ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

Final Report
ARCP2014-08CMY-Prabhakar

Assessing community risk insurance initiatives and identifying enabling policy and institutional factors for maximizing climate change adaptation and disaster risk reduction benefits of risk insurance

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Table of Content

Tables

Figures

Boxes

Equations

Project Overview

Project Duration	:	Jan 2014-Jan 2017
Funding Awarded	:	US$ 40,000 for Year 1; US$ 36,000 for Year 2
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Project Summary

Several risk insurance initiatives have been implemented at grassroots level over the years for reducing the vulnerability of communities to natural disasters. Despite these efforts, the penetration of risk insurance in the developing Asia Pacific is poor compared to many developed countries in the region due to several barriers that this sector is facing. Keeping this in view, this project aimed to assess the benefits accrued through community level risk insurance experiences in the region, evaluate barriers limiting its penetration, and identify interventions for greater risk insurance penetration leading to climate change adaptation and disaster risk reduction.

Keywords: Risk insurance, disaster risk reduction, climate change adaptation, agriculture, community, costs and benefits

Project outputs and outcomes

Outputs	Outcomes
Assessed the barriers to scaling up the risk insurance	As a result of the study, the project was able to sensitize policy makers to address the barriers to promotion of risk insurance through presentations in policy relevant forums organized under the project and various other events including ISAP, Adaptation Forum, SEADPRI Forum and policy workshops organized by various other policy relevant agencies. The inputs provided by the project "much appreciated by the National Disaster Management Agency Malaysia, which is now taken the agenda forward in Malaysia"
Identified and assessed the benefits and costs associated with risk insurance	As a result of the study, the project was able to sensitize policy makers to address the barriers to promotion of risk insurance through presentations in policy relevant forums organized under the project and various other events including ISAP, Adaptation Forum, SEADPRI Forum and policy workshops organized by various other policy relevant agencies. The inputs provided by the project "much appreciated by the National Disaster Management Agency Malaysia, which is now taken the agenda forward in Malaysia"

Key facts/figures

- The project has trained 8 young researchers who are early into the research career which enabled them to understand the subject of risk insurance and provide intellectual contribution to the project.
- The project has sensitized more than 100 professionals, policy makers and researchers on the subject of climate change adaptation and disaster risk reduction effectiveness of risk insurance through participation in the project-organized workshops and presentations in various conferences, seminars and forum.
- The project has quantified the cost-benefit ratio of risk insurance. In cast of India, it was found to be 0.492 while in Philippines it was 1.49 for insured farms and 1.31 for uninsured ones. These results suggest that in the case where catastrophic events occurred annually, rice production without crop insurance is still financially profitable as can be seen from NPV greater than zero and BCR greater than 1. Availing of crop insurance will increase the financial profitability of rice production since farmers with insurance have higher NPV and BCR compared with farmers without insurance.
- With catastrophic events occurring 60% probability (6 out of 10 years), the NPV of insured farms have reduced to PhP 72,956 per ha and the BCR to 1.32. Nonetheless, these are still higher than uninsured farms with NPV of PhP 62,925 per ha and BCR of 1.31. Overall, it is still financially attractive to avail of crop insurance since premium paid in present value terms is also relatively smaller than the payout received by the farmers.
- The highest BCR was found in Malaysia where the flood insurance can have as much as 9.57 BCR based on a single year flood loss and insurance premium paid.
- In case of Japan, the benefit-cost ratio of being insured can range between 1.3 to 2.1 depending on the area insured and the number of years of premium paid before loss was incurred due to natural disasters.

Potential for further work

The project has helped identifying the major berries in scaling up the risk insurance in the Asia Pacific region which include the aspects related to cost of insurance, limited progress in risk mitigation, limited risk awareness among the communities, policy makers and lack of enabling conditions for the public-private partnerships and inability of insurance to recognize and address non-economic losses and damages associated with natural disasters. One potential area for making risk insurance affordable and penetrate vulnerable locations is to link insurance with other market based approaches such as payment of ecosystem services (PES) which are emerging as a means of recognizing the importance of ecosystem services and their preservation. Such a linkage will complement both the market mechanisms and will most importantly take care of the limitations with the current insurance approaches. The PES approaches have already accumulated methodologies and experiences to value non-economic aspects of ecosystems those can be readily ported to design and implement risk insurance to value the non-economic losses and damages. In addition, such a combination will reduce the insurance premium costs due to cross-subsidization that happens in a PES framework, and increases the demand for PES in return. Other areas where the study findings of this project can be applied are in designing the cost-effective insurance measures for the poorest and vulnerable, to raise awareness of policy makers and insurance service providers in creating innovative insurance products and in influencing policy makers to invest in risk mitigation.

Publications (26 major outputs)

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Pull quote

"We found the project to be invaluable to start the conversation on the need for insurance at the national level. This is much appreciated by the National Disaster Management Agency Malaysia, which is now taken the agenda forward in Malaysia."

Prof Joy J. Pereira, SEADPRI, Malaysia

"The project helped generate discussion and debate amongst the farming community in relation to the benefits of MPCI. Whilst Australian farmers are modifying their farming practices to increase their climate resilience many farming businesses face significant financial risks associated with high debt levels as a result of prolonged drought or farm land expansion. The project helped demonstrate the merits of MPCI in terms of helping farmers to manage risk in a commercially driven agricultural environment."

Dr Jay Cummins, Director, IAFD, Australia

Acknowledgments

We gratefully acknowledge several searchers, government officials, Non-governmental organizations and community members who participated in this project directly and indirectly by providing valuable time, experiences, and expertise including being part of the surveys, consultations and forum conducted in this project.

1. Introduction

The Asia-Pacific region is one of the most vulnerable regions to a range of primary hydro-meteorological and geological natural hazards such as earthquakes, storms, floods, tsunamis, landslides, and droughts. The Emergency Events Database (EM-DAT) of the Center for Research on the Epidemiology of Disasters (CRED) suggests that the number of hydro-meteorological disasters during 2000-2009 was 10 times more than the number of disasters reported during 1947-1956. In the Asia-Pacific region, hydro-meteorological disasters claimed the lives of 0.22 million people with estimated total economic damage costs of US$ 285 million during 2001 – 2012 (Prabhakar et al., 2013b). An increase in the number of catastrophic disasters and related insured and uninsured losses has been reported. These disasters are undermining the developmental gains across the Asia-Pacific region and indeed the world.

The region's relatively high vulnerability to natural hazards is due to a range of geophysical, socioeconomic and developmental conditions, which include long coastlines, a highly variable monsoon system, high volcanic and tectonic activity, high poverty both within and outside of urban areas, high population densities associated with rapid urbanization, poorly planned urban development, absence of proper disaster risk reduction (DRR) mechanisms and institutional/regulatory frameworks including the existence and enforcement of structural standards such as building and land-use planning regulations, as well as the poor development of risk spreading instruments such as insurance.

In this context of high vulnerability, insurance has been suggested as an important risk management tool at all levels as it: a) promotes emphasis on risk mitigation compared to the current response-driven mechanisms, b) provides a cost-effective way of coping with the financial impacts of climate- and weather-induced hazards, c) supports climate change adaptation (CCA) by covering the residual risks which are not covered by other risk reduction mechanisms such as building regulations, land-use planning and disaster risk management plans, d) stabilizes rural incomes and hence reduces adverse effects of negative shocks on income and socio-economic development, e) provides opportunities for public-private partnerships, f) reduces the burden on government resources for post-disaster relief and reconstruction, g) helps communities and individuals to quickly renew and restore their livelihood activity, and h) addresses a wide variety of risks emanating from climatic and non-climatic origin, depending on the way the insurance products are designed (Prabhakar et al., 2013a).

Both life and non-life insurance play an important role in DRR. However, life insurance is more prevalent than non-life insurance in terms of the volume of insurance premiums, and this is especially so in the formal sector. In terms of climate change, among all the forms of insurance, insurance that covers the loss of livelihoods (e.g. agriculture insurance) is amongst the most important, yet its issuance is limited in the region. Though there are several policy and institutional initiatives to promote insurance in the Asia-Pacific region, the region has not been able to utilize the full potential of insurance. The problems facing insurance include poor internalization of insurance benefits, high insurance costs, poor access and availability of weather data, poor risk mitigation, lack of enabling policies, imperfect information, and technical complexity. A deeper problem is the lack of clear assessment and understanding of insurance benefits and costs in terms of DRR, CCA and SD among the stakeholders engaged in insurance policy making and delivery.

Traditional understanding of insurance effectiveness revolves around delivery of the contractual obligations, i.e. payouts as agreed in the contract. Insurance effectiveness is thus mainly assessed based on the number of people insured, avoidance of moral hazards and adverse selection, as well as minimization of basis risk (Figure 1). However, these indicators provide an inadequate and even misleading understanding of insurance effectiveness (Prabhakar, 2014a; Prabhakar, 2014b).

Traditionally, the insured are often not required to invest payouts in better risk mitigation practices. As a result, every disaster and the resulted payouts can perpetuate the risk. From this basic observation, it is clear that the assessment of insurance effectiveness in the contexts of DRR and CCA requires consideration of appropriate indicators.

There is a need to change from a cycle of risk perpetuation to a cycle of risk reduction. The design of insurance and the payouts from insurance should promote long-term reduction of vulnerability to threats to provide DRR and CCA benefits (Prabhakar, 2014a; Prabhakar, 2014b). As depicted in Figure 2, long-term risk reduction could be included as an insurance design criterion, with the insured required to invest payouts in risk mitigation practices after every payout. In this way, payouts would lead to risk mitigation rather than business-as-usual practices, resulting in net risk reduction. Payouts would no longer encourage high risk profit seeking behavior. However, this could only happen if a proper risk price signal is conveyed to the insured. The price of insurance is often heavily subsidized in most developing and developed countries; subsidies range between a producer loss ratio of 75% in Pakistan, China and Japan to as much as 350% in India (Food and Agriculture Organization of the United Nations, 2011). Subsidized premiums will not convey the real price signal leading to continuation of existing practices with no net reduction in risk. Most of these issues are linked to the insurance design and support services (e.g. education on risk management) for insurance buyers (Prabhakar, 2014b).

Figure 3 shows how conventional insurance may not lead to CCA outcomes (based on Prabhakar, 2014b). In a situation of repeated droughts and high vulnerability, the wellbeing of communities will be drastically impacted (image on left). Even though they may be able to recover to a certain extent after each drought, wellbeing will decline over the long-term. In a scenario where traditional insurance operates, with all its design and implementation limitations discussed in this report, the recovery from the disaster will be faster and the communities may be able to recover their pre-disaster level of wellbeing. This could be described as a situation of resilience (center image). The time taken to return to the earlier condition depends on the extent of damage covered by the insurance, the perils covered and how soon the payouts are made. In an adaptation situation (right image), communities are better able to deal with shocks while maintaining their adaptive capacity, leading to a long-term rise in their wellbeing. There is a need for the discussion on insurance effectiveness moves towards the adaptation scenario.

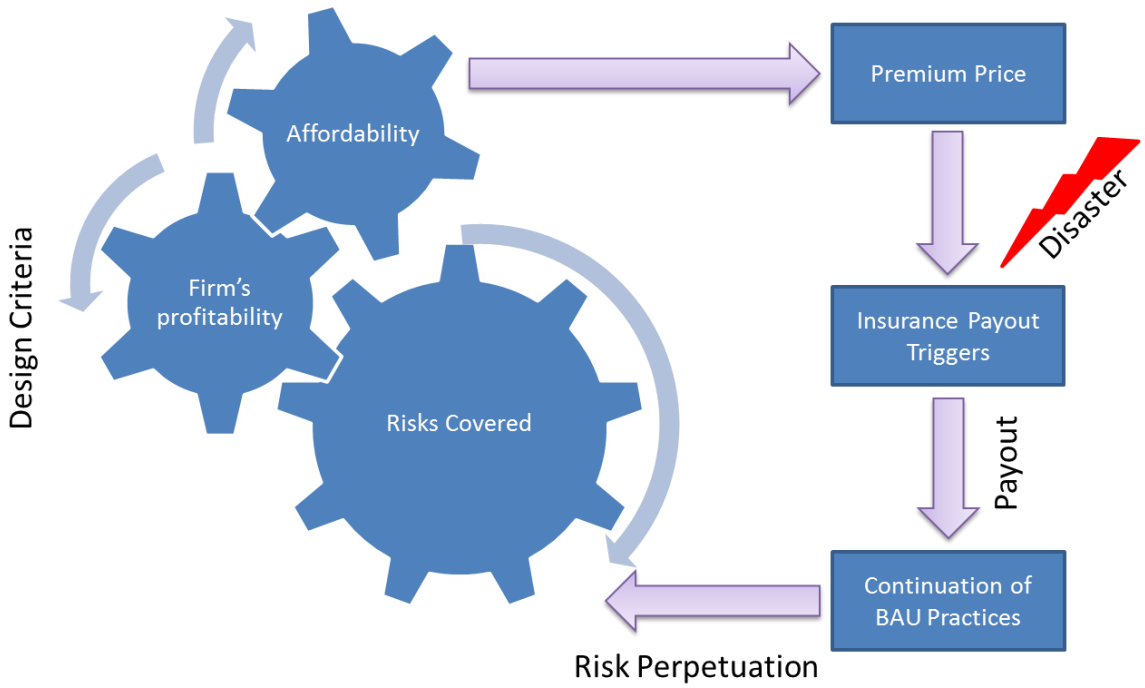


Figure 1. Traditional notion of insurance effectiveness leading to risk perpetuation

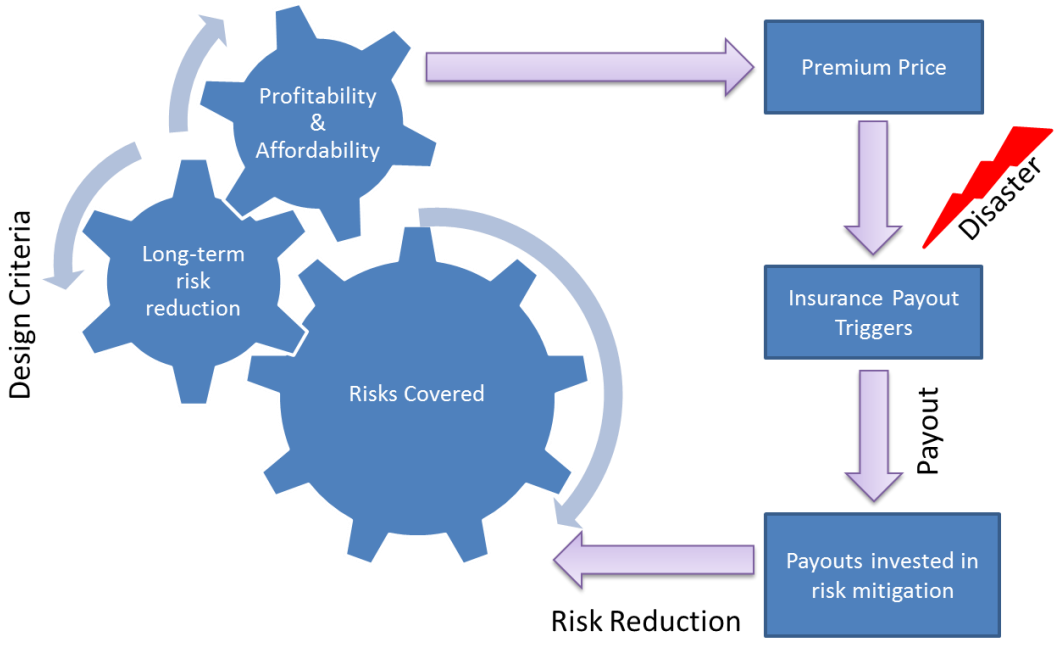


Figure 2. Insurance leading to risk reduction cycle

Source: Based on Prabhakar, 2014a

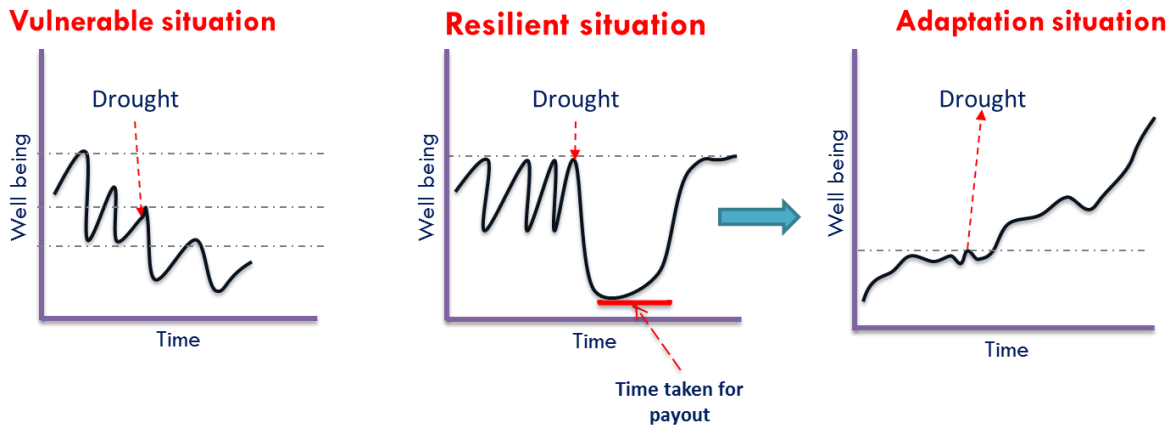


Figure 3. Moving from resilience to adaptation

Source: Based on Prabhakar, 2014b

Despite the 'commonly assumed' benefits of insurance, the evidence of insurance effectiveness in terms of long-term DRR and CCA outcomes is limited. Furthermore, the potential of insurance to benefit the most vulnerable groups has not been adequately explored.

Insurance accessibility is a problem for poor farmers and vulnerable groups in general. The barriers to increasing accessibility are associated with the lack of an enabling environment, access to information, growth of inclusive markets, as well as coverage and inclusion. The barriers and some proposed ways forward are listed in Table 1.

Table 1. Barriers that hinder insurance as a usable tool for the most vulnerable groups and possible ways forward

Features	Barriers	Way Forward
Culture of risk management	• Avoidance of catastrophic losses • Low awareness of risk • Lack of information on temporal aspects of risk • Knowledge gaps on acceptable levels of risk and thresholds	• Creation of incentives to promote positive and collective risk management behavior • Integration of risk management into public education programs • Protection against climate-related risks through prevention and risk reduction measures • Identification of context specific acceptable levels of risk and thresholds
Access to information	• Lack of decision support tools • Lack of data	• Identify needs and bridge current gaps • Increase availability of data on weather and climate extremes • Develop index based products

Features	Barriers	Way Forward
Growth of inclusive markets	• Lack of technical support and information on social safety nets • Poor integration of social aspects and non-economic values • Use of subsidies unexplored • Poorly structured incentive systems • Levels of capitalization not quantified	• Development of social safety nets as a complement or alternate to insurance • Develop comprehensive risk management approaches that integrate social aspects and non-economic values • Investigate appropriate use of subsidies • Establish context specific structuring of incentives linked to insurance • Identify adequate levels of capitalization for sustainability
Coverage and inclusion	• Vulnerable groups are not specifically targeted • Unclear roles of public and private sectors • Lack of stakeholder interaction • Weak governance systems	• Re-think the concept of insurance to include the very poor farmers into the value chain • Delineate roles of the public and private sector in climate risk insurance • Bring stakeholders together to identify perceived and existing gaps in the insurance industry, create enabling frameworks and bridge knowledge gaps in designing appropriate regulations • Innovate and create accountable and fair insurance approaches

Source: Based on the project consultations

To address this gap, the Asia-Pacific Network for Global Change Research (APN) is funding the project “Assessing community risk insurance initiatives and identifying enabling policy and institutional factors for maximizing CCA and DRR benefits of risk insurance” led by the Institute for Global Environmental Strategies (IGES), Japan. The objectives of the project are given below.

Objectives of the project

Objective 1: To identify technical, socio-economic, institutional and policy barriers limiting penetration of risk insurance: What insurance alternatives can be designed for locations with poor weather data?

Objective 2: To assess climate change adaptation and disaster risk reduction benefits and costs accrued through risk insurance initiatives: What benefits of risk insurance help it to scale up?

