

Research Article

Does program linking with insurance makes agriculture insurance sustainable?

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ABSTRACT

Agriculture insurance is most common forms of risk transfer in agriculture. It is often compulsory for borrowers of agricultural loans in low and middle income countries. This study tries to find out the status of compulsory agriculture insurance in Nepal and its sustainability through answering question “are compulsory agriculture insurance programs making agricultural insurance sustainable? Or we have to think differently for its sustainability. Household survey were conducted using pre-tested semi structured questionnaire in eight districts. Altogether 377 insurer farmers (132 crop and 245 livestock farmers) were selected from the list of target population using simple random sampling technique. Similarly, five cases were selected from the study districts. Result shows that Government of Nepal (GoN) has developed both cost of production and value based insurance products based on farmers demand. Basically, premium rate is fixed as five percent to cost of production based and seven percent to value based insurance for most of crops and livestock. Different governments programs such as youth self-employment program, youth focused program, spring rice promotion program and other grant/subsidy programs under different mega projects of GoN have started to link agriculture insurance with their programs. Insurance has been made mandatory to get such any subsidy support from the government for promoting agriculture insurance simultaneously. However, this study found that this strategy did not adequately work. But if they feel the enterprises is risky and realize the importance of agriculture insurance and can get higher returns from the enterprises, they were willing to participate in agriculture insurance. Most of farmers who participated in government grant program have limited understanding of crop insurance so that they have discontinued insurance after the end of grant/subsidy program. Therefore, it is necessary to revisit the existing provision of grant linked insurance and need to focus more on creating awareness on importance of agriculture insurance for its sustainability.

Keywords: Compulsory insurance, Grant, Continuation, Risk transfer, Sustainability

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INTRODUCTION

Agriculture insurance is most common forms of risk transfer in agriculture (World Bank, 2011). It can play the important role in protection of farmer's consumption and productive assets that enable farmers to take decision towards more risky, but potentially much more profitable farming activities, which demands the use of credit to purchase new production technology (FAO, 2011). Mahul and Stuley (2010) reported underdeveloped insurance market in low-income countries where cooperative and farmers group acts as a service provider of agricultural insurance in local level. The provision of agricultural insurance through rural banking networks, including microfinance institutions is still very limited, although several initiatives are under preparation in Africa and Asia (Mahul & Stuley, 2010). They reported almost 80 percent of agricultural insurance programs are offered on a voluntary basis. But agricultural insurance is often compulsory for borrowers of agricultural loans in low and middle income countries. This type of credit linked insurance may offer new opportunities to develop agricultural insurance in such countries (Mahul & Stuley, 2010). The heavily subsidized scheme in India is largely linked to bank lending. In China, crop insurance is voluntary, but it is compulsory for subsidized cattle and for sow epidemic disease livestock insurance programmes. In Japan, crop insurance is compulsory for the main staple crops of rice, wheat and barley for farmers who cultivate more than 0.3 ha of land, but fruit and livestock insurance are voluntary. In the Democratic People's Republic of Korea, rice and maize insurance is compulsory for cooperative (collective) farms (FAO, 2011).

Cost associated with creation of insurance awareness and other promotional campaigns are considerably lower where insurance policy is sold in compulsory basis. Financial institutions and input suppliers are also benefited with transferring farmer's default risk as a result of natural and weather events to the insurance industry, thus increasing the farmers' credit worthiness (FAO, 2011). With the formulation of crop and livestock insurance directives by the Government of Nepal (GoN), agriculture insurance was formally started by private insurance company from January 2013 (Bima Samiti, 2017). Limited awareness and lack of insurance service is a major constraint behind the adoption of agricultural insurance in Nepal (World Bank, 2009; Ghimire, 2014; Ghimire *et al.*, 2016). By realizing the limited flow of agriculture insurance in Nepal, GoN has taken an initiatives to make agriculture insurance compulsory through linking agriculture insurance with special government's agricultural programs and mega projects. Therefore, this study tries to find out the sustainability of agriculture insurance programs that are linked with different government programs by raising central question "are compulsory agriculture insurance programs making agricultural insurance sustainable?" Or we have to think differently for its sustainability.

METHODOLOGY

Household survey were conducted using pre-tested semi structured questionnaire in eight districts namely: Jhapa, Rupandehi, Palpa, Syangja, Surkhet, Nuwakot, Tanahun and Kaski to know whether farmers were involved in insurance due to their own interest or due to mandatory provision to get program support. Those districts were purposely selected with selection criteria of having higher insurance coverage and representing both ecology i.e. hills and terai. Pocket areas of crop and livestock insurers who have insured crop or livestock in insurance companies under crop and livestock directives were identified within the district in

consultation with respective DADO and DLSO. From the list of different insurers in the pocket area, altogether 377 insurer farmers (132 crops and 245 livestock) were selected using simple random sampling technique. Similarly, depth information about agriculture programs that were mandatorily linked with agriculture insurance in Nepal was collected using different cases from Kavre, Nepalgunj, Jhapa and Kaski districts of Nepal. Interaction with different stakeholders and experts were done to collect information about agriculture insurance products, their perception on government grants programs that were linked with agriculture insurance and future government's programs/strategies regarding agriculture insurance in Nepal. Moreover, secondary information were also collected from literature review.

RESULTS AND DISCUSSION

Agricultural insurance products in Nepal

Government of Nepal (GoN) has been implementing crop and livestock insurance since January 2013 by formulating crop and livestock insurance directives 2013. Under this directive, government has been providing 75% subsidy in premium to be paid by farmers. Insurance board of Nepal is involved in formulation of insurance policy in coordination of respective department from Ministry of Agricultural Development and Ministry of Livestock Development. Initially, agriculture insurance was started with six insurance products based on cost of production (BS, 2017). Until 2018, more than 70 insurance products for vegetables¹, cereals, fruits, fish, honey, and livestock's has been developed (Table 1). Based on demand of farmers and market need, about 55 insurance products (including 49 vegetable crops) has been designed based on value of production (Bima Samiti, 2017). Those value based insurance schemes in vegetable crops has also opened room to go for cost of production based insurance if farmers are interested to adopt it.

