril insurance policy covers the insured for unavoidable losses due to adverse weather conditions, plant diseases and pest infections, etc.

Livestock insurance policies

Livestock is primarily exposed to the risk of death caused by various types of diseases. In many cases, epidemic diseases can cause catastrophic losses from deaths of an entire stock of livestock. In 1984, millions of naira was lost as a result of rinderpest attack on cattle in Borno State, Nigeria (Epetimehin, 2010). Losses on livestock can be minimized if adequate feeding and veterinary services are available. Also, the spread of infectious diseases would be reduced if quarantines are available where infected ones can be kept away from the rest.

The problems of underwriting livestock insurance are enormous. The insured farmer has to provide satisfactory protection to his stock. The insured is expected to keep records of his cattle and present them for regular cross-checking. Such information includes owners name and address, types of breed animal's history, disease history, sex, age, weight and number and identification marks. Information about the feeding methods, breeding history and environmental conditions are also important for underwriters. Animals need plenty of water to survive and remain healthy, insurers must be satisfied that there will be adequate provision of water at all times. Acclimatization is also a very important factor in underwriting. The insurer has to be convinced that the animal can survive under the climatic conditions where it will be raised. Rating, like in crop insurance, is based on the expected revenue from the stock over a period of time. The claim settlement and adjustment premiums are carried out using the same procedure illustrated under the section on crop insurance.

Other covers

Insurance covers are necessary for the heavy machinery equipment used in the modern agricultural ventures. Tractors, trailers, ploughs and other implements used for cultivating and harvesting cost a lot of money. Farmers need insurance covers on these to meet mortgagors'

security demands as well as for the protection against public liability. It is highly probable that in the process of moving this equipment from one place to the other, a serious damage is done to public highways; covers for the risks can be taken under vehicle insurance.

A lot of agricultural ventures require the building and erection of solid structures. These include silos for cereals and warehouses for various types of crops. Conventional property insurance covers have to be taken to protect the farmer from losses incurred from damages to such structures. Public liability insurance is essential particularly in situations where farms are not isolated. Risks in this category include damages done to other farmer's crops by straying cattle of the inspired. In Nigeria, cattle are transported by road. Careless handling by the rearers can result in damages attracting claims (Epetimehin, 2010).

Personal accident and sickness policies are essential for the staff working on the farms. If a key employee is injured or falls sick, it will affect the activities of the farm resulting in a reduction in the activities of the farm resulting in reduction in the volume of products. With a personal accident insurance, the farmer can be indemnified for the cost of a temporary retention of another skilled person. As was mentioned earlier, most conventional insurance covers are applicable to a comprehensive agricultural insurance scheme. The requirement for underwriting is that the risks are those related to and restricted to the risks which the farmers are exposed.

THE RATIONALE FOR AGRICULTURAL INSURANCE

The poor in developing countries are the most exposed to and affected by natural hazards. They have limited or no access to insurance and financial services, and in most cases have to manage weather risks by their own means (Syroka and Wilcox, 2006; Pelling, 2007). This is often seen as a primary cause for what has been called the "poverty trap". In fact, poor households, being exposed to uninsured risk, tend to adopt low-risk strategies that may be economically inefficient (for instance devoting most of their land to crop varieties that promise more reliable yet lower yields). Then, when disaster strikes they often lose their productive assets and are therefore cast into a spiral of destitution, from which it is hard to escape (Syroka and Wilcox, 2006).

A growing body of evidence shows that climate change is set to increase the frequency and intensity of natural hazards. A recent UN report asserts a global increase of 87% in the number of hydro-meteorological hazards (as droughts, floods and hurricanes) in the last 20 years (UN, 2007). Old assumptions about the return period (the period of time between two climatic extreme events) and the severity of certain weather events are now unreliable. This is further eroding actual coping mechanisms and it is

raising new challenges for the reduction of social and economic impacts of natural disasters on vulnerable populations. The amplified frequency and intensity of natural disasters is recognized as one of the main factors challenging the achievement of the Millennium Development Goals, and it is also putting an increasing pressure on aid agencies, already overburdened by what has been referred to as “fatigue” in humanitarian response (Morris, 2005; Pelling, 2007; UN, 2007).