Objective 3: To identify enabling environment to scale up risk insurance: What policy and institutional processes can help scaling up risk insurance?

Objective 4: To sensitize policy makers and other stakeholders about scaling up the risk insurance

These objectives are relevant to the APN research area 'climate change and variability' as it addresses the adaptation concerns through risk insurance. This research identifies solutions to issues like poor availability or access to available weather information, identifying alternative innovative risk insurance products where weather information is not available, and exchanging research outcomes through forums such as APAN and IGES ISAP. This research is consistent with the CCAFS project of the CG-alliance as it investigates index-based crop insurance which plays an important role in climate related risk reduction in agriculture sector.

2. Methodology

In order to achieve the study objectives stated in the previous section, the project team has devised a multi-country case study based methodology that looks into country-specific circumstances of risk insurance and assess the benefits and costs of risk insurance and stakeholder perspectives on the same. The Figure 4 shows the flow of steps involved in the project. This methodology helped the team to assess the barriers to insurance, mainly through stakeholder perception surveys and consultations and assess the costs and benefits of risk insurance mainly through the household surveys of the insured and uninsured for comparison purposes.

Regional consultation workshop: As a part of the methodology employed by the project, a workshop comprising experts from the insurance sector, researchers and practitioners was held on 4-5 July 2014 in Bangi, Malaysia, to review evidence and assess effectiveness of insurance for DRR and CCA.

Household and stakeholder surveys: Household and stakeholder surveys were carried out in the project countries to assess the stakeholder perspectives, costs and benefits associated with the risk insurance. For this purpose, agriculture insurance was chosen as a form of insurance that is targeted at the predominant livelihood of the people in the project countries. Household surveys and consultations were conducted using the methods such as focused group discussions, structured questionnaire surveys, and small farmer group workshops.

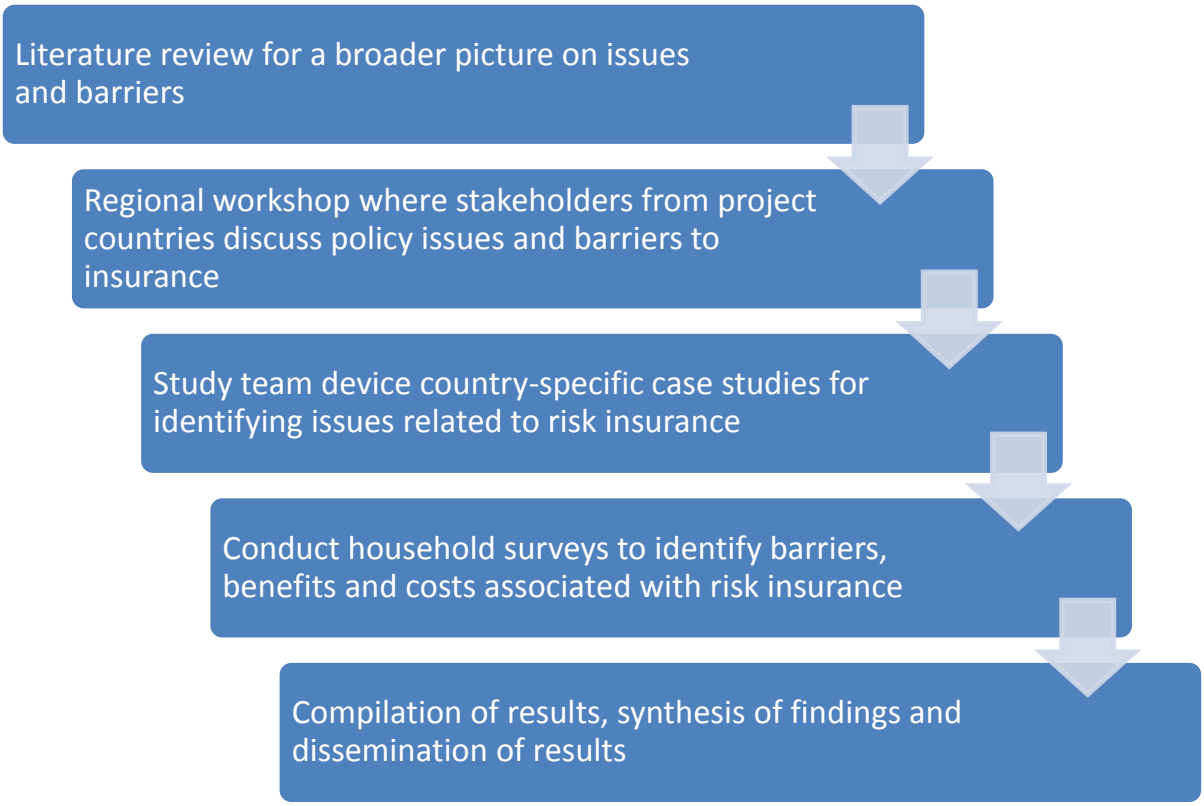


Figure 4. Steps involved in identifying the barriers, costs and benefits associated with risk insurance.

Detailed structured questionnaire surveys were implemented at the community level to understand needs and perception issues to be considered for formulating effective insurance programs at local level. The structured questionnaires consisted of questions on the demographic background of the respondent, the past crop loss experience, opinion on the crop insurance currently enrolled (in case of insured) and on the available insurance options (in case of non-insured and in Malaysia where there is no crop insurance in place).

A generic questionnaire was developed based on the literature review (Prabhakar et al., 2013a) and expert consultations by the authors. This questionnaire was further modified before implementing the survey by the respective country partners taking into consideration the individual country contexts. For example, the questionnaire surveys in Philippines was targeted to obtain opinions on the ongoing crop insurance programs while in Malaysia the survey was targeted at the house insurance program being implemented against floods. The questions slightly differed for both beneficiary and non-beneficiary categories where the emphasis for the beneficiary category was to obtain insights on their insurance experience while the non-beneficiary was to know barriers in enrolling into an insurance program and what they think about the value of insurance. The questionnaires also obtained a comparison of advantages between traditional crop loss compensation (relief) schemes and insurance. The elicited responses were analysed for specific preferences among communities for certain form of risk reduction based on self-evaluation of their experience in crop insurance and presented as % of responses.

2.1. Assessing the costs and benefits of insurance

For the study, the Cost-Benefit Analysis (CBA) method was used to compare the costs and benefits of crop insurance. It involved identifying the impacts of crop insurance on households, classifying these impacts into costs and benefits, and identifying and quantifying the economically relevant impacts. The utility of using the CBA methodology goes beyond a comparison of costs and benefits, the CBA is instrumental in evaluating alternative risk management strategies. CBA is a major decision support tool that is used by governments to organize and understand the socio economic costs and benefits and inherent trade-offs of public policy programs and projects (Mechler, 2016). Recently CBA's have come to the forefront notably for the appraisal of efficiency of disaster management projects, development projects and public interventions (Mechler, 2016). Overall CBA's can provide valuable information that go beyond the rhetoric and help in selection of contextual and best-suited interventions. CBA has limitations that have been recognized, some of the commonly recognized shortcomings in utilizing the CBA methodology are: (1) limitations of non-market goods including ecosystem services (2) Valuation of intangible goods (3) Lack of incorporation of uncertainty and risks in valuation (4) Spatial and temporal variability of risks. A study by Shreve and Kelman which compiled and compared CBA based methods for evaluating DRR strategies detailed key shortcomings in using CBA to evaluate DRR impacts in studies including, a lack of sensitivity analysis, a lack of consideration of future climate change impacts and temporal characteristics of benefits and dis benefits (Shreve & Kelman, 2014). Many of the costs and benefits from an intervention can be of intangible and indirect nature this presents a challenge to monetize and attribute for the purpose of inclusion in CBA, and while there are established techniques for valuation of certain intangible benefits such as labor benefits such as social cohesion is important for CBA's remain a challenge to valuate and quantify. However, CBA still presents an efficient methodology to compare the net benefits of various approaches to risk management.

In order to systematically analyse costs and benefits of agricultural insurance as a risk management strategy we follow a systematic procedure which included 1) Assessment of physical risks associated with cropping in the region and the resulting economic loss to farmers: Reasons for crop loss, frequency of crop loss and crop loss amounts, 2) Evaluation of the costs associated with using agricultural insurance as a risk management technique and 3) Evaluation of the benefits associated with crop insurance.

In this study we used the 'Comparative' approach, the study involves measuring the costs and benefits of agricultural insurance by comparing a group of insured farmers to a group of uninsured farmers with similar characteristics from the same village this case study has elements of ex-post and ex-ante. The study focuses on the micro level impacts of agricultural insurance. The Micro level impacts are defined as those that occur within households that have taken up insurance. The study identifies both qualitative and quantitative primary and secondary impacts. The data collection was done in two phases. In phase 1, the indicators for costs and benefits were developed using experts' opinions. In phase 2, the identified indicators were used in the questionnaires development.

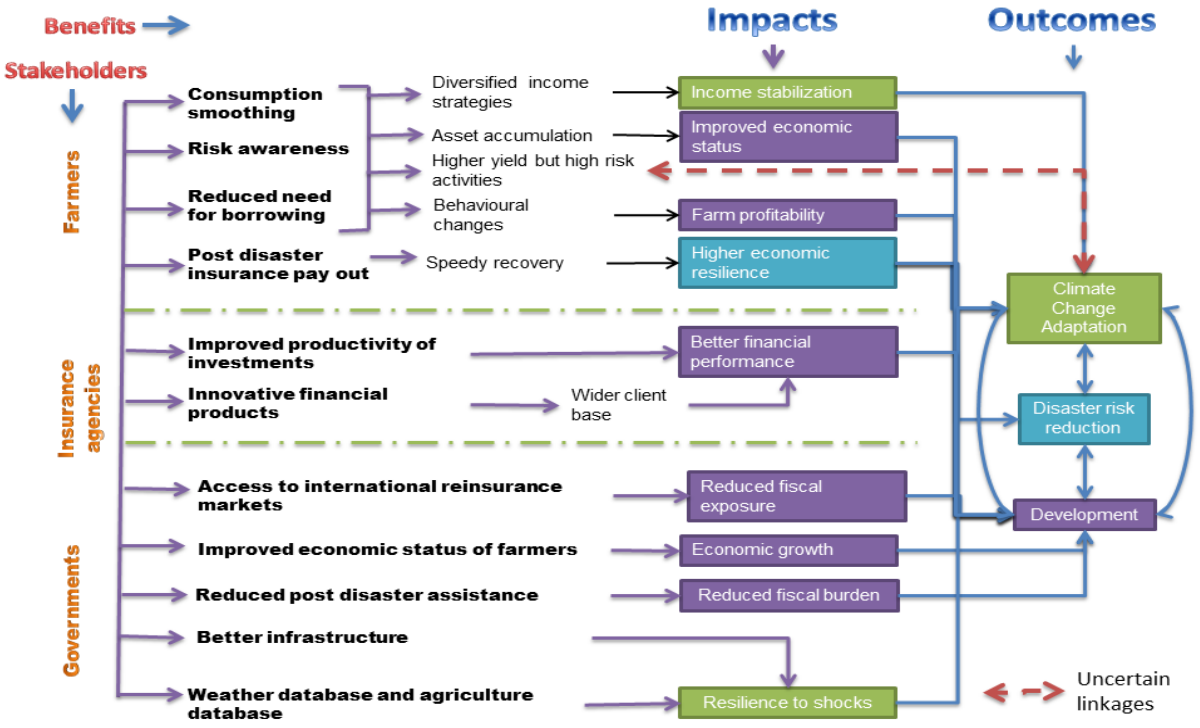
2.1.1 India

In India, the study was conducted in the Khammam and Warangal districts in Telanganna. 58 surveys to assess the cost and benefits associated with agricultural insurance were conducted in two villages, Perumala Sankeesa and Rajolu (See Table 2). Random sampling

was used to select farmer for the survey. The indicator framework used for assessing the costs and benefits of risk insurance are provide in Figures 5 and 6.

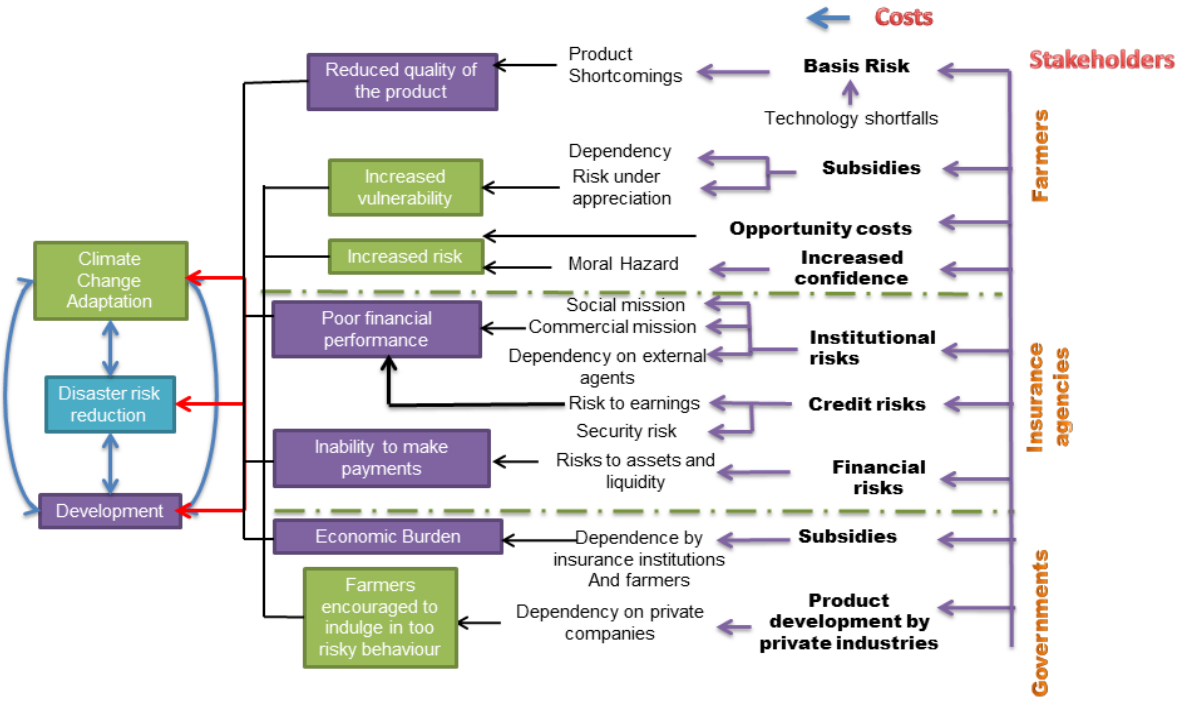
Table 2. Demographic characteristics of survey sample in India case study

	Education						Landholding size		
	Male	Female	Illiterate	Upto 10th	10+2	Degree	Small	Medium	large
Insured	14	13	3	23	5	2	8	4	15
Uninsured	15	15	6	23			10	7	12



Source: Authors

Figure 5. Climate change adaptation and disaster risk reduction benefits associated with risk insurance



Source: Authors

Figure 6. Climate change adaptation and disaster risk reduction costs associated with risk insurance

2.1.2 Malaysia

In Malaysia, the data was collected through interview and survey. The respondents are households in Kemaman, a district in Terengganu. Trengganu is divided into 7 districts and Kemaman is the 3rd largest district by land area. Kemaman is divided into 17 sub-districts (UPEN, 2011). Malays were the majority ethnic group with a total of 157,849, while 7034 were Chinese, 744 were Indian, 984 were from other ethnic groups, and 4960 are non-citizen. Kemaman is the second highest populated area after Kuala Terengganu.

In year 2013, Kemaman was affected by a severe flood. Since then flood has occurred every year with less severity. Table 3 records the number of families who were affected by flood from year 2014 to 2017 according to the political districts. Kemaman has been active in disaster risk reduction efforts and it is the only district in Malaysia that provide cash incentive to households who purchased Kampungku Policy.

Table 3. Number of families affected by flood in Kemaman

	Flood Seasons		
Political Districts	Flood in 2014/2015	Flood in 2015/2016	Flood in 2016/2017
DUN Air Putih	2494	477	Not available
DUN Chukai	3178	0	0
DUN Kijal	18	127	Not available
DUN Kemasik	20	0	Not available
Total	5710	604	245

According to the district office, DUN Air Putih and DUN Chukai are considered as high risks area ie more prone to flood, while DUN Kijal and DUN Kemasik are low risks. Both DUN Air Putih and DUN Chukai are located nearby Kemaman River. During the flood season 2016/2017, the flood occurred five times and the flood evacuation centres were in operations for a total of 15 days. The number of families affected shows that the severity of flood are decreasing in Kemaman.

Purposive random sampling method was employed to select the respondents (See Table 4). Two housing estates were chosen i.e. bricked houses (DUN Air Putih) and wooden houses (DUN Kijal). Then 30 questionnaires were distributed to households from each villages. Table 4 records the flood occurrence in the selected villages from year 2014. Bandar Baru Bukit Mentok is the housing estate with bricked houses and Kampung Padang Kemunting is the housing estate with wooden houses.

Table 4. Sample data selection in Malaysian case study

Selected Villages	Flood in 2014/2015	Flood in 2015/2016	Flood in 2016/2017	Kampungku Subscriptions
Bandar Baru Bukit Mentok (DUN Air Putih)	Yes	No	No	540
Kampung Padang Kemunting (DUN Kijal)	Yes	Yes	Yes	57

The indicators for costs and benefits of insurance are derived from literature reviews and confirmed by experts from academic and insurance industry. The indicators for measuring cost and benefits of flood insurance and the proxy for measurement are listed in Table 5. The benefits of having flood insurance coverage includes the cost of not having insurance.

Table 5. Indicators and proxy for measuring the cost and benefits of insurance to community

Indicators	Proxy
COST	
Premium	Annual premium
Moral Hazard	Average amount of compensation used for other than replacing/repairing damage property
BENEFITS	
Insurance pay-out	Average amount of insurance compensation received
Restoration of damaged houses / reduced stress	Average amount of money spent on repairs [with – without insurance]
Increase awareness on pre-cautionary measures	Average amount spent on house upgrades to reduce future losses [with – without insurance]
Less Financial Shock	Amount of money adjustment to be made for health, food and education within 6 months after flood occurrence [without insurance – with insurance]
Opportunity cost of borrowing	Interest charges from borrowing

For this study, the costs and benefits estimation are based on flood incidents from 2013/2014 until 2015/2016. The value is estimated on the basis of annual average cost/benefits per household. In particular, the analysis of the cost and benefits of insurance is problematic due to the fact respondents are unable to estimate the value. The responses to the amount of damages incurred and the amount of compensation used for other than repairing/replacing the damaged property were subjective and were therefore susceptible to recall bias.

2.1.3 Philippines

In Philippines, the data was gathered through a household survey involving 137 insured rice crop farmers and 426 uninsured farmers giving a total of 563 respondents. It was complemented with focus group discussions (FGDs), field observations and photo documentations. For the household survey, the number of respondents was computed following the formula given in Equation no.1. It employed stratified random sampling with proportional allocation in order to determine the sample size per municipality and to achieve greater number of representatives in the population sample.

Equation 1: Survey sample size calculation

$$n = (NZ^pq)/([N-1)(ME)]^2+Z2pq)$$

where: N = is the population size

Z = abscissa of the normal curve that cuts off an area of α at the tails (1.96)

p= estimated proportion of units in class that has been agreed on 0.5

q= (1-p) – 0.5

ME is the desired limits of error (in percentage)

Four indicators were used in assessing the level of effectiveness of the government-supported agricultural insurance which is anchored on the principal mandate of the Philippine Crop Insurance Corporation (PCIC) which is to provide insurance protection to farmers against losses arising from natural calamities, plant diseases and pest infestation (Table 6). These indicators are: 1) insured farmers receiving the insurance claims; 2) timeliness of insurance payout; 3) if the amount of insurance payout is commensurate with the losses incurred; and 4) if the insurance payout helped in the recovery of the insured farmers.

Table 6. Effectiveness indicators and its corresponding scale values

	Effectiveness Indicators			
Numeric value	Received insurance claim	Timeliness	Amount commensurate with the incurred losses	Insurance payout helpful in farmers' recovery
0.00-0.25	Not effective	Not effective	Not effective	Not effective
0.26-0.50	Slightly effective	Slightly effective	Slightly effective	Slightly effective
0.51-0.75	Effective	Effective	Effective	Effective
0.76-1.00	Very effective	Very effective	Very effective	Very effective

Indicators and sub-indicators were normalized for aggregation purposes. The equations used in normalization procedure is shown below:

Equation 2: Normalization of sub-indicators for aggregation purposes

$$y = \frac{Max\ (x_I) - X_I}{\text{Max}\ (x_I) - \text{Min}\ (x_I)}$$

Where: y - normalized value, X_i - value of the observation, $Min\{X_i\}$ - minimum value for all observations, $Max\{X_i\}$ - maximum value for all observations

The overall effectiveness rating of rice crop insurance was assessed using two approaches for purposes of comparison. First, the average of the four indicators was obtained using equal weights for each variable. Second, relative weights per variable were assigned based on the researchers' judgement and appreciation of the local situation in the study area.

Moreover, benefit cost analysis (BCA) was conducted to provide basis in comparing different scenarios of farmers with insurance and without insurance assuming with and without catastrophic events using 15% discount rate. The net present value (NPV) and benefit cost ratio (BCR) were used to assess the financial profitability of farmers with insurance and without insurance. The NPV was computed using the following equation:

Equation 3: Net Present Value

$$NPV = \sum_{t=0}^{T} \frac{(B_t - C_t)}{(1+r)^t}$$

where: where: Bt = benefit at time *t*, Ct = cost at time *t*, r = discount rate, t = time (years) where observation is noted, and T = life span of investment (years). The BCR was computed as the ratio of discounted stream of benefits and discounted stream of costs over the time horizon considered in the analysis. Below is the formula used to compute BCR.

Equation 4: Benefit-cost ratio

$$BCR = \sum_{t=0}^{T} \frac{B_t/(1+r)^t}{C_t/(1+r)^t}$$

3. Results & Discussion

3.1 Barriers to risk insurance

3.1.1 Perceptions on barriers in Japan

To understand farmers' perceptions about agriculture insurance and how these are related to farmers' perceptions of risks, available products, premiums, premium subsidies, claims settlement processes, and benefits of agriculture insurance, a survey was conducted in Okinawa prefecture targeting farmers, NOSAI staff, and prefectural government officials (Prabhakar and Ozawa, 2014). The surveyed farmers were primarily men involved in full time farming. Nearly 53% were in the age group 60-70 years and the rest were between 40-60 years. Forty-seven per cent of the farmers own on average 4 ha of land and the rest have around 1-3 ha. Thirty-seven per cent of the farmers had an annual income of 10 million yen or more; 27% of those interviewed did not disclose their income. Nearly 94% of the farmers had received some kind of farm subsidy, other than an insurance premium subsidy. All the farmers had participating in insurance for several years.

Of the surveyed farmers, nearly 90% felt that insurance is necessary for recovering from crop loss and perceived it as a good policy for the government to implement. Interestingly, nearly 57% of the farmers considered that there were no loopholes with the insurance claim procedures, whilst 30% felt that the loss damage assessment was unsatisfactory. Many farmers seemed to have been satisfied with the claim settlement process as nearly 57% had received their insurance claims within 3 months (with others receiving claims sooner). Some 83% of the farmers perceived that their insurance claims were received in time, helping them to recover from the disaster. Most farmers felt that the loss or damage assessment was fair and satisfactory. Nearly 43% were of the opinion that the insurance claim payment could help them recover mostly from the disaster while 30% felt that they could recover fully and 10% could not recover at all.

Regarding the premium subsidy, most farmers felt that the current level of subsidy was sufficient while 37% were of the opinion that it needed to be increased. None of the farmers favoured the removal of the premium subsidy. Hence, the subsidy may have played a major role in making the insurance an attractive incentive for farmers to take up the insurance scheme. Interestingly, no major issues regarding moral hazard or anti-selection issues were reported either by the farmers or by the insurers. Another finding was that farmers strongly preferred indemnity based insurance products - as it was found that the loss ratio is also less than 100%. Hence, there is considerable resistance from farmers towards changing from indemnity based products to weather based insurance or index based products.

3.1.2 Perceptions on barriers in Philippines

Insights on how farmers, with or without insurance cover, look at insurance for agriculture were obtained from structured questionnaire surveys conducted in various locations with the help of MicroEnsure and Cocolife. A total of 29 insurance beneficiaries and 10 non-beneficiaries from various municipalities have participated in the surveys. The beneficiary group respondents comprised of 35 % male and 65% female, with 72% above 50 years old. Most were farmers with one rural entrepreneur. 58 % considered themselves belonging to the low-income group and the rest to the middle-income group. 69% owned 2 ha or less of land and 100% of the lands owned by all respondents were arable.

All the respondents have experienced crop losses due to natural calamities (floods, droughts, landslides, forest fires, insect outbreak, uncongenial weather conditions such as temperature, humidity, etc.), mostly in 2012. 90% had crop losses in the range of 75-100%. 50% of them have not recovered from their losses yet, 67% of them are still at a loss, 3% took a bank loan to cope with their loss, and 28% resorted to various types of coping measures that included borrowing from microfinance institutions (MFIs) (100 % of them), insurance payout (50%), personal money (38%), and crop loan, compensation from other crops, and assistance from the department of agriculture (12%).

Among the participants of insurance program, 55% said they have been in an insurance program for less than a year, 38 % for 2-3 years, 1% for 4-5 years, and 1% for more than 6 years. More than half of them (59%) expressed having average level of understanding of their insurance program and 41% expressed having good level of understanding. They attributed their understanding to the efforts of the insurance providers, with 48% of them rating such effort as good, and 41% rating such effort as average. 10% of them rated the efforts as bad.

Majority of the respondents paid more than USD 49 premiums for insurance per year, with 41% paying USD 49-73 and 31% paying more than USD 73. Those who paid less were 17% for USD 25-49 and 10% for USD 25 and less. Among those who responded to the question on affordability of the premiums, 17% said it is affordable and the same percent also said it was not. One third said it was costly but was made affordable by innovative approaches and one third of them were not sure.

Of those who responded to the question on the amount received as insurance claim payout, all said it partially compensated their loss but was insufficient for recovery from disaster. On the level of satisfaction with the claim received, majority (66%) was uncertain, 21% thought it was bad, 4%, very bad, and 10% had high level of satisfaction. On the insurance claim procedure, 62% was uncertain, 24% thought it was bad, and 14% had high satisfaction. 44% said they received their payout within three months after their submission of the required documents to the insurance agency. Over 30% (31%) received it within two months after and 25% received it four months after. Of those who commented on the timeliness of the payout, only 33% said that it was timely for them to get back to their normal life. Most of the respondents (83%) said that their claims were assessed fairly, 14% were uncertain, and 3% said they were unfairly assessed. Of those who responded to the question on grievances, 67% indicated that their grievances on insurance settlement were not addressed well by the insurer.

Their recovery after the disaster was slow according to 59% of the respondents and very slow according to 28%. Some (7%) had not progressed since the disaster. A few (3%) said

they are better than before the disaster or had recovered fully. Before enrolling in the insurance program, 79% were not able to recover from disaster, 14% were able to recover with the help of relatives and friends, and 3% were able to recover with the help of the government; but 3% said that they were able to recover better than with insurance. All of the respondents said that the government should provide subsidy for the crop insurance premium, with 52% of them saying 100% subsidy, 17% with 75% subsidy, 17% with 50% subsidy, 7% with 25% subsidy, and 7% with subsidy that is based on the economic level of the farmer. Most (86%) of them wanted that 100% of the crop loss would be covered by the insurer, 7% said partially covered but could be insufficient for full recovery, and another 7% said partially covered but sufficient for full recovery.

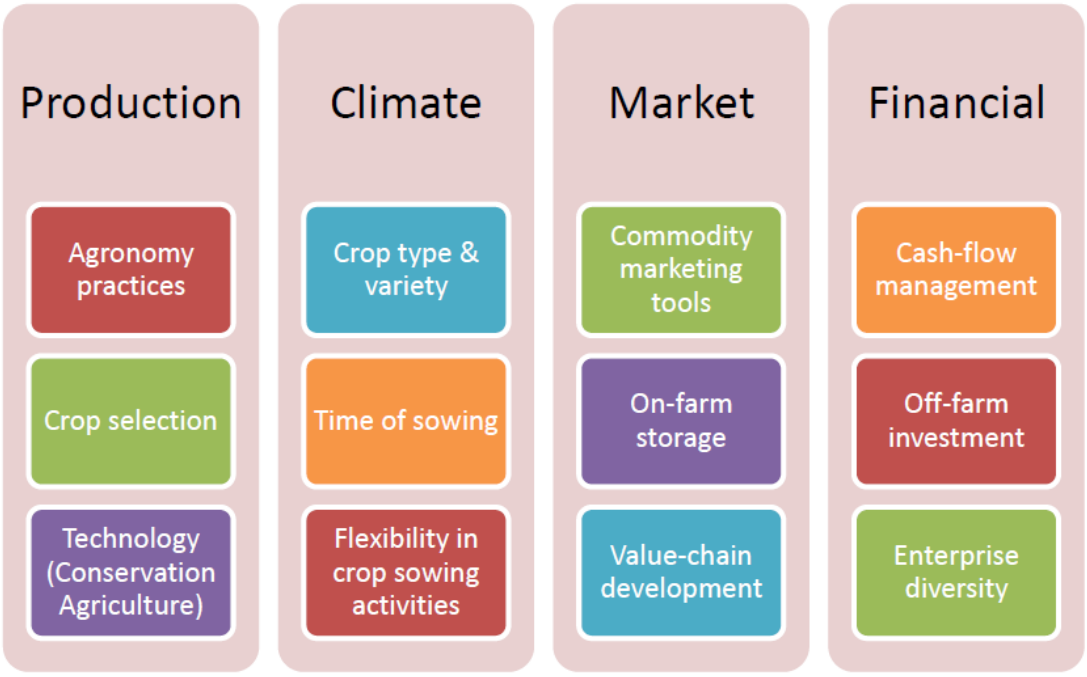
Among the non-beneficiary group covered by the survey, 10 farmers were randomly chosen, with 60% male and 40% female, with 70% of them with an age more than 40 years. 40% of them considered themselves belonging to the low-income group and 60% to the middle-income group. Fifty % of them owned 2 ha of land and 50% owned at most one hectare of land. All of their lands are arable. All had experienced crop losses, mostly in 2012, with 50% experiencing 50% crop loss, 40% with 75% crop loss, and 10% with 25% crop loss. 70 % said they had not recovered from the disasters although 40% of them borrowed money from MFIs. All of them said they did not receive any government support to cover their crop loss. All of the respondents had no experience with any type of crop insurance. All wanted government subsidy for the premium, with 30% of them opting for 100% subsidy, 20% for 75% subsidy, and 50% for 50% subsidy. All wanted insurers to cover their crop losses fully.

3.1.3. Perceptions on barriers in Australia

Three workshops were conducted in Perth (Western Australia), Clare (South Australia) and Bendigo (Victoria). These three locations were selected due to their proximity to the major broad acre dryland grain production zones (primarily cereals (wheat and barley), oilseeds (canola), and pulses (field peas, chickpeas, lupins and faba beans) and livestock production (sheep and cattle) in each of these Australia States. The workshops were in each case attended by six farmers. Small group sizes were specifically selected in order to allow in-depth discussions between participants, so that quality in-depth information could be obtained, and specific lines of questioning explored. Participants at each of the workshops were engaged in a range of discussions relating to on-farm risk management, crop insurance practices, and barriers limiting their future farm business operations. Discussions were kept open through the facilitator asking follow up questions for clarification, and respondents amongst themselves asking questions and making comments to one another. Key responses from participants were recorded, which were then used to prepare the summary of findings.

The farmers considered that it is important to describe and define the specific risks. There are many risks, and it is important to define and categorise the risks accordingly (and are summarised in Figure 7):

1. Production risks – associated with producing the crop
2. Climate risk – linked to production and outcomes
3. Commodity market risks – marketing, including forward contracting, currency shifts
4. Financial management – farm business cash flow



Source: Authors

Figure 7. Various barriers faced by Australian farmers

In terms of farmer attitudes to risk, their attitudes are a reflection of their own particular farming environment. For instance, the farmers from WA tended to be more risk adverse during the workshop compared with the other two groups involved in the study. This was reflected in the 'run of poor seasons' that they had experiences in the previous 10 years. Farmers attending the workshops were very familiar with the climate risks that they faced on a seasonal basis. The variability in climatic conditions form one season to the next provided one of the major challenges to the farm business. Farmers attempt to manage the variability in seasonal conditions through adopting a flexible approach to their crop sowing practices. These include having an optimum 'time of sowing', where if opening rains are not received by a specific date they may adjust their management practices, which may include any of the following strategies: 1. The dry seeding of some crops if it has not rained sufficiently by a certain date. 2. Changing the type of crops grown, from a long season to shorter season maturing crop types and varieties. 3. In marginal production zones, taking the decision not to sown any crop at all, or reduce the areas sown to specific crop types. 4. Reducing specific crop inputs (such as reducing the amount of fertiliser applied in line with a reduction in the yield potential of crops). 5. Undertaking Soil Probe Monitoring of stored moisture and available nutrients. Monitoring available soil moisture during the autumn period, coupled to analysis of available plant nutrients (nitrogen, phosphorus) has increasingly become a valuable management tool for grain growers. 6. Adoption of 'rainfall deciles' to guide crop production decision making during the growing season. The rainfall decile comparison provides an indication as to how favorable the season is progressing in terms of rainfall received (in comparison to average rainfall for a given district).

Australian farmers are exposed to global commodity markets, with no government subsidies or interference in the prices that farmers receive for their commodities. There is no government procurement, no minimum price set for the grain and other commodities that they produce. As a result, there were a number of tools identified by workshop participants

that they utilised in an effort to reduce the risk and variability in prices received for their grain and other commodities. How and when farmers sell their grain is one of the principle tools that farmers can use to reduce the risk of price volatility, and hopefully maximise the price that they receive for their grain. The price offered to farmers for their wheat for example, varies constantly from one day to another. Farmers can opt to sell their crop even before they have commenced sowing, hence they need to make sure that they are capable of harvesting and delivering the amount of grain they have contracted at the commencement of the growing season. Farmers therefore have the option of forward contracts, contracting grain during the growing season, or opting for a cash price at harvest.

In terms of the crop insurance products that the farmers were using (for insurance against hail and fire just prior to harvest), farmers unanimously declared that it was a necessary practice to undertake, given the relative risks to crops leading up to, and during the grain harvest period. The policies, taken out during the grain flowering and grain fill period would have the specific level of cover adjusted according to the anticipated yield of the crop (as assessed by the farmer) when taking out the specific insurance policy. Within these policies, there is also the option of insuring the grain whilst in on-farm storage facilities.

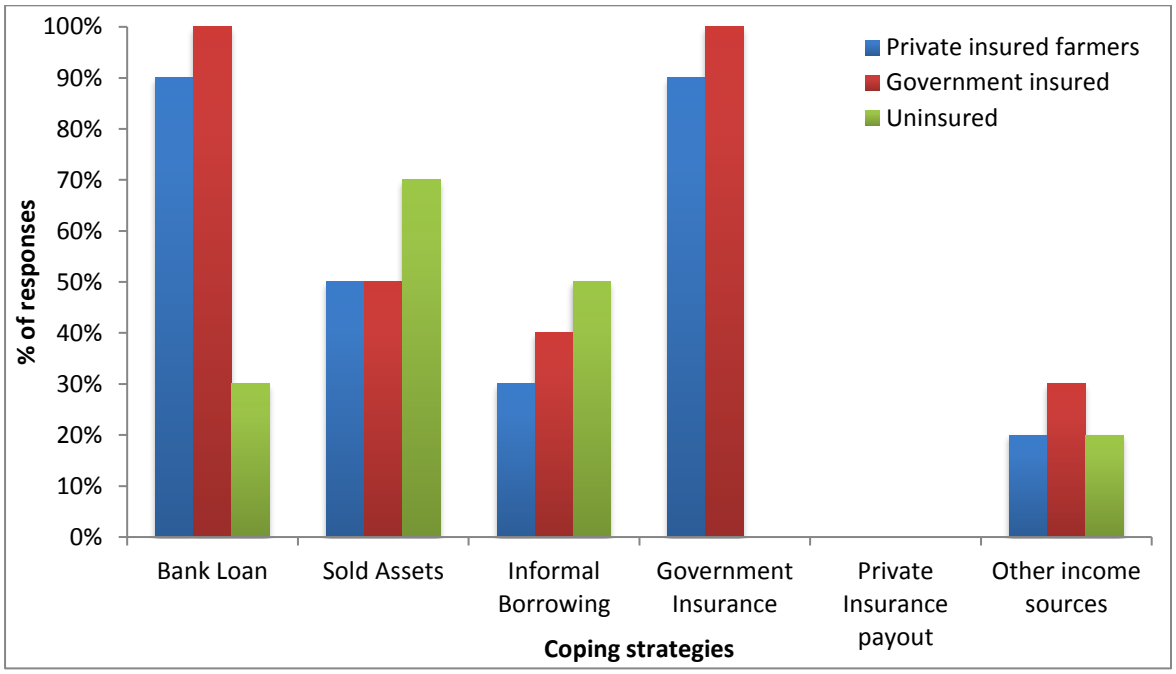
Whilst the initial cost of the insurance seems quite cheap, the price will vary according to the level of insurance that is taken out (the value and yield of the crop). The cost of the insurance will vary according to the rainfall reliability of the given farming district. That is, the greater the likelihood of drought occurring, the higher will be the cost of the insurance. Generally speaking, farmers who can 'least afford' the insurance are the ones that should take the insurance out (farmers with high debt ratios, and who farm in drought prone areas). In many instances the cost of the insurance becomes prohibitive. Finance institutions (banks) are promoting the multi-peril crop insurance (MPCI) product to their 'at risk' clients. The extent to which DRR insurance is taken up by Australian farmers is primarily limited to a small number of products that are related to insuring for specific events, such as hail and fire (with insurance being taken out by the farmer prior to harvest). Other more elaborate products, such as the MPCI, whilst capable of insuring farmers against such events such as drought, tend to be cost prohibitive, particularly amongst those farmers located in the drought prone regions, where the incidence of drought is far greater.

3.1.4. Perceptions on barriers India

For understanding the barriers in India, the survey was carried out in the Bonthiralla village, in the Dhone Mandal of Kurnool District, Andhra Pradesh. The village is situated in hot and arid region and is demarcated as rainfall deficit area in the state. The average annual rainfall is 760mm and hence frequent droughts are prevalent in the region. 30 insured households where selected within the Bonthiralla village for the purpose of household surveys. Equal number of farmers with government insurance, farmers with private insurance offered under ICRISAT project and uninsured farmers were selected. Farmers where selected based on their availability and willingness to participate in the survey.

Survey questionnaires were developed based on a set of indicators identified that demonstrate the effectiveness of insurance. The survey questionnaire was designed to elicit responses from farmers regarding the degree of effectiveness of the insurance, in terms of short term DRR and long term CCA benefits and to identify important shortcomings in insurance products being offered in the village. The questionnaire included questions regarding the socio-economic characteristics of farmers and specifics of the insurance product they were enrolled in.

The primary means to cope with disaster losses within the village in the order of preference are: bank loans, informal borrowing, selling of assets and insurance payouts (please refer to Figure 8). None of the respondents reported receiving government compensation, as a part of disaster relief efforts, on crop losses. All the farmers (insured and uninsured) reported taking loans from various sources at least once a year. It was observed that a large percentage (80% of government insured and 70% of private insured) of farmers resorted to obtaining bank loans compared to only 30% of uninsured farmers in 2014. This can be attributed to the fact that government crop loans are not available to uninsured farmers. Uninsured farmers can take government loans other than crop loans.