In Sub-Saharan Africa, about 140 million people live with the constant threat of droughts or floods. According to the literature, this “uncertainty” prevents poor farmers from making higher risk, higher return investments. For instance, crop diversification and buffer stock (stopping farmers from selling surplus at a market price) are often extremely costly in terms of efficiency. Then, when the rains fail to arrive, vulnerable households act fast. First strategies include selling non-productive assets or migration of family members. However if the situation does not improve, they are often forced to use more costly coping strategies, like removing children from school, reducing food consumption and health expenditures and selling productive assets (tools, livestock, etc) (Barnett et al., 2006).

According to World Food Programme (WFP), subsistence farmers tend to sell their productive assets within six weeks from the rain failure. They need cash to buy food at harvest time and they know that if they wait too long prices will fall as other farmers will also be selling their assets. By the time humanitarian aid reaches the poor, which can add an extra 8 months after the harvest has failed, they have already lost their livelihoods and therefore their ability to benefit from better weather the following year. According to the World Bank and WFP, this “delay” under ex-post emergency model, accounts for huge numbers of new destitute people after a climate-related disaster, since after losing their productive assets, they often become semi-permanent beneficiaries, trapped in a state of dependency from external aid for many years (Hess et al., 2006; Morris, 2005). This was well illustrated during the last severe drought in Ethiopia in 2002: over 1.5 million tons of food aid had been shipped to the affected areas of the country and humanitarian assistance, through food and non-food relief, prevented a disastrous famine. In Nigeria, the story is not different as floods ravaged plenty homes in many states of the country, destroying lives, properties, farmlands and rendered many homeless in the later part the year 2012. It is sad to say many indigent individuals lived in resettlement camps for months and survived only on government relief materials.

Concept of climate change and adaptation: A summary

In the longer term, climate change is a significant

statistical variation in the median state or climate variability that continues for a long period (measured in decades or longer). In other words, climate change represents a trend in the change of a climate variable, for example, the trend in temperature increase. For the purpose of international policy, UNFCCC (1992) has defined climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, in addition to natural climate variability over comparable periods”. It is worth pointing out that UNFCCC differentiates between the alteration in atmospheric composition that is attributable to natural causes and the alteration that originates from anthropogenic activities.

Natural causes of climate change

Climate change variations can be the result of natural phenomena that influence the balance of solar energy on earth. These phenomena include changes in solar radiation and changes in the interactions among different components of the climate system (e.g. changes in the composition of the atmosphere due to volcanic activity or an increase in cloud coverage). The speed of response to such phenomena is different for each component of the climate system. While the troposphere reacts in a matter of days or weeks, the ocean responds over decades, centuries or even millennia owing to its thermal capacity. The biosphere can respond either rapidly, especially to extreme events such as droughts, hurricanes or floods, or slowly, to progressive variations.

Anthropogenic causes of climate change

Since the beginning of the industrial era, human activities have generated changes to some components of the climate system. First, changes in the atmospheric composition have occurred mainly because of fossil fuel burning. Second, changes in land use (e.g. deforestation) have interfered with the balance of greenhouse gases (GHGs) between the atmosphere and the biosphere. Land-use changes have resulted in two important consequences for the present discussion: 1) an evident increase of GHG emissions; and 2) a change in vegetation and ecosystems that affects the physical and biological properties of the earth's surface, along with their speed and way of interacting with other climate system components (Robledo and Forner, 2005).