(Source: Authors)

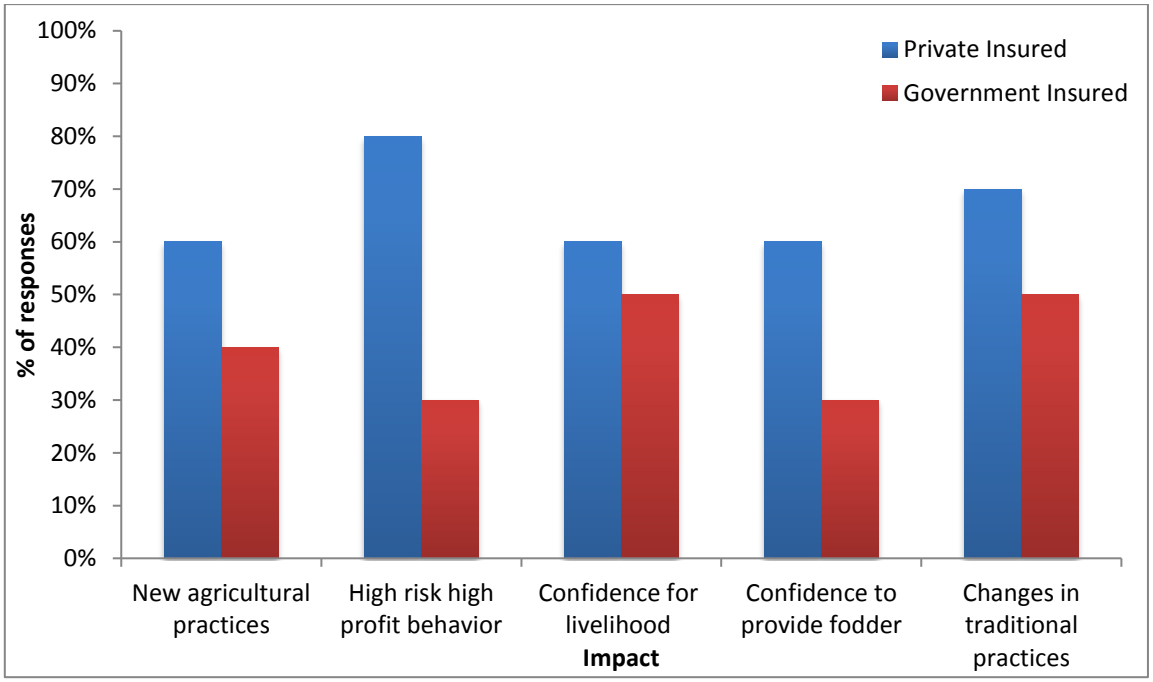
Note: The private insurance has not yet triggered in this region

Figure 8. Strategies to come out of disaster loss

90% of government insured farmers reported that the payout received was sufficient to cover less than 50 % of the disaster losses. All government insured farmers reported that insurance payments were made 4 months after the report of crop loss was filed. The same number also reported that the payouts were delayed making them ineffective to help in immediate coping. To deal with this, both insured (50% private insured and 60% government insured) and uninsured farmers (60%) sold their livestock at 30-40% below market prices. 40% of government insured farmers and 30% of private insured farmers took informal loans from moneylenders, neighbours and family as banks take long time to process loan applications.

70% of privately insured farmers and 50% of government insured farmers reported to have introduced new agricultural practices for reducing the impacts of extreme weather events such as droughts (Figure 9). Examining the CCA methods adopted by the survey respondents, it was seen that farmers who have taken private insurance are highly likely to take up number of better crop management practices compared to government insured and uninsured farmers. The primary reason for this could be due to the technical knowledge support that the private insurance holders receive. The respondents hoped that these better

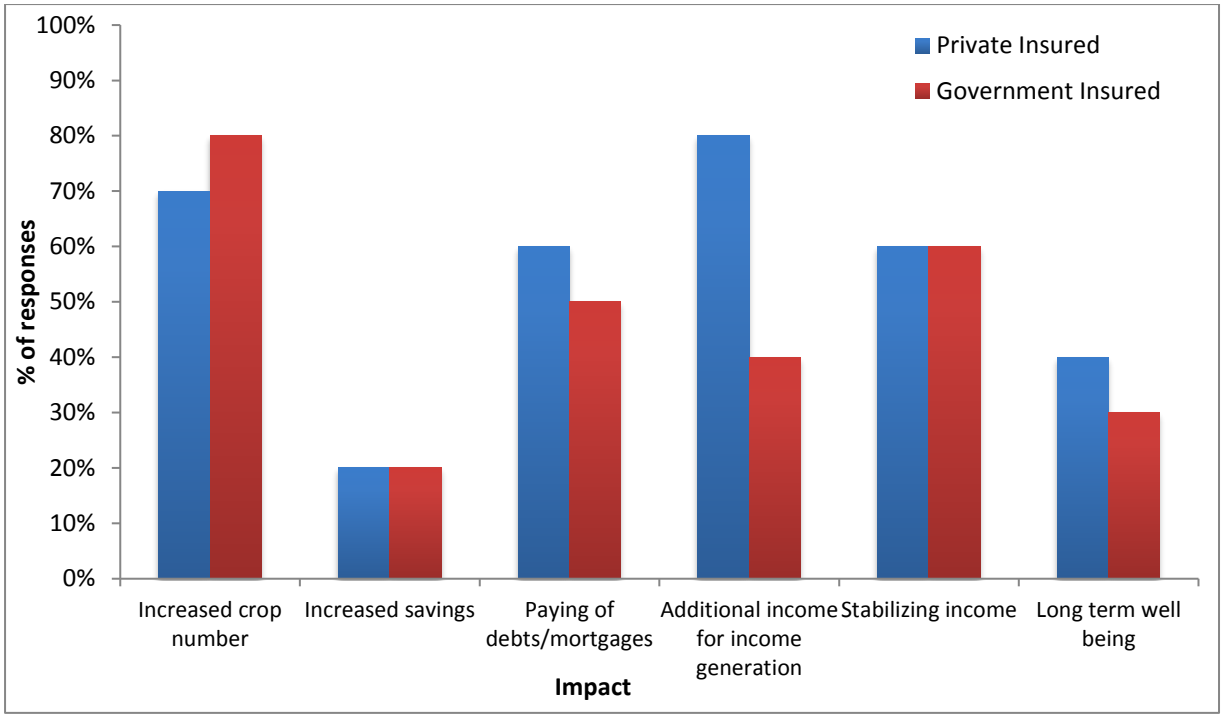
management practices will contribute towards building resilience of farmers. 90% of respondents reported cost as a major constraint for adopting better management practices followed by lack of labor (50%) and lack of technical support (36%). Currently, the premium on insurance is not calculated based on management practice followed by farmers and they don't require farmers to adopt better crop management practices. 40% of the private insured farmers and 10% of the government insured farmers opined that the crop management practices should be taken into consideration while fixing premiums so that it acts as incentive for farmers to follow best management practices leading to reduced crop losses. 80% of farmers with insurance (government as well as private) said that they have increased the number of crops they grew after taking crop insurance.



(Source: Authors)

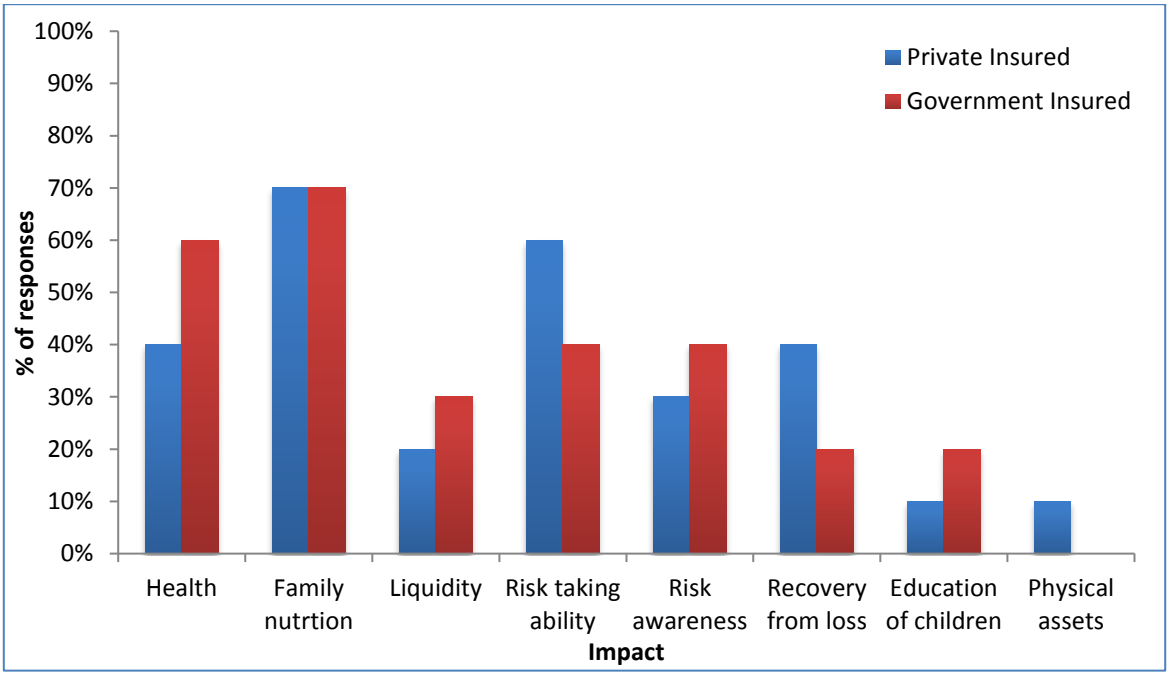
Figure 9. Long term behavioral effectiveness

60% of the private insured farmers reported that insurance had helped to pay off debts (Figure 10). Responses from government (80%) and private (80%) insured farmers indicated that the insurance did not had a significant impact on their savings; however, 40% of the government insured farmers reported that the number of their livestock increased after enrolling into insurance indicating the positive impact of insurance on asset creation. 30% of the insured farmers also reported that the presence of insurance has prompted them to increase the amount of land that they leased for farming. Only 10% of insured farmers (private and government) thought the amount paid for insurance premium has opportunity cost. 90% of the government insured farmers and all of the private insured farmers reported that they would continue taking insurance. Many of the government insured farmers felt that insurance did have a positive impact on their household in terms of nutrition (70%), health (60%) and risk taking with gainful returns (60%). This was also true in the case of farmers who enrolled private insurance where 90% of farmers felt that insurance had a positive impact on health (Please refer Figure 11).



(Source: Authors)

Figure 10. Long term livelihood effectiveness



(Source: Authors)

Figure 11. Opinion of farmers on positive impact of insurance

Regarding the opinion of government insured farmers about the insurance, 70% of farmers rated the payment received as very low, 80% of farmers felt that the time taken for payment was very long and 80% rated the amount of payout received as good. The biggest improvement that farmers would like to see in the insurance product is a full subsidization of premiums. 40% of the uninsured farmers stated that the main reason for not enrolling in insurance was the lack of knowledge regarding the insurance product. 60% of uninsured

famers would be open to enrolling if changes such as coverage of more perils (30%) and increase in subsidy (50%) are made.

The stakeholder consultations conducted as a part of this project[1] has indicated several barriers that are hindering the spread of risk insurance in the Asia and Pacific region in general and the study countries in particular. The specific barriers identified proposed interventions are shown in the Table 7.

Table 7. Barriers and proposed interventions in the agriculture sector

Characteristics of Insurable Risks	Barriers	Proposed Intervention
Large exposure units	• Age, education, risk perception, farm size of farmers • Relief dependence & willingness to pay • Accessibility	• Bottom-up education • Moving from individual to group farming • Product innovation
Accidental losses	• Moral hazard • Adverse selection	• Product innovation – multiple year coverage • Compulsory participation
Measurable losses	• Lack of data	• Comprehensive data on risk factors • Incentive for group farming • Sharing of data among insurers
Determinable losses	• Fair assessment • Lack of trust	• Comprehensive database of farmers • Trained and independent loss adjusters • Index-based products
non-catastrophic	• Exposure to climate risk is systemic risk • Severe losses and long recovery period	• Promoting self-insurance at local levels • Spreading of risk across countries/regions
Economically feasible premiums	• Low income farmers and high dependence on agriculture • High risks leading to high premiums	• Promoting off-farm income • Innovative premium collection • Product design • Lower administrative cost • Mandatory combination of risk management and risk mitigation strategies

(Source: Based on consultations organized by the authors)

[1] As a part of the methodology employed by the project, a workshop comprising experts from the insurance sector, researchers and practitioners was held on 4-5 July 2014 in Bangi, Malaysia, to review evidence and assess effectiveness of insurance for DRR and CCA.

Culture of Risk Management: Climate change is associated with systemic and prevalent risks. Some of the risks may be associated with catastrophic losses, making the risk uninsurable. The low awareness of climate change risks and lack of information on temporal aspects of risk also pose challenges to make insurance feasible for the most vulnerable groups. Other issues that need attention include acceptable levels of risk as well as selection and definition of appropriate thresholds, above which coping capabilities are exhausted. These issues are context specific and are related to monetary, cultural, security or wellbeing related concerns, among others. In such cases, incentives have to be created to encourage people to take the right risk management behaviour. Risk awareness derived from risk assessment through insurance expertise and services needs to be effectively integrated into public education programs.

Access to information: A major challenge for the insurance sector is access to information. Decision support tools to help decision makers allocate limited resources among a range of risk management tools are limited. Similarly, databases that can support assessment such as weather data to design a viable insurance product are not always available, particularly in developing countries. Such gaps need to be identified before any insurance scheme can be effectively promoted for the most vulnerable groups.

Growth of inclusive markets: Presently, technical support and information on how social safety nets can be used as a complement or even as an alternative to risk insurance are lacking. Integration of social issues and non-economic values in comprehensive risk management approaches has also not advanced. The use of appropriate subsidies as well as context specific and structured incentive systems that are informed through expertise from the insurance sector have not been adequately explored. In the case of financial risk transfer approaches, levels of capitalization required to achieve sustainability have not been established.

Coverage and inclusion: Vulnerable groups are not specifically targeted by the insurance sector. Unclear roles of public and private sectors, lack of stakeholder interaction and weak governance systems are also fundamental issues that need to be resolved. Innovation is required to ensure insurance products can penetrate countries that lack stable and functioning governance systems to assure accountability and fairness. These fundamental issues need to be resolved before the rural poor communities will be able to use insurance as part of their risk mitigation strategies.

3.2. Cost-benefit analysis of risk insurance interventions

3.2.1. India

In India, presently crop insurance is mandatory for all farmers for whom crop loans are sanctioned/renewed for the notified crop during the stipulated crop season, non loanee farmers can obtain insurance by paying the stipulated premium. Under the compulsory component for loanee farmers the sum insured would be equal to the fixed Scale of Finance for the crop which the crop loan was taken for. The insurance premium payable by the loanee farmer is financed by the loan disbursing office of the bank, and treated as an additional component of the Scale of Finance of the loan. The maximum insurance charges payable by the farmer for food and oilseed crop is 1.5% and 2.0% of the sum insured in *kharif* and *rabi* season respectively; or the actuarial rate whichever is less. In the case of commercial/annual crops the maximum insurance charge payable by the farmer is 5 % of

the sum insured or the actuarial rate, whichever is less. The difference between the premium rate and insurance payable by the farmer is shared equally by the center and the state.

Recent developments, where the cooperative bank in Warangal district went to court on behalf of farmers to obtain a stay order against the payment of premium clearly depict that farmers in the region are unhappy regarding the amount of premium that they pay. 39% of farmers said that they had felt household income stress due to the high cost of premiums. The survey revealed that farmers would prefer if the premium was further subsidized by the state. None of the farmers in the survey had a clear understanding of the actual premium of the insurance and the amount subsidized by the state, to this affect all farmers in the survey reported that they received no subsidy on their premium. 14% of the uninsured sample of farmers ranked the high cost of premium as the foremost reason they had not taken up insurance.

Opportunity costs refer to the income forgone by not investing resources in alternate opportunities that could be more lucrative. In crop insurance they are the costs associated with using resources to pay the premium for insurance and by affect foregoing the employment of other risk management strategies that could be more beneficial to the livelihood of the farmer. In the study, we compared the net benefits of agricultural insurance between insured and uninsured farmers to understand if the net benefits from opting for agricultural insurance is greater than other investment and risk management strategies. Of all the insured farmers that were interviewed none of them felt that they could have invested the insurance premium in more profitable activities. Only 17% of insured farmers felt that they could have invested the premiums in other risk management strategies, particularly drilling of bore wells. However, as the cost of bore well digging is much higher (>10000) insurance was the preferred risk management strategy. Lack of other options for investment seems to make agricultural insurance a more attractive option, 39% of insured farmers in the region responded that they do not know where else to invest the insurance premium.

Opportunity costs of crop insurance in the region appear to be somewhat low primarily because of the low premiums paid by farmers for insurance, the premium is often not substantive enough to invest in alternate income generation and augmentation apart from purchasing of livestock, without the availability of alternate opportunities to meaningfully invest smaller sums of money farmers perceive that insurance is the best possible investment for the premium. The study indicates that uninsured farmers prefer to invest money for the purchase of livestock (46% compared to 17% of insured farmers). The study indicated that more insured farmers (28%) have made significant investments particularly in small business compared to uninsured farmers. Furthermore, only 10% of insured farmers felt that there was even a moderate potential for implementing alternate strategies to insurance.

A significant downside of crop insurance is the potential lack of correlation between payment and actual losses (Figure 12). The survey revealed a 0.194 correlation of percentage of crop loss covered by the insurance payout to premium paid in loss years 2012, 2013 and 2014. This low level of correlation indicates that the premium does not reflect the payment for losses, similarly comparing the percentage of crop loss to the percentage of crop loss that was compensated by the insurance the correlation is only 0.1380, indicating that the level of correlation between the actual loss and compensation received is quite low (Figure 13). 14% and 10.71% of farmers respectively reported that losses from prevalent risks that remained uncovered and crop failure but no compensation received were the major costs of insurance.

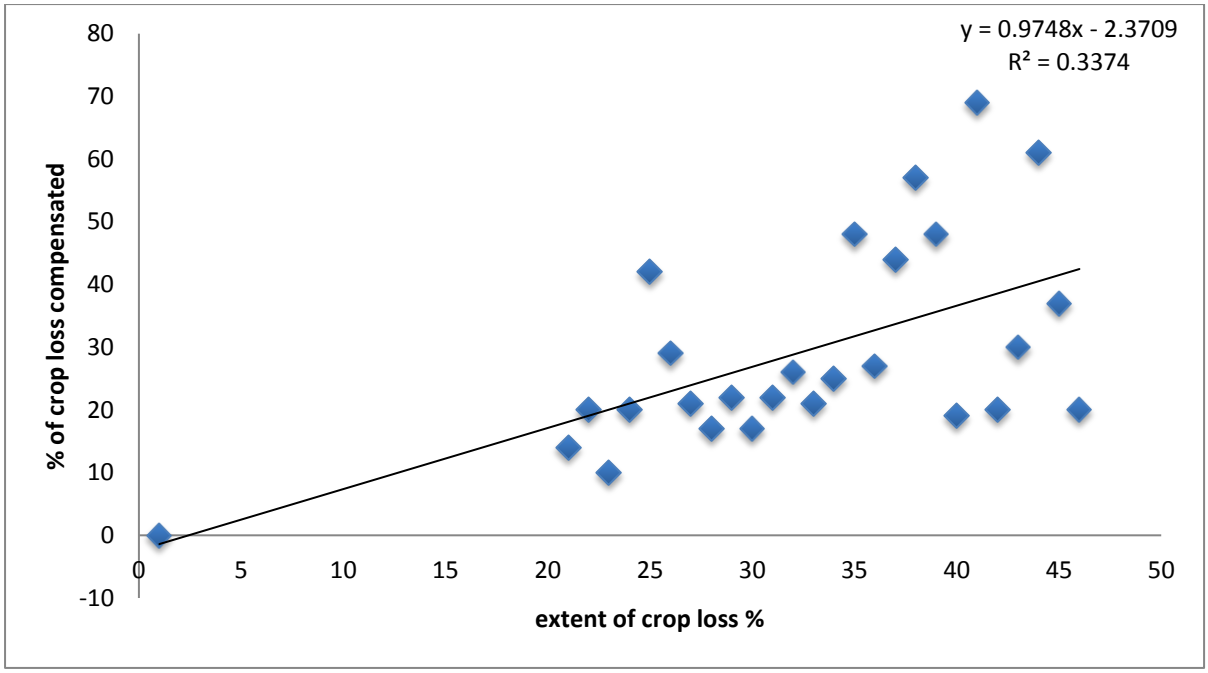


Figure 12. Correlation between loss and insurance payout

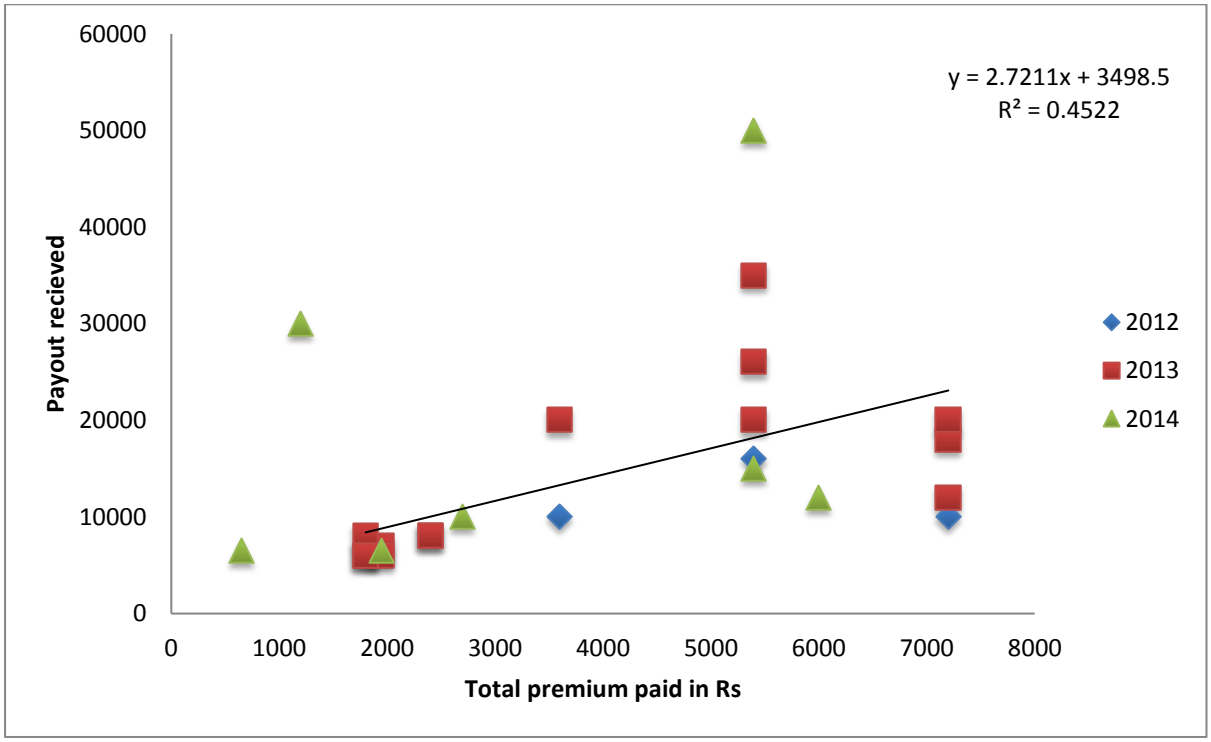


Figure 13. Correlation between premium and payout

Stabilization programs like crop insurance can have dual economic direct benefits for users; they can increase mean incomes and reduce income variability. The former is referred to as transfer benefits and the latter as risk benefits. Transfer benefits refers to riskier and profitable behaviour such as investment in machinery, growing of high-risk high yield crops etc.

In order to understand if insurance has discernible impacts on the consumption patterns of farmers we compare consumption during loss years between insured and uninsured farmers. 85% of insured farmers reported that they had to make household consumption adjustments during the last season of crop loss, this was higher than 75% of uninsured farmers who made household consumption adjustments during the same period.

Traditional risk coping strategies employed by farmers to cope during disaster years include the sale of assets, migration to temporary non-farm labour, as well as loans from informal sources; mainly family and village money lenders (Figures 14 and 15). These traditional risk coping strategies are costly; sale of productive assets can diminish current and future livelihood potential, loans from money lenders are accompanied by often-exorbitant interest rates which entraps farmers in vicious debt cycles. Furthermore, covariate risks drives up interest rates charged by local money lenders and further pushes down prices of assets particularly cattle sold in distress sales. By providing immediate post disaster liquidity, insurance has the potential to reduce the requirement for these costly risk coping strategies.

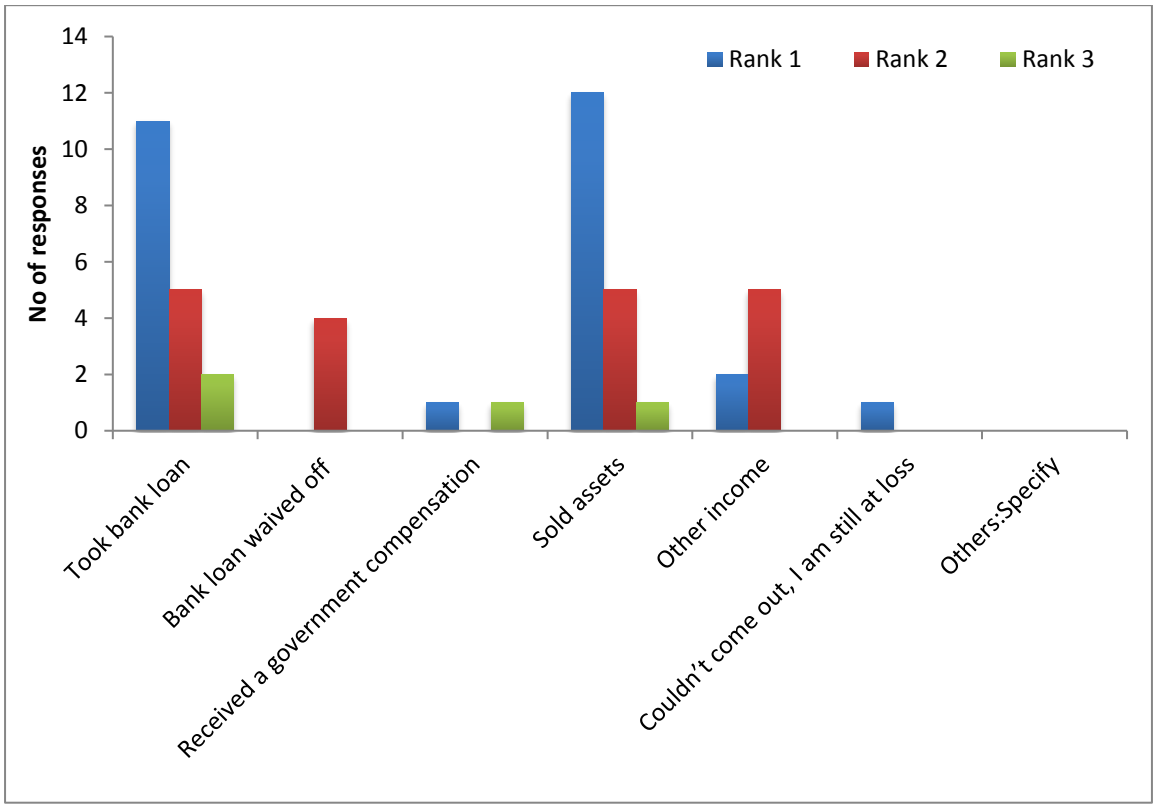


Figure 14. Loss coping strategies of insured farmers

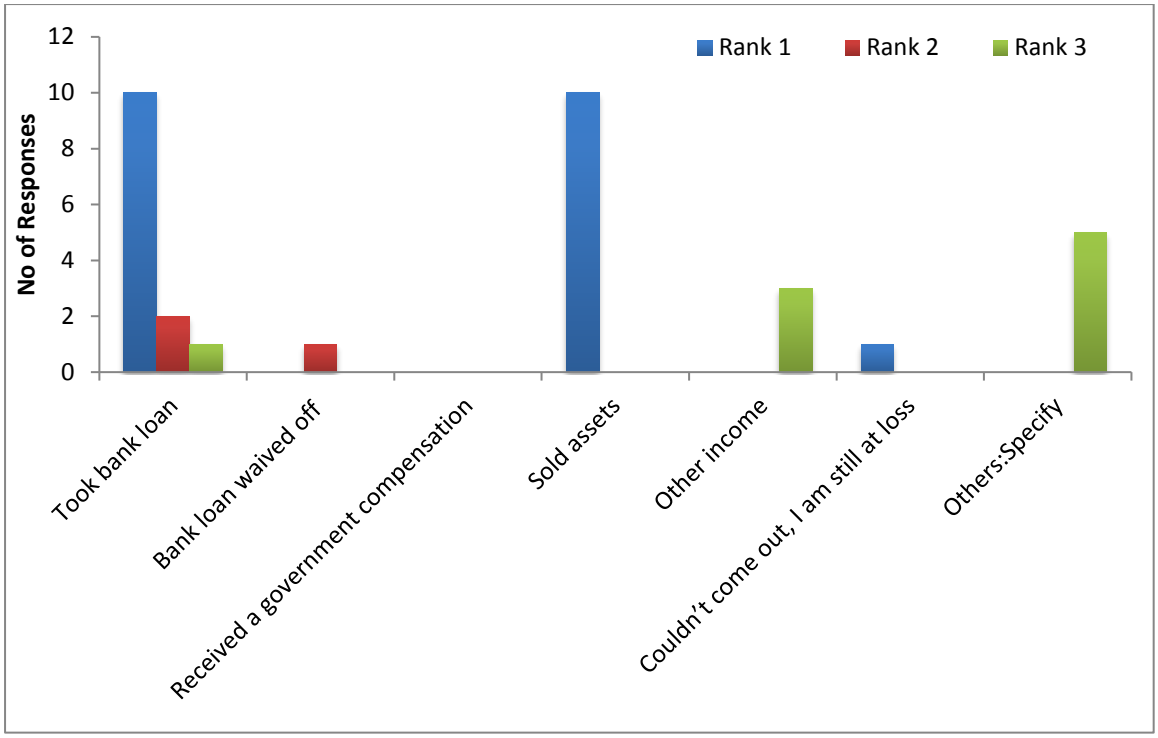


Figure 15. Loss coping strategies of uninsured farmers

The survey showed that in the last crop loss year, 64.2% of uninsured farmers sold assets to cover losses compared to 35.7% of insured farmers. 42.8 % of uninsured farmers reported that they had sold livestock during the loss season, of these farmers 50% of farmers reported that they had to sell the cattle below market price. This suggests that insurance has reduced the need for farmers to sell assets to cover losses. For the same loss year 64.2% of uninsured farmers reported taking loans to cover crop losses, 39% of farmers reported that they took these loans from banks as well as money lenders and 53% of farmers reported that they had partially repaid the loan. The prominent reason for taking the loan was unexpected household expenses (46.4%). 82% of insured farmers reported that they took loans during the season they suffered crop loss, of these farmers 74% of insured farmers reported that they borrowed money from money lenders.

85% of insured farmers reported that they had to make consumption adjustments in periods of crop loss this was higher than the 74% of uninsured farmers (Based on Figure 16, also see Table 8). This indicates that insurance has not had a significant impact on household income fluctuations and in effect the need for consumption adjustments during periods of crop loss.

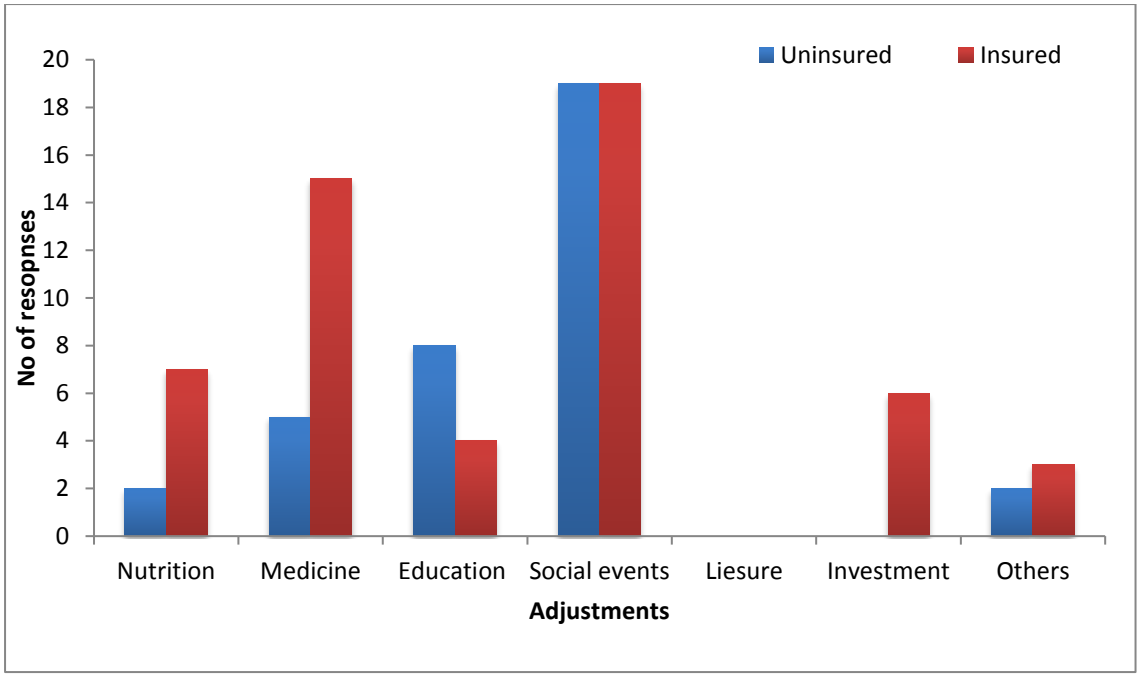


Figure 16. Household consumption adjustments of insured and uninsured farmers

Farmers perceived that the biggest cost of insurance was the income stress caused from paying premiums (42.8%) this is reflected in the majority farmers opinion that the premium should be completely subsidized by the government (67.8%). Unavailability of cash during crucial periods was also identified as a cost of insurance; the average time between claims and payout was 7 months. Consumption smoothing (64.2%), was perceived to be the biggest benefit of agricultural insurance this is followed by increased confidence (57.14%) and ability to recover from disasters (42.8%).

Based on the assessment of costs and benefits of agricultural insurance in the region, the costs and benefits that can be monetarily quantified are used to obtain a Cost-Benefit Ratio (CBR) calculated at a household level. The total benefit at the household level is composed of the gross insurance payout paid per household per acre (P) plus the increase in the farm (I_f) profits owing to increased asset build up and positive farmer behavioural outcomes of crop insurance. The increased in farm profit is calculated as the average difference in profits over a single cropping season between insured (P_{if}) and uninsured farmers (P_{ui}), calculated per acre. The per acre insurance payout for the last loss season averaged across insured sample farmers is considered. The costs considered for the calculation of the CBR include the insurance payout for the last year plus the perceived opportunity costs and the uncompensated losses. Uncompensated losses are calculated as the total loss minus the insurance payout received.

Equation 5: Benefit-cost ratio

$$I_f = P_{if} - P_{ui} \quad (1)$$

$$L_u = L - P \quad (2)$$

$$CBR = \frac{IP+O+L_u}{P+I_f} \quad (3)$$

Table 8. Uninsured and insured farmer perceptions on the Costs and Benefits of insurance

Costs			Benefits		
	Insured %	Uninsured %		Insured %	Uninsured %
Household income stress due to high premium	42.8	100	Consumption smoothing	64.2	66.7
Inability/difficulty in paying premium	3.6	66.7	No income fluctuation	10.7	66.7
Crop failure but no compensation	7.14	66.7	Improved credit worthiness	10.7	16.7
Unavailability of cash during crucial periods (Seed buying etc.)	17.85	33.3	Increased agriculture profitability	10.7	0
Can also lead to delayed recovery from disaster	3.6	0	Increased confidence	57.1	16.7
Losses from prevalent risks (disease, pests, markets) which remain uncovered	14.3	0	Increased high risk high yield crops planted	0	0
Reducing sustainable risk mitigation activities (Eg. Soil conservation, irrigation technologies)	0	0	Increased investment in livelihood assets	0	16.7
Reduced consumption	3.6	16.7	Post disaster liquidity	10.7	33.3
Loans	14.3	16.7	Ability to recover from disaster	42.9	16.7
Uncompensated crop losses of insured crops	3.6	0	Timely insurance payout	10.7	33.3
Time taken to receive payout after loss	7.14	50	Increased bank loans taken for high yield crop/farm practices	7.1	0
Debts	32.14	16.7	Increased monoculture	3.6	16.7
Increased water usage	7.14	16.7	Timely insurance payout	28.6	0
Decreased soil fertility	0	0	Steady income in loss year	3.6	0
Reduced water availability	3.6	0	Reduced debts	32.1	33.3
			Preserved assets	3.6	0
			Increased Investment expenditure	3.6	0
			Increased farm profits	14.3	

Source: Authors based on survey results

The calculated CBR for the agricultural insurance program averaged for the sample insured households is 0.492 this indicates that the program has a positive impact, and the overall benefits outweigh the costs.

3.2.2. Philippines

In Philippines, broadly, cost benefits analysis was computed to provide a basis of comparing the different scenarios of farmers with insurance and without insurance assuming with and without catastrophic events. Table 9 shows the summary of cost benefit analysis results. With catastrophic events assumed to occur annually, the net present value (NPV) for a 10-year period at 15% discount rate is about PhP110,375 per ha and PhP62,925 per ha for rice production with and without crop insurance, respectively. The corresponding benefit-cost ratio (BCR) is found to be 1.49 for insured farms and 1.31 for uninsured ones. These results suggest that in the case where catastrophic events occurred annually, rice production without crop insurance is still financially profitable as can be seen from NPV greater than zero and BCR greater than 1. Availing of crop insurance can increase the financial profitability of rice production since farmers with insurance have higher NPV and BCR compared with farmers without insurance. Overall, there is incentive to avail of crop insurance given that the difference between the NPV of insured and uninsured (PhP47,450) is quite significant. In addition, the premium paid in present value terms (PhP22,244) is only about 32% of the payout received (PhP69,694).

Similar trend has been observed in the scenario with catastrophic events based on actual data. With catastrophic events occurring 60% probability (6 out of 10 years), the NPV of insured farms have reduced to PhP72,956 per ha and the BCR to 1.32. Nonetheless, these are still higher than uninsured farms with NPV of PhP62,925 per ha and BCR of 1.31. Overall, it is still financially attractive to avail of crop insurance since premium paid in present value terms is also relatively smaller than the payout received by the farmers.

In the scenario without catastrophic events, rice production for both insured and uninsured farmers was still profitable but this time uninsured farms have realized a higher benefit than those who availed of crop insurance. It is therefore not financially attractive to avail of crop insurance when catastrophic events are not realized at certainty in any year since farmers will just incur additional costs of premium payment for the insurance coverage without receiving any compensation at all. This implies that crop insurance is only useful when catastrophic climate events are known with certainty.

Table 9. Summary of cost benefit analysis results for a 10-year period at 15% discount rate and scenarios of catastrophic events

Scenario	NPV	BCR
With catastrophic events throughout the year		
Insured	110,375	1.49
Uninsured	62,925	1.31
Difference	47,450	
Payout	69,694	
Premium	22,244	
With catastrophic events based on actual data		
Insured	72,956	1.32
Uninsured	62,925	1.31

Scenario	NPV	BCR
Difference	10,031	
Payout	32,274	
Premium	22,244	
Without catastrophic events		
Insured	40,681	1.18
Uninsured	62,925	1.31
Difference	-22,244	
Payout	0	
Premium	22,244	

Source: Authors

3.2.3. Malaysia

A total of 47 questionnaires were returned. Majority of the respondents are female (61.7%) and worked as housewives (51.1%). The highest education level attained are only secondary level (68.9%) while the rest only completed primary level education. All respondents had experience flood. The summary statistics are presented in Table 10.