Although still subject to debate, there is consensus among many scientists that the increment of GHGs in the atmosphere (mainly carbon dioxide and methane) is the main cause of the climate changes experienced. As already indicated, the occurrence of these gases is mainly due to the burning of fossil fuels (approximately 80%) and changes in land use. However, the geographical

distribution of these causes differs for each activity, the burning of fossil fuels being greater in developed countries, while deforestation is greater in developing countries particularly the tropics.

Concept of adaptation and types of adaptation

This is defined as an adjustment by a system in response to climate stimuli. It is a process by which strategies to moderate, cope with and take advantage of the consequences of climate events are enhanced developed and implemented. There are two types of adaptation: autonomous and planned adaptation. Autonomous adaptation refers to the automatic responses that every system generates to respond to a stimulus. For example, plants react to temperature changes by increasing or decreasing their transpiration. Such responses are automatic and their purpose is that the system involved withstands the change, provided that the minimum required environmental conditions are maintained and the changes do not occur too quickly for autonomous adaptations to take place.

An illustration of this is a forest ecosystem that is affected by increments in droughts. A potential impact would be an increased risk of fire, so that any event that could trigger fire could severely damage the forest. The vulnerability of the system is determined by the impacts per se and the forest's capacity to overcome them (e.g. root structure, seed properties and so forth).

Planned adaptation

Human beings have the capacity to foresee impacts and generate responses aimed at minimizing them. The set of strategies and conscious actions to minimize impacts is called planned adaptation. Planned adaptation supplements autonomous adaptation, especially in case where the system does not have sufficient autonomous capacity to overcome an impact, or where the autonomous adaptation responses generate a cost that could be reduced.

Five main climate change related drivers: temperature, precipitation, sea level rise, atmospheric carbon dioxide content and incidence of extreme events, may affect the agriculture sector in the following ways:

- i) Reduction in crop yields agriculture productivity: There is growing evidence that in the tropics and subtropics, where crops have reached their maximum tolerance, crop yields are likely to decrease due to an increase in the temperature.
- ii) Increased incidence of pest attacks: An increase in temperature is also likely to be conducive for a proliferation of pests that are detrimental to crop production.

iii) Limit the availability of water: It is expected that the availability of water in most parts of Africa would decrease as a result of climate change. Particularly, there will be a severe down trend in the rainfall in Southern African countries and in the dry areas of countries around Mediterranean Sea.

iv) Exacerbation of drought periods: Increase in temperature and change in the climate throughout the continent are predicted to cause recurrent droughts in most of the region.

v) Reduction in soil fertility: An increase in temperature is likely to reduce soil moisture, moisture storage capacity and the quality of the soil, which are vital nutrient for agricultural crops.

vi) Low livestock productivity and high production cost: Climate change will affect livestock productivity directly by influencing the balance between heat dissipation and heat production and indirectly through its effect on the availability of feed and fodder.

AGRICULTURAL INSURANCE FOR CLIMATE CHANGE ADAPTATION

There is growing evidence that the frequency and severity of hydro-meteorological events are on the rise, partly as a result of global warming. The Fourth Assessment Report by the IPCC (2007) concludes that warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. The agricultural sector is particularly affected by more frequent and more severe adverse natural events, such as drought, floods, and windstorms, thus reinforcing the systemic component of the adverse natural events.

Insurance can potentially play an important role in climate change adaptation for households in developing countries as part of the overall climate change adaptation strategy. Market-base for insurance premiums can signal the underlying risk exposure and help farmers and governments better assess and manage the economic impact of natural disasters. They can also provide farmers with incentives to adapt to climate change (for example, by shifting from crops that are unviable in the medium term as a result of climate change). However, any premium subsidy program that distorts the risk-based premiums may send the wrong economic incentives to farmers and impede, or at least delay, adaptation strategies.