Table 10. Definition and Summary Statistics of Variables

Variable	Definition	Mean	Std. Dev.	Min	Max
Household Income	Household Income	2449	2878	300	18,000
House value	Estimated Market Value of House	94,267	118,379	7,000	650,000
Content value	Estimated Value of Household Items	31,073	38,161	1,000	200,000
Damages	Total damages to house and household content incurred from Dec 2013 to Jan 2017	19,242	19,158	0	105,000
Repair	Amount spent for repair and replacement on recent damages	8,678	10,862	1,000	40,000
Compensation	Total compensation from House owners/Householders Insurance for losses incurred in Dec 2013 to Jan 2017	16,358	23,272	2,800	89,000
Premium	Annual insurance premium for House owners/Householders Insurance	184	106	78	398
Loss of work	Number of lost working days	9.52	5.73	3	28
Age	Age in years	46	13	24	77

Source: Authors

Majority of the households owned some types of insurance policies. Only 21.3 percent household owned house owner/householder insurance policy (Table 11). Wooden housing estate are not eligible to be covered by house owner/householder insurance policy. Nonetheless, majority of the households owned Kampungku policy.

Table 11. Households with insurance policies in year 2016

Types of Insurance	Insurance Ownership	
	Own	Do not Own
Any types of Insurance	91.50%	8.50%
Owned House owner/Householder	21.30%	78.70%
Owned Kampungku Policy	97.70%	2.30%
Owned Other Insurance	84.60%	15.40%

Source: Authors

It seems possible that the motivation to purchase are influenced by the flood experience which was also found in Kunreuther (1996). Both households in the two housing estates were affected by major flood during the flood seasons December 2012 to January 2013 and the recurrence of flood in the following years a has influenced the household to purchase insurance. The two main reasons for purchasing HO/HH insurance are the desire to get compensation for losses incurred and the need to meet the housing loan provider's requirement. Interestingly, the reason for purchasing the Kampungku policy, aside from the desire to get the pay-out, is affordable price. Thus, insurance design is important factor to encourage purchase among the communities (Prabhakar et al., 2015).

Table 12 compares the average amount of damages per house, the average amount spent on repairs and the average amount of compensation received from the insurance company between insured and insured houses in the bricked housing estate only. The table indicates that the households with insurance are able to spend higher amount of money for repairs compare with households without insurance.

Table 12. Average amount of damages and average amount of insurance compensation received per household from Dec 2013 to Jan 2017

	Insured Houses	Uninsured Houses
Amount of damages	42,600	12,164
Amount spent on repairs	10,400	4,375
Amount of Insurance Compensation	18,650	0

Source: Authors

In an interview with the JKKK, most households received assistance from various agencies to cover the cost of repairs to the damaged houses. In addition, the amount of cash received for flood relief has been consistent for the past few years. The respondents received RM1000 from the state government and RM500 from the federal government. In addition to the emergency cash fund from Kampungku policy, a household received in total RM2500 in cash. Based on the data on table 10, the average damages per flood seasons per uninsured household are RM3,041. It means that on average, 82 percent of the damages are covered by the amount of cash received. On comparison, for the insured households, only 44 percent of the insurance compensation received managed to cover the damages incurred.

Contrary to expectation, this study did not find evidence for significant difference between insured and uninsured in terms of the number of loss working days, the household adjustment on consumption, distance to nearest river, the amount spent for repairing the damaged house, the willingness to invest in DRR efforts and the economic status 6 months after the flood occurrence.

Table 13 provides the estimated cost and benefits of flood insurance for community. The data is based on a 3-year flood experience. None of the respondent incurred interest charges due to borrowing thus the value is nil. In fact, only two respondents indicated that they had to borrow from relatives. The need to borrow is minimal as the district office has allocated sufficient supports (food and shelter) during and after the flood occurrence. Only 1 respondent indicates that he used the insurance pay-out to make house improvement (increase pre-cautionary measures).

Table 13. Estimated cost and benefits of insurance to community

Measures	Value per household (RM)
COSTS	
Premium	184
Moral Hazard	500
BENEFITS	
Insurance pay-out	4,662.50
Restoration of damaged houses	1506.25
Increase awareness on pre-cautionary measures	375
Opportunity cost of borrowing	0
BENEFITS – COSTS	5,859.75

Source: Authors

A number of respondents indicated that they do used all the insurance pay-out for house repairs. From the interview, the respondents have indicated that only partial amount of the compensation was used for repair cost. The respondents were unwilling to spend for full repair cost due to anticipation that there will incur future flood damage. As said by one respondent:

"We did minor repairs. The truth, we only did what is needed and critical. The balance of the money is used to back-up daily expenditures. We recycle household items that are usable and restrain from buying new items".

It is interesting to note that although the respondents who owned insurance and have received compensation due to the flood losses, none has indicated that they have recovered fully. Nonetheless, all respondents assert that insurance is an important tool to help them to recover from losses due to flood. Majority of them did not feel that the money invested in insurance premium can be used for more gainful livelihood activities and they indicated their intention to renew the insurance policy.

Box 1. CASE STUDY: Costs and benefits of MPCI in Australia

Farmer Alistair Mace farms in southern Queensland and first heard about multi-peril crop insurance (MPCI) in September 2013. There were about 30 growers at the meeting and he recalls that the general consensus was that it all sounded a little "too good to be true". However, the Mace family looked into it further and decided that MPCI was the right way forward. "We just couldn't afford to take the risk of losing the season's income," explains Alistair.

The season started off well enough, with good planting rains and above-average crop establishment. But conditions soon started to dry out and yield potential slipped. The Mace family harvested everything they could, but with such low yields their grain revenue per hectare was significantly below their insured amount, which enabled them to claim against their MPCI policy.

With their cover, their bank knew they would be guaranteed an income, which went a long way in getting them through one of their toughest ever production years. That's because the model ensures that if grain growers experience a bad season, they can at least break even and start the next year in exactly the same financial position as they did the year before. "This has the potential to be the biggest fundamental change we will make to the way we are going to farm," says Alistair. The family says they now treat MPCI as a necessary input. "If you put it into a gross margin, the premium costs less than a contract header – and we had one of the more expensive policies in Australia," he says.

The cost worked out to be $29/ha to guarantee an income of $329/ha. "What's more, with the insurance in place, farmer Alistair had the confidence to sell grain forward early in the season to take advantage of better prices. So the higher prices we were able to achieve more than offset the cost of the insurance."

The case studies demonstrate the particular benefits and demand for MPCI. It is important that both the benefits and the costs can be clearly detailed and listed. The benefits are not only financially driven, but also aligned to increased farmer confidence and enhanced decision-making. Improving farmer risk management skills are key attributes that are also worthy of mentioning, however it is sometimes difficult to assign the specific financial benefits associated with these attributes.

Source: Authors

4. Conclusions

These findings, suggest that insurance may assist community to recover and may influence DRR as the estimated benefits of insurance outweigh the estimated cost. Despite the promising results, question remains on the effectiveness of insurance in DRR. This study is limited by the lack of information on the total amount of government relief fund and the amount spent by the various government agencies on the repair cost of the damaged houses. Thus, the question on whether the resources for disaster relief fund can be allocated more efficiently could not be addressed. In addition, this research is dampening by the inability of the respondents to fairly estimate the amount of losses incurred, the premium

paid to the insurance company and the cost for protection measures. In addition, as owning insurance is not a self-initiative effort at least for some since it is required by loan providers, more efforts need to be made to identify other purchase drivers in order to develop better understanding on insurance purchase decision against flood risk. Further studies need to be carried out in order to validate the benefits of insurance and to establish the viability of a flood insurance program.

Overall, the Philippine government-supported agricultural insurance may be considered as effective in terms of timeliness and insurance payout and in helping the farmers to partially recover from agricultural losses and damages. It aids in reducing the farmers' financial risks associated with climate-related event. In addition, results from the cost and benefits analysis showed that in cases of catastrophic events, availing of crop insurance increases the financial profitability of rice production since farmers with insurance, have higher NPV and BCR compared with farmers without insurance. Overall, there is an incentive to avail of crop insurance given that the difference between the NPV of insured and uninsured is quite significant. Crop insurance investment is very useful when catastrophic climate events are known with certainty. Thus, crop insurance particularly for those communities which are highly vulnerable to changes in climatic condition can help in reducing the risks associated with the current and future climate change impacts.

This study compiles and compares the costs and benefits of agricultural insurance at the household level using a CBA approach. The greater part of the variables could not be monetarily quantified and were compared qualitatively; other variables that could be monetized were used to obtain a CBR. The CBR (0.492) indicated that overall the crop insurance was successful, however, as a large proportion of the variables could not be quantified into monetary values due to lack of sufficient data the CBR does not portray a complete encompassing value of costs and benefits.

The cost of ineffective implementation of the program particularly delayed period between loss and payment of claims could not be input into the CBR. Insurance has demonstrated particular proficiency in assisting farmers with short-term coping however this has been hindered by inefficient payout delivery systems. Delayed payments are a significant cost that also has the potential to diminish the beneficial impacts of insurance particularly the loss coping benefits. In the absence of timely payout farmers will turn to informal unsustainable coping strategies such as loans from money lenders and sale of productive assets. This can be aggravated when farmers make decisions based on the security provided by insurance; uncompensated and delayed payments can lead to an income shock to the household. Uncompensated losses due to basis risk in yield based insurance or due to uncovered losses is a significant impediment to farmers' confidence in insurance. Although the PMFBY has attempted to address this issue by incorporating micro level crop yield experiments, studies have shown that given the lack of household level yield data and the high variability in physical conditions the determination of accurate threshold yield remains a challenging affair (Vyas & Singh, 2006), this is reflected in the study where the majority of farmers remain wary of uncompensated losses.

Unquantifiable benefits particularly change in farmer's attitudes towards risk management and increased confidence in their farming practice are difficult to measure particularly because these changes are gradual and take a significant amount of time to manifest into tangible rewards in the form of increased farm profits, temporal studies to understand the changing patterns of crop management due to agricultural insurance maybe useful in this

regard. Furthermore, attributing changing practices and behaviour to a single variable given the dynamic nature of agriculture in India is a precarious task. The study has demonstrated that there has yet to be significant long term impacts of insurance on farmer livelihoods in the region; changes in farmer behaviour relating to confidence building and associated positive impacts on farm management practices are yet to be realized, and significant impacts on profits and assets are only slowly emerging. There was no substantial evidence to indicate that farm profits had increased as a result of insurance.

Studies have identified consumption smoothing was as one of the primary benefits of agricultural insurance, however, it has yet to be significantly realized in the study site, the data indicated that the majority of insured farmers still had to undertake consumption adjustments comparable to uninsured farmers during periods of crop loss.

Overall the study indicates that crop insurance has been beneficial to the livelihoods of farmers, this is echoed by a majority of farmers (85.71%) who find crop insurance beneficial and attribute it at least partially to their recovery from crop loss. The preference for insurance can also be attributed to the lack of availability and knowledge of other risk management practices, furthermore, rather than the most beneficial option, crop insurance is the most economically efficient risk management strategy available for farmers in the region. In the absence of risk investment options for smaller amounts of money, crop insurance emerges as the preferred choice, 90% of farmers said that there was very low potential for implementing alternatives to crop insurance. Another primary driver for the uptake and preference for insurance is its mandatory linkage to crop loans. Nearly all the insured farmers stated that accessing credit in banks was the primary reason they had taken crop insurance.

The primary reason stated by the uninsured farmers for reluctance to take insurance was a lack of knowledge (75%) Although crop insurance are highly subsidized farmers remain unaware of the subsidies provided and the actual cost of premium. The lack knowledge is a serious detriment to the uptake of insurance particularly among non loanee farmers.

The study shows that although crop insurance is useful in managing farm risks the benefits of crop insurance have not been complete realized, crop insurance in integration with other methods are a more useful method to manage agricultural risks. Dissemination of knowledge regarding on farm risk management strategies could be useful to strengthen risk management capacities of farmers. In conclusion although theoretically the benefits clearly outweigh the costs further efforts are required to completely realize the potential of insurance. The agricultural insurance product in its current form is presently relatively new and a longer incubation period maybe required to realize the long term benefits of agricultural insurance.

Based on responses given by the farmer participants and respondents, it is recommended that corrective measures should be done by the government to improve the program particularly on its delivery system and the payout amount.

MPCI and other related insurance products offer farmers in Australia significant benefits in terms of the opportunity to better manage financial risk as a result of poor seasonal conditions brought about by climate variability.

There are wide ranging benefits that extend beyond the specific financial benefits associated with the insurance products. These include the ability to make more confident decisions in relation to the management of the cropping enterprises (since there is a higher likelihood of

gaining a financial return, even if the level of coverage benefit relates to recouping the operating costs to produce the crop).

Whilst MPCI policies require a relatively large upfront payment, there is a guarantee of achieving a modest level of income that covers much of the risks associated with producing the specific crops. This is appealing not only to farmers themselves, but also the banks (financiers) of the farmers cropping operations.

Whilst MPCI has only been offered in Australia for a small number of years, the uptake of MPCI has been relatively a slow event largely due to the conservatism of Australian farmers. Hopefully this will be overcome in future years as farmers become more aware of the benefits of MPCI in being an extremely valuable tool to better manage the risks associated with farming and agricultural production in Australia.

5. Future Directions

Agrarian and poor communities in general in the Asia-Pacific region are highly vulnerable to climate change. Effective reduction of vulnerabilities requires aligning sustainable development (SD), climate change adaptation (CCA) and disaster risk reduction (DRR) initiatives. Insurance has been increasingly advocated as a risk management tool both by the CCA and DRR communities. However, to what extent insurance has been able to provide risk management benefits is not clearly evident from available experience. The discussion in this report shows that the uptake and effectiveness of insurance is low in the agricultural sector and amongst the most vulnerable groups. Major barriers exist, and while ways to overcome these can be suggested, the limits of insurance must also be recognized. Insurance does not prevent the occurrence of losses, but it does have the potential to benefit DRR and CCA if the current barriers are adequately addressed. Each country and each region within countries have unique risk and vulnerability contexts and thus the design of insurance services must be context specific and targeted to specific vulnerable communities. Keeping in view the importance of agriculture in the livelihoods of Asian communities, this report mostly delves into the experiences emanating from agriculture insurance, though lessons from other forms of insurance has also been drawn wherever relevant.

There is a lack of clear assessment and recognition of insurance benefits and costs in terms of DRR, CCA and SD in existing research. Specifically, there is no evidence to suggest that the current form of insurance provides long-term risk reduction. To the contrary, the ways the insurance programs are designed and implemented today do not provide the full potential benefits that risk insurance offers.

For insurance to provide DRR and CCA benefits, there is a need for the insurance industry to first address the traditional issues that are hindering its effectiveness. From the discussion in this report, it is evident that the traditional insurance programs impose a huge financial burden on the insured because of administrative costs, and unresolved adverse selection and moral hazard problems. Administrative and legislative remedies are necessary to address some of these problems. Another challenge is for the insurer to have an adequate financial base. This report suggests fast-tracking pilot testing of index insurance programs, promoting greater access to international reinsurance markets and promoting targeted government-supported insurance programs for the poorest people who cannot otherwise afford insurance.

The studies in the developing markets indicate that farmers' awareness of insurance is quite low, particularly in India; they even are not aware about their own insurance coverage and claim settlement as the claims are directly settled by the banks that provided the crop loans to the farmers. These findings suggest that a piecemeal approach to solving the issues that are hindering the functioning of crop insurance programs will not work; rather, all the important issues and impediments need to be resolved through policy interventions and well-coordinated efforts from all the key stakeholders.

After addressing common insurance issues, the national level policy environment need to focus on product innovation, compulsory and multiple year coverage, development and sharing of comprehensive databases and capacity enhancement of loss adjusters, among other issues facing rural insurance in developing countries in the region. In terms of the agrarian community, more needs to be done to enhance awareness and effect change in behaviour and movement towards a proactive collective risk management approach. CCA and DRR benefits can be generated even by taking new approaches to drawing up insurance contracts. For example, insurance contracts could specify payouts to be made to female household members, which could in turn increase the role of women in household risk management decisions. Insurance could be designed in such a way that it is mandatorily combined with on-farm risk mitigation practices and conveys proper price indications to those who implement risk mitigation practices.

The report examines the available methodologies and indicators to assess the effectiveness of risk insurance. The major limitations to effectivness measurement methodologies are a lack of a uniform set of indicators to measure insurance outcomes, which makes cross comparison between different studies and insurance products nearly impossible, and lack of a clear definition of expected insurance outcomes for CCA and DRR. The dearth of literature quantifying real benefits and costs of insurance is associated with the complexity of connections between CCA, DRR and SD, the complex ways in which stakeholders are impacted by insurance, and limited understanding on the CCA, DRR and SD concepts among the related professionals.

Insurance premium costs or affordability has emerged as an important issue regarding outreach to the most vulnerable and poor households. NGO-MFIs and other developmental NGOs with a strong presence in rural communities that are willing to experiment with product design and delivery may be the most effective conduits for insurance to poor farming households. To take on this role, they will first need to invest in generating local data and building information systems and the technical capacity of staff to handle insurance. They will also need to experiment with the losses covered, payout arrangements and triggers, packaging of insurance with other products, as well as with delivery models.

Engaging appropriate stakeholders and building their capacity in insurance delivery is an important aspect of ensuring insurance effectiveness. The report has identified that there could be different means of delivering insurance to different sections of the society. Most importantly, the report indicated that public-private partnerships form an important means of insurance delivery and capacity building of the stakeholders engaged. For reaching the poorest communities in the rural areas, NGOs could provide an effective means of delivering insurance services and can strengthen the community-based insurance approaches. Governments must play the role of an enabler through appropriate policies and as a regulator by putting in place proper monitoring and evaluation procedures that encourage

movement beyond the notions of traditional insurance effectiveness towards considering the adaptation and disaster risk reduction benefits of insurance.

Agrarian and poor communities in general in the Asia-Pacific region are highly vulnerable to climate change and for effective reduction of vulnerabilities require aligning of SD, CCA and DRR initiatives. Insurance has been increasingly advocated as a risk management tool. However, from the discussion in this chapter, the uptake and effectiveness of insurance is low in the agricultural sector and amongst vulnerable groups. Major barriers exist, and while ways to overcome these can be suggested, the limits of insurance must also be recognized. Insurance does not prevent the occurrence of losses but it does have the potential to benefit DRR and CCA if the current barriers are adequately addressed. Each country has unique risk and vulnerability contexts and thus crop insurance implementation must be context specific and targeted to specific agrarian communities.

Public-private partnerships in which government works in conjunction with insurers will enhance the potential and effectiveness of insurance for the agrarian community. Insurers need to focus on product innovation, compulsory and multiple year coverage, development and sharing of comprehensive database and capacity enhancement of loss adjusters, among others. In terms of the agrarian community, more needs to be done to enhance awareness and effect change in behaviour, from a subsidized victim mentality to a proactive collective risk management approach.

Fewer than 10 million of the estimated 4 billion people worldwide who live on less than US$ 2 a day currently have access to formal insurance. Furthermore, there are fundamental challenges associated with the lack of targeting of vulnerable groups, unclear roles of public and private sectors, lack of stakeholder interaction, and weak governance systems which make insurance in its current form unviable to the most vulnerable households. The design of insurance should take into account poverty and multidimensional inequalities to enhance resilience among vulnerable communities. The growth of inclusive markets needs to be promoted to make insurance more viable. Governments must move out from blanket subsidies to targeted subsidies in order to maximize the welfare benefits and to make insurance available to the most vulnerable groups. There is a need to revisit the concept of insurance effectiveness in order to maximize the potential for insurance to deliver disaster risk reduction and climate change adaptation benefits. The following chapter discusses insurance effectiveness indicators from this perspective.

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7. Appendix

Conferences/Symposia/Workshops

IGES-SEADPRI-eeMausam-IAFID-UPLB Regional Consultation Workshop on Evidence for Disaster Risk Reduction and Climate Change Adaptation Effectiveness of Insurance: Challenges and Opportunities. 4-5 July 2014, Hotel Puri Pujangga, Universiti Kebangsaan Malaysia (UKM), Bangi, Malaysia.

For list of participants and other details, please refer to the attached proceedings. All presentations are available at: http://www.iges.or.jp/en/natural-resource/20140704.html

Funding sources outside the APN

Source	Approx. Amount	Purpose
Asia-Pacific Adaptation Network (APAN)	*5000 USD*	*Support for conducting case studies in the project countries of Philippines and India*
Centre for International Governance Innovation (CIGI)	*2000 USD*	*To participate and present study findings in the workshop on Thinking Outside the Boat about Climate Change Loss and Damage: Innovative Insurance, Financial and Institutional Mechanisms to Address Climate Harm Beyond the Limits of Adaptation. March 16-17, 2016 – Washington, D.C.*
APEC Research Center for Typhoon and Society (ACTS)	*4000 USD*	*Fund travel related to two workshops organized by ACTS and National Taiwan University for presenting the study findings.*

List of Young Scientists

The following young scientist have worked on this project during the project period.