In the case of drought, risk financing arrangements like insurance offer farmers a valuable opportunity to finance their losses, but they can perpetuate farmers' heavy dependence on rainfall. New financing products should provide an incentive to permanently switch to alternative, more sustainable, agricultural and economic practices, such as less water-intensive crops (particularly high-value

cash crops), livestock, or some agro-processing activities. Drought adaptation insurance could provide coverage against risks caused by a shift from nonviable farming to viable (agricultural and non-agricultural) businesses. This insurance product would protect farmers against new sources of risks resulting from a change to farming practices that are more drought resilient and less water intensive. Drought adaptation credit could provide initial capital to shift to a long-term viable business. In the event of an unexpected loss caused by a failure in the adaptation investment, repayments could be postponed or (partially) forgiven. These financial arrangements for drought adaptation would try to induce farmers to shift away from farming practices that are known to be unviable in the long term because of global climate change. The programs have helped farmers shift from non-viable crops to livestock and designed livestock insurance policy for small ruminants in these communities.

Modernizing the agricultural sector

Agricultural insurance can be an important tool for spurring rural economic development and the modernization of the agricultural sector, because it helps transfer excessive agricultural risks to a third party. This may be an important motivating factor for providing insurance in developing countries.

Increasing access to credit

The limited access to credit makes agricultural households particularly vulnerable to unexpected income shocks, such as adverse weather. They often reduce their income risk by diversifying and choosing low-risk activities or technology, which usually have low average returns. Access to credit is severely restricted for a large part of the rural population, mainly because banks do not think that the economic and financial preconditions are met to expand their portfolio of agricultural loans. The main constraints include low population density and small average loans, which increase the transactions costs of financial intermediation, making it difficult for formal financial institutions to operate on a commercially viable basis.

Collateral requirements to minimize risk exposure by formal financial institutions can further hamper access to formal financial services. Most traditional lenders require land and buildings as collateral. Small farmers often lack assets that can be collateralized, or the value of their assets is substantially reduced by legal difficulties (such as lack of formal property titles). Microfinance, which provides access to credit without formal collateral, has opened access to loans for millions of poor people, but it has not reached most agricultural activities (World Bank,

2008).

Agricultural insurance can facilitate access to credit, because it increases the credit worthiness 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.

In many developing countries, rural banks retain credit risk (partly caused by adverse natural events) on their books, acting de facto as insurers of last resort. These banking institutions are usually not equipped to retain these production risks, which can affect the viability of their overall ending activities. Agricultural insurance can assist governments in transferring these agricultural risks to third parties, such as insurance companies.

Facilitating the adoption of higher-yielding activities

Agricultural insurance can help farmers and herders invest in more profitable but sometimes riskier activities. Poor farmers in developing countries tend to adopt safety-first behavior, basing their production decisions on a survival strategy that minimizes the likelihood that their revenue will fall below a certain level (De Janvry et al., 1991). Agricultural insurance can help farmers invest in more profitable activities, because insurance contributes to the transfer of excess risk to a third party. Governments may want to promote this risk-transfer instrument as part of their overall policy on the modernization of agriculture. In the context of climate change, insurance can also facilitate the adoption of adaptation activities. In India, for example, farmers in Andhra Pradesh were encouraged to shift from rainfed crops to livestock as a way to better mitigate the impact of recurrent droughts on their livelihood, and a livestock insurance policy was especially designed for those farmers (World Bank, 2006).

Improving the management of post disaster assistance programs

By their very nature, post disaster assistance programs are unplanned and can expose the government to open-ended fiscal responsibility. Agricultural insurance programs can help governments better manage the budgetary impact of ad hoc assistance programs. Doing so is particularly relevant in developing countries, where any intervention in the agricultural sector can have a major impact on the government budget (World Bank,

2007). In India, for example, the post disaster financing of insured crop yield losses creates significant delays (of several months) in the claims settlement process. Agricultural insurance and related agricultural risk assessment techniques can allow the governments to better plan for probable major losses and secure immediate liquidity in the aftermath of a disaster.