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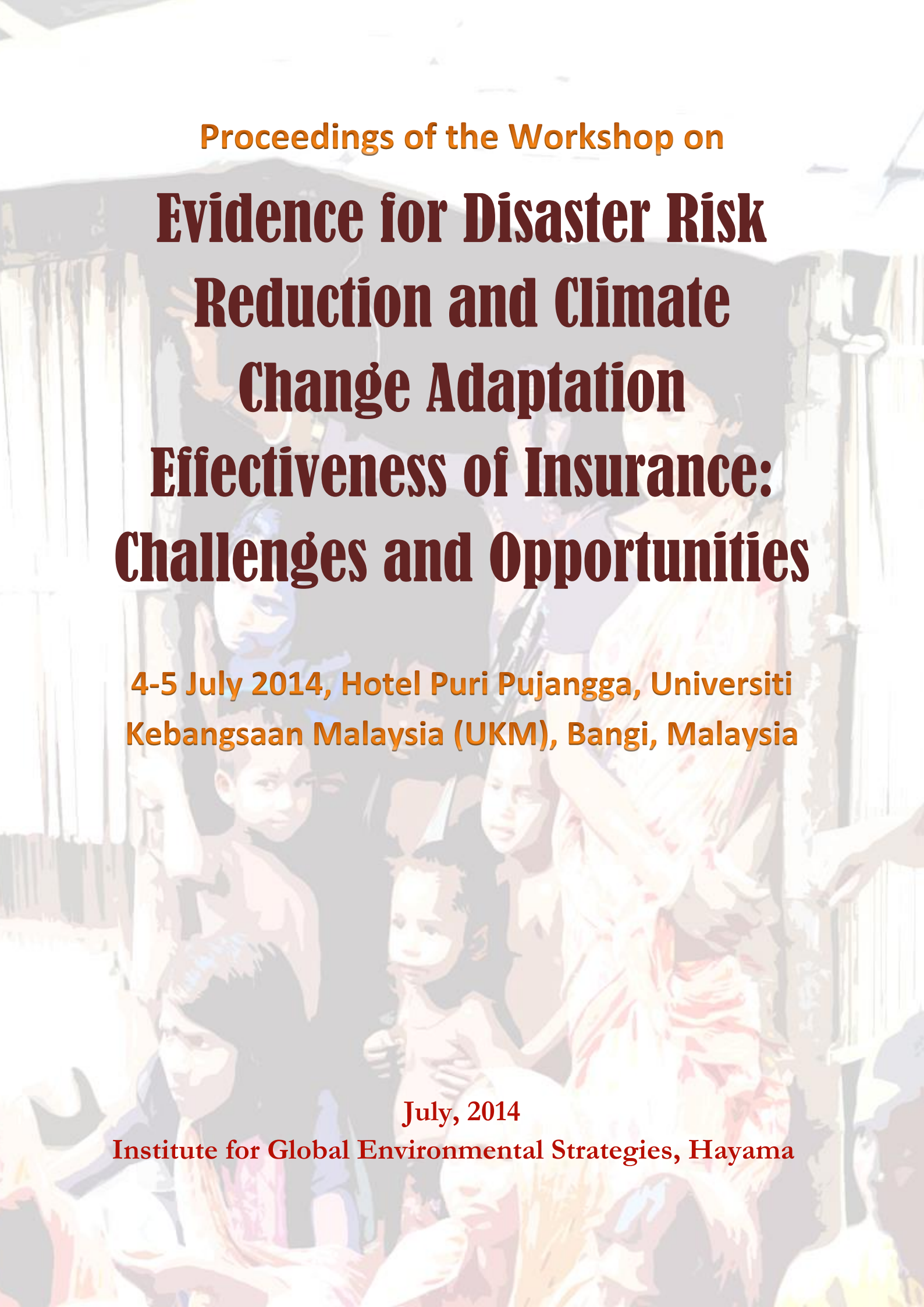
Glossary of Terms

MPCI	Multi-Peril Crop Insurance
CCA	Climate change adaptation
DRR	Disaster risk reduction
CBA	Cost-benefit analysis
BCA	Benefit-cost analysis
NPV	Net present value
SD	Sustainable development
MFI	Microfinance institutions

Proceedings of the Workshop on

Evidence for Disaster Risk Reduction and Climate Change Adaptation Effectiveness of Insurance: Challenges and Opportunities

4-5 July 2014, Hotel Puri Pujangga, Universiti Kebangsaan Malaysia (UKM), Bangi, Malaysia



July, 2014
Institute for Global Environmental Strategies, Hayama

Evidence for Disaster Risk Reduction and Climate Change Adaptation Effectiveness of Insurance: Challenges and Opportunities

Date and venue

4-5 July 2014, Hotel Puri Pujangga, Universiti Kebangsaan Malaysia (UKM), Bangi, Malaysia

Organizers:

- Institute for Global Environmental Strategies, Hayama, Japan
- Southeast Asia Disaster Prevention Research Institute, UKM, Bangi, Malaysia
- University of Philippines at Las Banos, Philippines
- eMausam Weather Services Pvt Ltd
- International Agriculture for Development, Australia

July, 2014

Institute for Global Environmental Strategies, Hayama

Suggested Citation: IGES, UKM-SEADPRI, UPLB, eMausam and IAFD. 2014. Evidence for Disaster Risk Reduction and Climate Change Adaptation Effectiveness of Insurance: Challenges and Opportunities. IGES Workshop Proceedings. Hayama, Japan: Institute for Global Environmental Strategies.

Prepared by: SVRK Prabhakar, IGES

Rapporteurs: Md. Shahin Mia, Md. Sujahangir Kabir Sarkar and Md. Azizul Bari of UKM

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Presentation files: http://www.iges.or.jp/en/natural-resource/20140704.html

Elaborate research report: http://pub.iges.or.jp/modules/envirolib/view.php?docid=5535

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Contents

Preface

Risk insurance has emerged as an important cost effective risk management approach over the past several decades which involved transferring the risk from the most vulnerable to those willing to bear the risk with a fee. Over the years, the risk insurance industry has evolved by providing wide variety of insurance products covering agriculture insurance to life insurance to various forms of asset insurance and combinations. Climate change has brought an important dimension to the human development. As a result, stakeholders across the spectrum are forced to mainstream the climate change concerns into developmental efforts. The benefits provided by insurance have attracted climate change adaptation and disaster risk reduction practitioners to consider insurance as an important tool as it is believed providing an important risk management opportunity to address both climatic and non-climatic risks. As a result, risk insurance has widely been discussed in international negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) and under the post-2015 framework for disaster risk reduction.

While there is considerable growth in the insurance market, much of this growth has come from certain forms such as life, asset and vehicular insurance while leaving behind the vulnerable and neediest out of its reach; the livelihoods of most vulnerable to climatic vagaries have often not been reached by the insurance providers. Several bottlenecks remain unaddressed which include the cost of insurance, poor progress in risk mitigation, lack of awareness among the communities, lack of proper enabling policy environment etc. From a deeper perspective, there is a lack of proper evidence as to what adaptation and disaster risk reduction benefits are accrued from risk insurance and to what extent compared to other risk management opportunities that exist or can be developed as an alternative to risk insurance. Keeping this background in view, the research team engaged with the Asia Pacific Network for Global Change Research (APN) project on “Assessing community risk insurance initiatives and identifying enabling policy and institutional factors for maximizing climate change adaptation and disaster risk reduction benefits of risk insurance” (ARCP2013-18NMY-Prabhakar) have organized a regional expert consultation meeting on 4-5 July 2014 at Bangi, Malaysia to discuss issues pertinent to identifying and measuring DRR and CCA benefits of risk insurance. Subsequent to the workshop, this research report is developed to reflect the current level of understanding on this subject and identifies the issues for further focus by the project. The authors acknowledge the tremendous support received by the research and development community in making us understand the issues involved in risk insurance.

Presentation files: http://www.iges.or.jp/en/natural-resource/20140704.html

Elaborate research report: http://pub.iges.or.jp/modules/envirolib/view.php?docid=5535

SVRK Prabhakar
On behalf of all the Organizers

Background

The Asia-Pacific region is one of the most vulnerable regions to a range of primary hydro-meteorological and geological natural hazards such as earthquakes, storms, floods, tsunamis, landslides, and droughts. The Emergency Events Database (EM-DAT) of Center for Research on the Epidemiology of Disasters (CRED) suggests that specifically the number of hydro-meteorological disasters over the 2000-09 period was 10 times more than the number of disasters reported during 1947-56. In the Asia-Pacific region, the hydro-meteorological disasters have claimed the lives of 0.22 million people with estimated total economic damage costs of 285 million US$ during 2001 - 2012. An increase in the number of catastrophic disasters and related insured and uninsured losses has been reported undermining the developmental gains across the Asia-Pacific region and the world.

The region's high vulnerability to natural hazards, compared to other regions in the world, is primarily caused by a range of geophysical, socioeconomic and developmental conditions which include a long coastline, a highly variable monsoon system, high volcanic and tectonic activity, high poverty both within and outside of urban areas, high population densities associated with massive immigration to cities, partly poorly planned urban development, partly absence of proper disaster risk mitigation mechanisms and institutional/regulatory frameworks including prevalence and enforcement of structural standards such as building- and land-use planning regulations, as well as the poor development of risk spreading instruments such as insurance.

Both life and non-life forms insurances play an important role in disaster risk reduction. However, life insurances are more dominant than the non-life insurances in terms of the volume of insurance premiums, more so in organized sector. From the point of climate change, among all the forms of insurance, the form of insurance that covers the loss of livelihoods (e.g. agriculture insurance) is of most important but still its spread is limited in the region. Though there are several policy and institutional initiatives to promote insurance in the Asia-Pacific region, the region has not been able to utilize the full potential of insurance. The issues are poor interenalization of insurance benefits, high insurance costs, poor access and availability of weather data, poor structural risk mitigation, lack of enabling policies, imperfect information, and technical complexity.[1] The most significant realization stems from the fact that there is a lack of clear assessment and recognition of insurance benefits and costs in terms of disaster risk reduction, climate change adaptation and sustainable development. There is also lack of clear discussion on possible alternative mechanisms that can provide similar benefits that of insurance but can be implemented

[1] Prabhakar, S.V.R.K., G. S. Rao, K. Fukuda, and S. Hayashi (2012) Promoting risk insurance in the Asia-Pacific region: Lessons from the ground for the future climate region under UNFCCC, In P. Schmidt-Thome and J. Knieling, Implementing Climate Change Adaptation Strategies, London": Blackwell Publishers.

much easily considering the constraints limiting the spread of insurance to the most vulnerable.

IGES is a strategic policy research institute located in Japan, focusing on global environmental issues. Established more than a decade ago, IGES has been contributing to providing strategic policy solutions to important environmental issues in the Asia and Pacific region. Though we are small institute, we are endowed with capable staff and collaborators that we work with throughout the region. Climate change is one of the most serious challenges for our planet. To address this challenge, the national international community, governments, NGOs, private sector and even individuals are now focusing their attention on how to deal with the climate change impacts through adaptation interventions.

Asia is inevitably be at the center of climate change adaptation activities as most Asian vulnerable to climate change due to largely agriculture based population, high prevalence of poverty and poor governance reflected in terms of poorly developed technical and financial capacities to address developmental problems.

The Asia-Pacific region is one of the most vulnerable regions to a range of primary hydro-meteorological and geological natural hazards such as earthquakes, storms, floods, tsunamis, landslides, and droughts. The Emergency Events Database (EM-DAT) of Center for Research on the Epidemiology of Disasters (CRED) suggests that specifically the number of hydro-meteorological disasters over the 2000-09 period was 10 times more than the number of disasters reported during 1947-56. In the Asia-Pacific region, the hydro-meteorological disasters have claimed the lives of 0.22 million people with estimated total economic damage costs of 285 million US$ during 2001 - 2012. An increase in the number of catastrophic disasters and related insured and uninsured losses has been reported undermining the developmental gains across the Asia-Pacific region and the world.

Insurance has been promoted as a significant risk management tool at all levels (national, local, regional).

Advantages provided by risk insurance

1) Promotes emphasis on risk mitigation compared to the current response-driven mechanisms.
2) Provides a cost-effective way of coping with the financial impacts of climate- and weather-induced hazards.
3) Supports climate change adaptation by covering the residual risks uncovered by other risk reduction mechanisms such as building regulations, land-use planning and disaster risk management plans.
4) Stabilises rural incomes and hence reduces the adverse effects on income fluctuation and socio-economic development.
5) Provides opportunities for public-private partnerships.
6) Reduces burden on government resources for post-disaster relief and reconstruction.
7) Helps communities and individuals to quickly renew and restore their livelihood activity.
8) Addresses a wide variety of risks emanating from climatic and non-climatic origin, depending on the way the insurance products are designed.

Despite its advantages, the spread of insurance has been very slow and limited in the Asia and pacific region. In terms of insurance, probably the audience in this room knows better than we researchers do in terms what benefits it provides where it is as a risk management instrument, how it has been growing and what are the bottlenecks in making it work. Both life and non-life forms insurances play an important role in disaster risk reduction. However, life insurances are more dominant than the non-life insurances in terms of the volume of insurance premiums, more so in organized sector. From the point of climate change, among all the forms of insurance, the form of insurance that covers the loss of livelihoods (e.g. agriculture insurance) is of most important but still its spread is limited in the region. Though there are several policy and institutional initiatives to promote insurance in the Asia-Pacific region, the region has not been able to utilize the full potential of insurance. The issues are poor internalization of insurance benefits, high insurance costs, poor access and availability of weather data, poor structural risk mitigation, lack of enabling policies, imperfect information, and technical complexity. The most significant realization stems from the fact that there is a lack of clear assessment and recognition of insurance benefits and costs in terms of disaster risk reduction, climate change adaptation and sustainable development. There is also lack of clear discussion on possible alternative mechanisms that can provide similar benefits that of insurance but can be implemented much easily considering the constraints limiting the spread of insurance to the most vulnerable.

This expert consultation workshop has been conducted jointly by IGES, UKM-SEADPRI, IAfD, Eemausam Weather Services Limited, India and UPLB, Philippines. This has been organized as a part of an ongoing project on evaluating climate change adaptation and disaster risk reduction benefits of insurance approaches funded by the Asia Pacific network for Global Change Research (APN). The aim of this workshop is to get to the bottom of some of the issues plaguing the spread of insurance. We believe that there is very limited research on how various forms of insurance are helping communities in addressing climate change and variability related issues. This gap is very significant since lack of clear understanding on benefits and costs of insurance is hindering different stakeholders engaged in insurance to fully promote and get maximum out of it. The event discussed issues underlying the spread of insurance, try to understand how effective the ongoing efforts by different governments and insurance companies and NGOs have been on the ground, how different stakeholders approach the issue of insurance effectiveness and what indicators can we identify to assess its effectiveness.

Keeping this in view, this workshop aims to assess the benefits and costs accrued through insurance, evaluate barriers limiting insurance penetration, identify interventions for greater insurance penetration leading to realization of climate change adaptation and disaster risk reduction and identify alternative approaches to insurance for targeting those cannot be reached through insurance.

Key Questions:

- *To what extent the current insurance approaches are able to reduce risks that they are designed to address?*
- *What are the lifecycle costs and benefits accrued through insurance to various stakeholders engaged in insurance?*
- *What methodologies are suitable for assessing the disaster risk reduction and climate change adaptation benefits and costs of insurance?*
- *How different stakeholders have ensured that the insurance delivers the intended benefits while keeping the costs minimum? While doing so, how they designed, implemented, monitored and evaluated the insurance products?*
- *Considering the costs in implementing affordable insurance to most vulnerable, what alternative approaches can be identified that can deliver similar benefits that of insurance while doesn't incur same level of costs and doesn't suffer from save level of limitations?*
- *What national level policy provisions are necessary for creating enabling environment for greater penetration of insurance?*
- *What are the perceptions of different stakeholders on the current policy environment for promoting insurance in the Asia Pacific region?*

AGENDA

Day I: 4th July 2014

Time	Item
20:00-20:15	**Session I: Opening remarks**
	Henry Scheyvens, Area Leader, Natural Resources and Ecosystem Services, IGES
	Joy Pereira, Professor and Principal Fellow, SEADPRI-UKM
20:15-21:15	**Session II: Overview session** **Chair:** *Joy Pereira, SEADPRI-UKM*
15 min presentation each and 15 min open discussion at the end	1. Effectiveness of insurance programs: Objectives and expectations of the workshop. *SVRK Prabhakar, IGES, Japan* 2. Insurance effectiveness: Policy level questions for which do not yet have answers for making insurance a go-to tool for the most vulnerable. *Sobiah Becker, UNU* 3. Community level barriers that make insurance a difficult tool in risk reduction and ways to overcome. Arpah Abu Baker, UUM COB
21:30	**End of Day I. All APN project partners to stay for a project meeting**

Day II: 5th July 2014

Time	Item
9:00-10:30	**Presentation Session III: Country policy environments and issues limiting scaling up: Researchers perspectives** **Chair:** *David W. Blackett, AG Insurance*
15 min presentation each and 30 min open discussion at the end	1. Crop insurance and risk reduction in agriculture in Australia: Issues and way forward. *Ashley Lipman, IAfD, Australia* 2. Insurance environment in India: Bottlenecks and opportunities for a cost effective insurance products, *G. S. Rao, eeMausam, India* 3. Insurance initiatives in Philippines: Issues and opportunities for community involvement. *J. Pulhin, UPLB, Philippines* 4. Crop insurance experiences from Japan: How insurance benefitted subscribers of sugarcane insurance in Okinawa prefecture of Japan? Some observations. *SVRK Prabhakar and N. Ozawa, IGES*
10:30-11:00	**Tea break**
11:00-13:00	**Session IV: Indicators for overcoming technical, policy and affordability bottlenecks to scale up insurance: Insurance sector and government experiences** **Chair:** *Arup Chatterjee, ADB*
15 min presentation each and 30 min open discussion	**I. Insurance industry:** 1. Australia experience of monitoring and evaluating insurance effectiveness. *David W. Blackett, AG Insurance, Australia* 2. How the plantation insurance has benefited the plantations in Malaysia: Metrics of insurance effectiveness considered by the Sime Darby. *Osman Ahmad, Sime Darby* **II. Governments:**

(PTO)

Time	Item
	1. Japan experiences of evaluating insurance effectiveness: The role of governments. *Teruo Saito, Sompo Japan Nipponkoa Risk Management Inc., Japan* 2. Government representative from Philippines: *Antonio Uy, Philippines Crop Insurance Corporation, Philippines* **Guide questions for the post-presentation discussions:** a) how better the insurance industry and governments can work together to address the insurance issues? b) What effectiveness indicators were considered for implementing insurance? c) Despite considerable subsidies, were industry and governments be able to reach and benefit the most vulnerable and poor? d) Can there be alternatives to insurance considering the bottlenecks in making the insurance work?
13:00-14:00	**Lunch break**
14:00-15:30	**Session V, Panel session:** NGO experiences in implementing insurance products in agriculture with focus on measuring the effectiveness of the insurance products **Chair:** *Henry Scheyvens, IGES*
15 min presentation each and 30 min open discussion	1. Insurance experience from India. *S, Balasubramanian, People Mutuals, India* 2. Representation from Bangladesh: *Baqui Khalily, InM, Bangladesh* 3. Donor experiences of evaluating insurance programs. *Arup Chatterjee, ADB* 4. Effectiveness of micro-insurance programs in Philippines: Metrics used for measuring the effectiveness. *William H. Martirez, Microensure, Philippines* **Guide questions for the post-presentation discussions:** a) How the insurance effectiveness was assessed, monitored and evaluated, b) how the insurance products were made affordable to the most poor and vulnerable, and c) if those experiences can be scaled up and how?
15:30-16:00	**Tea Break**
16:00-17:30	**Session VI: Methodologies for assessing insurance effectiveness** **Chair:** *Baqui Khalily, InM*
15 min presentation each followed by 30 min discussion	1. Some experiences of evaluating insurance effectiveness, *Sobiah Becker, UNU* 2. Methodologies for evaluating the effectiveness of insurance programs across scales keeping in view the diversity of programs. *Steward Doss, National Insurance Academy, India* 3. Methodologies applied for monitoring and reporting the crop and plantation insurance effectiveness in the insurance industry. *En Halim Jantan, Sterling Brokers Malaysia* 4. Comparing national (flood) insurance and safety net arrangements, Anna Lorant, Joanne Bayer and Susanne Hanger, IIASA (joined by Skype) **Guide questions for the post-presentation discussions: a)** What should be the objective of insurance effectiveness assessments? b) What should be the guiding principles for such effectiveness assessments? c) Have insurance effectiveness assessments have been used in setting national guidelines for governing insurance and how they were useful? d) Do the past assessments provide sufficient evidence for insurance to be the go-to-tool?

(PTO)

Time	Item
17:30-18:30	**Session VII: Breakout groups: Identifying indicators for assessing the effectiveness of insurance initiatives** *SVRK Prabhakar, IGES*
	Explanation of the purpose and clarifications: 5 min *Break out group discussions (3 groups): 40 min* *Plenary presentations: 15 min* This session aims at identifying specific indicators for assessing the effectiveness of insurance products so that the policy makers, insurance beneficiaries and industry entities can use them for evaluating the performance of insurance products. All the participants will be split into 3-4 groups to discuss on the following question and come up with a list of indicators reflecting the perspectives of the government, industry and research communities a. Please identify important objectives of evaluating insurance programs for different stakeholders: insurance beneficiaries, delivery agencies (NGOs, MFIs, and industry) and policy (governments). b. Please identify indicators that can help capture/quantify/identify the effectiveness of insurance benefits Refer to the example sheets provided for setting the discussion. Please consider the following requirements: a. Indicators that can help assess disaster risk reduction, climate change adaptation and sustainable development benefits of insurance and other risk management options. Consider the exposure, sensitivity and capacity elements in it as much as possible. b. Indicators at community, delivery (micro-finance institutions, insurance industry and NGOs) and policy (governments) levels. c. Indicators that help compare effectiveness of different insurance products and other risk management options. d. Mostly quantitative but identify quantitative-proxies for qualitative ones if necessary. e. Indicators that help in decision making in both ex-ante and ex-post stages of insurance delivery.
18:30-18:45	**Session VIII: Closing remarks and end of the workshop**

Please contact prabhakar@iges.or.jp for any clarifications on the agenda

Proceedings

Session II: Overview

1. Effectiveness of insurance programs: Objectives and expectations of the workshop.

SVRK Prabhakar, IGES, Japan

Key issues

1. People's behaviour towards insurance service/products
2. Insurance provides benefit short term while long term benefit absent
3. Cost effectiveness of insurance
4. Financial risk management

Policy relevant result

1. Insurance link with DRR and CCA
2. Need to cover vulnerable and poor people

Way forward

1. Efficient payoff
2. Socio-economic development at rural level
3. Farmers risk mitigation options

Any other important observation:

- moral hazards
- lack of sufficient studies

2. Insurance effectiveness: Policy level questions for which do not yet have answers for making insurance a go-to tool for the most vulnerable

Sobiah Becker, UNU

Key issues

1. Climate resistant livelihood
2. Economic and other impacts of climate change
3. Prolong vulnerability due to climate change
4. Poverty reduction through insurance

5. Reduction of social vulnerability

Policy relevant result

1. Effective risk financing scheme
2. Public private partnership
3. Database provision
4. Risk awareness in education

Way forward

1. Gaps identification among stakeholders
2. Creation of incentives
3. Social aspect in risk management

Any other important observation: Decision support system

4. Community level barriers that make insurance a difficult tool in risk reduction and ways to overcome.

Arpah Abu Baker, UUM COB

Key issues

1. Loss estimation of several events
2. Education level/understanding insurance service
3. Government support/financial aid as insurance
4. Good distribution channel
5. Willingness to pay

Policy relevant result

1. Bottom up education
2. Awareness raising
3. Multiple payment system in the non-life insurance
4. Data availability
5. Promoting off-farm income

Way forward

1. Attractive insurance product/premium
2. Public private partnership
3. Government support for administrative cost
4. Risk retention and risk reduction

Any other important observation

1. Fair assessment of loss
2. Farmers database

Chair Remarks

Speaker: Joy Pereira

Key issues

1) Identification of risk factor
2) Age and education level
3) Insurance should be developed on farmers needs
4) Rainfall insurance
5) Priority on local cultural practices
6) Developed product by market survey

Policy relevant result

1) Identifiable, measurable and sustainable
2) Looks on cultural and social norms for socially acceptable
3) Innovative in case of premium, product design and marketing
4) Small group can be formed to cover the risk of crop insurance

Way forward

1) Suitability of social group/marginal group
2) Common terminology about insurance
3) Subsiding from government level

Any other important observation

6. Farmers perception assessment

Session III:

Session Title: Country policy environments and issues limiting scaling up: Researchers perspectives. **Chair: David W. Blackett, AG Insurance**

1. Crop insurance and risk reduction in agriculture in Australia: Issues and way forward

Speaker: Ashley Lipman, IAfD, Austrilia

Key issues:

- Farmer attitude to managing risk on agriculture

- Able to manage risk, primarily through risk mitigation approaches
- Assessing the likelihood of the risk
- Improve decision making: moisture monitoring
- Improve decision making: rainfall decals.

Policy relevant result

- While of managing process
- Income protection, accident and life insurance policies
- Market risks are considered more important than production risks.
- Multi-peril crop insurance (MPCI) is now gaining popularity to farmers in Australia.

Way forward

- Introduce traditional yield insurance product.
- Introduction of index-based products shows some promise.
- Government subsidized insurance products may be improved in Australia.

Any other important observation

- Forward contracting
- On-farm storage of grain

2. Insurance environment in India: Bottlenecks and opportunities for a cost effective insurance products

Speaker: Srinivasa Rao Gattineni, eeMausam, India

Key issues:

- Discrepancy in area insured
- Crop cutting experiment (CCEs)
- Crop loan practices
- Technical skill and capacity building of personnel associated with crop insurance schemes
- Awareness of farmers regarding various features of the schemes
- Product design
- Settlement of claims
- Delay in payment of insurance claim is a barrier in insurance program in India.

Policy relevant result

- Benchmark while deciding the premium

Way forward

- Critical risk should be identify

- Database should be available and online
- Premium rates for irrigated crops should be different from that of non-irrigated crops

Any other important observation

- Use technology (GIS, GPS, GPRS, Remote Sensing, Crop Simulation Models, GPRS enables photographs etc.)

3. Insurance initiatives in Philippines: Issues and opportunities for community involvement

Speaker Name: Juan.M. Pulhin, UPLB, Plilippines

Key issues:

- Based on primary data there are very few Community based insurances in Philippines.
- Insurance to marginalized incivilities
- Weather index based insurance

Policy relevant result

- Tax exemptions
- Discounted prices of farm inputs

Way forward

- Insurance should be planned for long term financial protection for the farmers.
- Limited financial and institutional capacity, micro insurance schemes may raise supplementary financial resources contributing to the socio-economic condition
- Provide adequate agricultural insurance to marginalized farmers and fisher folks
- Promotion of public private partnership (PPP) especially in Agriculture

4. Crop insurance experiences from Japan: How insurance benefitted subscribers of sugarcane insurance in Okinawa prefecture of Japan? Some observations

Speaker Name: SVRP Prabhakar and N. Ozawa, IGES

Key issues:

- Way of crop insurance is helping farmers
- Alternative risk insurance strategies
- Low temperature is the main peril for crops in Japan

Policy relevant results:

- NOSAI (Agricultural mutual Aid System)
- Paddy Insurance to agriculture Natural disaster
- Sugarcane Insurance to agriculture Natural disaster

Baqui Khalily, InM, Bangladesh

Q.1: Do we issue that insurance company a very choice not to our agricultural insurance in Australia?

Q. 2: Have there any innovation in any crop sensitivity vary climate sensitive, has there been any innovation responsible to climate change?

Steward Doss, National Insurance Academy, India

Q. 1: Is there any intensity involved in farmers contractive because farmer contract is a complex behavioural instrument, most of the farmer able to do?

Session IV:

Session title: Indicators for overcoming technical, policy and affordability bottlenecks to scale up insurance: Insurance sector and government experiences

Chair: Arup Chatterjee, ADB

This session was chaired by Arup Chatterjee, Asian Development Bank (ADB), Manila, Philippines. Four papers were presented during the session. The first two papers focused on effectiveness of insurance programmes from the perspective of insurance industry while the remaining two papers highlighted the role of governments in insurance effectiveness. The presentations and comments during the discussion session are summarised in the following sections:

1. Australia experience of monitoring and evaluating insurance effectiveness

Speaker: David W. Blackett, AG Insurance, Australia

Mr. David Blackett, in his presentation, focused on technical and affordability bottlenecks faced by insurance industry to scale up insurance. Technical bottlenecks for insurance industry include moral hazard, morale risk and adverse selection. The presenter highlighted that one of the main affordability bottlenecks is cost of capital of insurers, reinsurers and government. The affordability bottlenecks include administration, distribution expenses, loss adjusting expenses and pure risk premium. The speaker opined that insurance company should approach to the root level farmers in order to scale up insurance programmes. He emphasized that there should be a

holistic approach to evaluate and manage the risks of insurance. In this case, reinsurance can be a way forward to minimize the risks of insurance.

2. Insurance Effectiveness in Climate Chance Adaptation and Disaster Risks Reduction

Speaker: Osman Ahmad, Sime Darby Insurance Pvt. Ltd. Selangor, Malaysia

Mr. Osman gave an overview on insurance coverage of Sime Darby, a private insurance company, in some countries around the world, particularly in Malaysia. The presenter highlighted the mainstream insurance activities carried out by Sime Darby. The downstream insurance activities of the company include food and non-food based segments. On the other hand, the upstream insurance activities include agriculture based segments, particularly the plantation insurance. The company's plantation insurance activities are mainly based on palm oil sector which include development of oil palm plantation, cultivation of oil palms, management of estates and so on. The company also carries out some research and development (R&D) activities for palm oil plantation. The company also has taken some initiatives to cover the losses and damages due to natural and climate-related disasters.

3. Japan experiences of evaluating insurance effectiveness: The role of governments

Speaker: Teruo Saito, Sompo Japan Nipponkoa Risk Management Inc., Japan

The presenter highlighted the importance of insurance to recover people from disaster and develop resilience. He also focused on responsibility of the government concerning national resilience. The speaker gave overview on effectiveness of insurance during the Great East Japan Earthquake in March 2011. Insurance industry was successful in managing the losses and damages caused by the earthquake without significant financial impairment. The government of Japan worked with insurance industry to fulfill its responsibility. The government served as reinsurance underwriter to share the liability of insurance companies. The presenter emphasized that insurance premium should be affordable to make the insurance more effective. The speaker also focused on the challenges to the risks of water-related disasters in Japan. There is an increasing tendency of torrential rainfall as a long-term trend which will become stronger due to the impact of climate change. Therefore, insurance industry should take initiatives to develop new insurance products to face the challenges from the risks of climate related hazards in future.

4. Government representative from Philippines: Philippines Crop Insurance Corporation (PCIC), Philippines

Speaker: Antonio Uy, PCIC, Philippines

Mr. Antonio, in his presentation, focused on the importance of agricultural insurance to serve as an effective financial adaptation measure against the destructive effects of climate change. He also highlighted the various insurance activities of PCIC, Philippines. PCIC is a government supported insurance company which started operation in 1981. The product lines of PCIC include rice crop insurance, corn crop insurance, livestock insurance, fisheries insurance, non-crop agricultural asset insurance, high-value commercial crop insurance, term insurance packages. The presenter also showed the success rate of PCIC in serving the farmers during the last few years. Finally, the speaker highlighted the government interventions for disaster risk reduction to combat the effect of climate change.

Panel Discussion

This discussion began with the panel expressing their views against the guided questions posed by the Chair. An open forum followed with comments and questions from the participants. The panel members were later invited to address the comments and questions. From the panel discussion, the suggested key issues, solution relevant results and way forward are as follows:

Key Issues:

- Technical bottlenecks
- Affordability of insurance and client value
- Insurance and disaster risk reduction
- Insurance and climate change adaptation
- Lack of credible data

Solution relevant results:

- Risk aggregation and risk accumulation statistics
- Risk layering approach to decision making before buying insurance
- Using existing mechanisms for risk management/ insurance (mutuals, cooperatives, NGOs)
- Capacity building and training the resource persons of the insurance industry
- Developing innovative products and claim settlement approaches

Way forward:

- Public- private partnerships (self-sustainability)
- Develop indicators (moral/morale hazard, adverse selection, ratio of subsidy to total premium)
- Role of subsidies
- Hybrid financial products (mixture of insurance and other financial derivatives)

- Develop an enabling environment

Session V:

Session title: NGO experiences in implementing insurance products in agriculture with focus on measuring the effectiveness of the insurance products

Chair: Henry Scheyvens, IGES

This session was chaired by Henry Scheyvens, IGES, Japan. Four papers were presented during the session. The presentations and comments during the discussion session are summarised in the following sections:

1. Climate Risk Mitigation Through Rainfall Indexed Crop Insurance

Speaker: S. Balasubramanian, People Mutuals, India

Mr. Balasubramanian focused on rainfall indexed crop insurance to mitigate climate risk in crop plantation. There are three mechanisms in coping with climate-related risks in crop plantation, namely, risk prevention, risk reduction and risk finance (i.e. crop insurance). The speaker emphasized on rainfall indexed crop insurance to manage the climate-related risks in agriculture sector. Because rainfall is the most potent factor influencing crop yield especially in tankfed agriculture and rainfed agriculture. One of the important features of rainfall indexed crop insurance is that it covers rainfall risks of crops such as risks of deficiency of rainfall, dry spell, and risks of excess rainfall. The other features include affordable premium, high renewal rates and high client value. Finally, the presenter gave importance on mutual rainfall indexed crop insurance for its uniqueness in regular monitoring and evaluation, affordability and scalability.

2. NGO Experiences in Implementing Insurance Products in Agriculture in Bangladesh

Speaker: M. A. Baqui Khalily, Institute of Microfinance, Bangladesh

Professor Khalily, in his presentation, focused on disaster risk reduction strategies which include disaster risk fund, ex-ante access to finance, and insurance mechanism. He opined that disaster Risk Reduction strategies should encompass insurance and non-insurance interventions. Because Traditional insurance markets are not appropriate for poor and vulnerable households due to non-affordability, non-accessibility and non-acceptability. In this case, community based insurance interventions, for example, micro-insurance may be more appropriate. Non-insurance interventions of community organisations like NGOs/MFIs may also be helpful for

reducing risks of poor and vulnerable people. Finally, the presenter pointed out some indicators to assess the effectiveness of community based insurance interventions.

3. Donor experiences of evaluating insurance programs

Speaker: Arup Chatterjee, Asian Development Bank (ADB), Manila, Philippines

Mr. Arup focused on donor experiences in evaluating insurance programs. The presenter emphasized that donor should be correctly defined and identified. Donor is not a market actor. They play a catalystic role in financial market. Donor, like ADB provides financial and technical services to the actors (such insurance company, bank, MFIs) in the financial market.

4. Effectiveness of micro-insurance programs in Philippines: Metrics used for measuring the effectiveness by MicroEnsure

Speaker: William H. Martirez, MicroEnsure, Philippines

Mr. Martirez focused on microinsurance and its effectiveness in Philippines. Microinsurance provides the poor access to a basket of risk protection, support and services in exchange of affordable premium payments in pursuit of poverty reduction. The speaker identified some indicators to assess the effectiveness of microinsurance programmes in Philippines. The indicators can be divided into four key areas, namely, marketing and distribution, financial management and viability, efficiency and client value, and investment management. The presenter also highlighted the performance indicators for microinsurance which include product Value, product awareness and client satisfaction, service quality, and financial prudence.

Panel Discussion

This discussion began with the panel expressing their views against the guided questions posed by the Chair. An open forum followed with comments and questions from the participants. The panel members were later invited to address the comments and questions. From the panel discussion, the suggested key issues, solution relevant results and way forward are as follows:

Key Issues:

- Climate risk mitigation
- Disaster risk reduction strategies
- Community based insurance interventions

Solution relevant results:

- Encompassing insurance and non-insurance interventions
- Initiatives for community based insurance interventions

Way forward:

- Promote alternative interventions (for example, ex-ante financing, non-insurance interventions by NGO/ MFIs)
- Conduct insurance education programme at grass root level
- Ensure efficiency of insurance market

Session VI:

Session Title: Methodologies for assessing insurance effectiveness

Chair: Baqui Khalily, InM

1. Some experiences of evaluating insurance effectiveness

Speaker Name: Sobiah Becker, UNU

Key issues:

- Climate Change leads vulnerable people into deeper poverty
- Poverty and social variability are intertwined
- For the low-income people needs understand of risk management

Policy relevant result

- The livelihood protection policy is now initiating in Caribbean island countries
- Livelihood protection policy helps reduce livelihood risks and vulnerabilities.
- Insurance is a means of building resilience at grassroots level
- Livelihood protection policy provides financial liquidation to the poor.

Way forward

- Effective instrument to manage and transfer risk
- Improves access to credit, leading to financial stability in the long run
- Encourages behaviour shift from risk neutral to risk aware

2. Methodologies for evaluating the effectiveness of insurance programs across scales keeping in view the diversity of programs

Speaker Name: Steward Doss, National Insurance Academy, India

Key issues:

- Assessing economic loss is an important indicators of effectiveness of insurance

- Coverage of losses and spread of insurance products are important indicator for insurance
-

Policy relevant result

- Make CAT Risk Insurance Compulsory
- Make premium rates affordable to farmers and low income householders

Way forward

- Varieties in insurance products should be taken into consideration
- Premium rate should be reduced to increase the number of insurance
- Farmer inputs should be considered in designing insurance product
- Alternative risk management mechanism, for example reinsurance and other small financial services should be initiated to minimize the risks and effectiveness of insurance program.
- Develop Portfolio Risk Management
- Increase the penetration through new micro channels
- Increase the participation of Public and Private Partnerships

Any other important observation

- Variation in temperature is another area of consideration. However, insurance company provides insurance services for rainfall, not temperature.

3. Methodologies applied for monitoring and reporting the crop and plantation insurance effectiveness in the insurance industry

Speaker Name: En Halim Jantan, Sterling Brokers, Malaysia

Key issues:

- Crop insurance coverage in Malaysia is very limited.
- Cost of acquiring data related losses and damages is very expensive
- Implementing crop and plantation insurance
-

Policy relevant result

- Agencies responsible for covering risks
- Provide financial capacity to the crop & plantation community
- Agency responsible to administer data related to crop insurance
- Promote large-scale farming
- Set the relevant policies in the crop and plantation insurance implementation

Way forward

- There should be incentives for insurance company as well as poor farmers for effectiveness of insurance
- Government also should promote large scale farming
- There should be some sort of low for insurance like car insurance. In other words agriculture insurance should be mandatory by law.

4. Comparing national (flood) insurance and safety net arrangements

Speaker Name: Anna Lorant, Joanne Bayer and Susanne Hanger, IIASA

Key issues:

- There are some evaluation criteria for insurance programs

Way forward

- Risk based pricing should be initiated for reducing the risk in agricultural insurance
- Viability of the insurance program should be ensured
- Adequate data on various aspects on insurance should be available and freely accessible
- Affordability issue should be taken into consideration in designing the insurance products.

Q &A

Sobiah Becker, UNU

As we are discussed in earlier session, we valuating our insurance product does with in coming to question per at the stage because of the product have been on market for under a year in Grenada the product is not been marketed yet. Therefore, any valuation would be doing at least two years down the line.

Steward Doss, National Insurance Academy, India

The most important objective for measuring effectiveness of insurance program, whether are we able to measure the real effectiveness from the multi stakeholder point of view. We should not go with one particular line of approach that is considering only the insurance experience or farmer experience the better assessments could be holistic, methodology. All the key stakeholders are involved in the program.

Remarks by chair:

Providing agriculture insurance is expensive/ costly. In case, participatory approach in designing insurance products would reduce the bottleneck of insurance.

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