However, with Agricultural Insurance, farmers can be saved from losses or damage to crops and livestock or the effect of which can be minimized. Crop insurance in developing countries can thus:

- a) Cushion the shock of disastrous crop losses in bad year.
- b) Help to ensure a considerable measure of security in farm income over the years and this contribute to the stability of the agriculture and in turn the general economy.
- c) Improve the position of farmers in relation to agricultural credit.
- d) Strengthen the position of the agricultural cooperative societies as a result of the strengthening of the economic position of the farmers the credit institution can thus be more liberal in providing the much needed credit to the farmers, accepting crop insurance contracts as collateral.
- e) Give the farmers greater confidence in adopting new and improved farming practice and in making greater investment in agriculture for improving crop yield and increasing agricultural production.
- f) Help to replace sporadic and haphazard grant and relief operations which government in developing countries are frequently called upon to undertake in emergencies by a pre-planned and actuarially calculated system of compensation awards under which the parties concerned government and farmers generally know in advance their respective liabilities and the farmers in particular known the extent of protection available in case of unavoidable losses of their crops.

Agricultural insurance therefore is a necessary part of the institutional infrastructure essential for the development of agriculture which is basically a high risk enterprise. Based on the aforementioned roles, agriculture insurance could be a panacea to alleviate some of the problem militating against agricultural production in Nigeria.

The implications for extension practices

Information

Information plays a key role in insurance provision. Reliable estimate of the frequency of natural hazards and the damage caused are essential for accurately assessing and pricing risks. For example, flood insurance has not been widely available in Africa until recently in part because flood maps and elevation modeling were

not available to a sufficient degree of accuracy. In addition, storm surge and coastal erosion are excluded from most insurance policies because the localized impacts are not understood well enough. Improvements in the quality, extent or availability of information can make insurers more willing to provide cover. By reducing uncertainty, this can lower the cost of doing so. Reliable information, provided in a suitable form, can also facilitate good risk management and adaptation decisions by households and businesses. For example, households that are aware of their exposure to particular risks can make decisions about where they live, how they prepare for (or adapt to) hazards and which insurance products they purchase.

Insurance education

Encouraging education and training in insurance is the dimension of effort for enhancing insurance awareness. This can take several forms. Essays and debating competitions on insurance topics have been organized in schools and colleges in many countries. These are, however, usually held in the cities and similar efforts need to be made in the semi-urban and rural areas. Students in remote areas are often more receptive to new ideas and their response is likely to be genuine. Insurance has been included as a subject in many universities and schools. The insurance sector can support such moves by lending its personnel to give lectures. Agricultural insurance is a new area compared to other lines of business, and information and knowledge of its various aspects have to be built up. To start with, institutional arrangements should be made for sharing models of product design. Cross fertilization of ideas would take place, and this will go a long way towards removing the fear of the unknown that today surrounds the business. Creation of a data bank may be considered where information about models developed by various markets, difficulties encountered and experience gained, and basic statistics are compiled.

CONCLUSION

Insurance and other risk transfer solutions can be part of a systematic adaptation approach and can enable vulnerable countries to better manage the new climate risks. Insurance can provide financial security against the economic impacts of extreme climate events and may for some climate change perils, be more cost effective than certain prevention measures. The combination of risk transfer and prevention adaptation measures is a subjective change that depends on policy preferences, investment choices and opportunity costs. There are three mechanisms by which insurance can be an important component of adaption. The first is by directly

transferring the risks away from the vulnerable allowing people to use insurance payouts to recover from shocks and maintain their livelihoods. The second by allowing them to take productive risks (e.g. to take or make a loan, to invest in their own productive capacity and to develop economically). The poor are almost always the most exposed to climate impacts. They are more likely to escape poverty if they are able to better protect themselves. The third mechanism is through the signals provided by insurance pricing insurance sets a price tag on risks. If certain activities become riskier under a changing climate the insurance price will rise to reflect this risk. The price increase can incentivize change to less risky activities and to more comprehensive risk management strategies.

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