Two more value based insurance products are also in pipelines (Table 1). Farmers can choose value or cost of production based scheme but in Tea, mix approach is offered, i.e., cost of production approach before plucking stage and value based approach at plucking stage. Premium rate is fixed five percent to cost of production based and seven percent to value based insurance for most of crops and livestock except apple (8%), turmeric (5%), spring rice (5%), cereal seed multiplication (5%), fish pond (one percent), ostrich (2%) and broilers (1.25 percent). The details of premium rate and insurance types are given in Table 1.

From FY 2013/14, 17 non-life insurance companies have been involved in crop and livestock insurance. Initially insurance companies were not happily involved in crop insurance program, but the GoN has assigned three to five districts per insurance company to cover 77 districts within the country. Their insurance policy and procedure is according to the guidelines provided by insurance directives 2013. Overall insurance market coverage is particularly higher for livestock than the crop sector (Bima Samiti, 2017).

¹ It includes 49 vegetable crops

Table 1: Description of different insurance products in Nepal

SN	Insurance product	Premium rate	Insurance type
1	Vegetables (49 crops)	5 and 7% per crop for cost of production and value based, respectively	Value based and cost of production based (plastic house cost consideration only in cost of production based)
2	Ginger	7%	Value based
3	Turmeric	5 %	Value based
4	Forage (seed multiplication and forage crop)	7%	Value based
5	Cereals seed multiplication	5%	Value based
6	Spring (<i>Chaita</i>) Rice	5 %	Value based
7	Fish	2% per year	Value and cost of production based
8	Apple	8%	(WI) weather index based
	Rice	5% per crop	Cost of production based
9	Fruits	5% per year	Cost of production based
10	Vegetables including potato and mushroom	5% per crop	Cost of production based
11	Cardamom	5% per year	Cost of production based
12	Banana (pro rata basis for more than a year)	5% per crop	Cost of production based
13	Sugarcane	5% per crop	Cost of production based
14	Honey bee	5% per year	Cost of production based
15	Fish pond	1% per year	Cost of production based
16	Livestock	5% per year	Cost of production based
17	Poultry (layers/parent/duck)	5% per year	Market valuation
18	Poultry (Broiler)	1.25% per batch	Market valuation
19	Ostrich	2% per year	Cost of production based
20	Fruits: Apple, Orange, Mango	On discussion*	Value based
21	Tea	On discussion*	Cost of production based before plucking stage and value based at plucking stage

Source: Bima Samiti, 2017 & discussion with Agriculture Insurance focal person from Department of Agriculture, 2018; * are pipeline products

To make agriculture insurance program effective, Department of Agriculture (DoA) and Bima Samiti had provided insurance orientation trainings (regarding insurance products, procedure and importance of agriculture insurance etc) to different insurance agents² (about 1200) in more than 31 districts over 4 years (2014/15 to 2017/18) time period in coordination with DADO, DLSO and different I/NGOs (Bima Samiti, 2017; communication with Agriculture Insurance focal person, Department of Agriculture, 2018). They have also plan to continue it. Commission for insurance agent is 15% of premium rate for each product, however if insurance is done through member organization such as group/cooperative there will be 15% discount on total premium (Bima Samiti, 2017).

²Insurance agents were agri. and livestock technicians and leader farmers

Government's agriculture programs and its linkage with agricultural insurance in Nepal

Although the insurance is voluntary that the farmers has choice either to join or not in insurance scheme, crop insurance in mega rice (spring rice) program in Nepal are compulsory/mandatory for those farmer who want to participate in the program. This program is a typical output based facilitation program that provides NRs 5000/ha cash incentive after the farmers/farmers' group/cooperatives grow spring rice and ensure their crop via crop insurance program. The program was introduced in FY 2015/16 in 15 terai districts with the objective of productivity increment and area expansion to contribute to become self-sufficient in rice production. The program has targeted to increase the area of spring rice to 300 thousand hectares from the base year area 111 thousand hectares through increasing productivity from 4.0t/ha in base year to 5.0 t/ha (CDD, 2015). The target of increasing spring rice area was 5400 ha in 2015/16 while achievement was only 2542 hectares (CDD, 2016). Similarly, the target of extending area under spring rice for fiscal year 2016/17 was 6900 ha in 35 districts (CDD, 2016). The program has been implementing as per mega rice production program implementation guidelines, 2015 ((Bhandari et al., 2017).While selling the individual insurance policy the problem of adverse selection is high since farmers only join insurance when they perceive that they are under risk of crop failure. Compulsory insurance address the problem associated with individual insurance that all farmers have to insure their crops so there will not be the problems of adverse selection. In addition to the compulsory program, other different agricultural projects/programs like youth focused (*Yuba Lakshit*) program supported by DoA through DADO; mega projects of Ministry of Agriculture and Livestock such as Project for Agriculture Commercialization and Trade (PACT), Raising Income of Small and Medium Farmers Project (RISMFP), High Value Agriculture Project (HVAP), Irrigation and Water Resources Management Project (IWRMP); and other different agriculture programs supported by different organizations/institutions such as NGOs, Bank, community based organizations i.e cooperatives. Dairy are also linking their agriculture programs with agriculture insurance in Nepal. Similarly, Youth and Small Entrepreneur Self-Employment Fund (YSEF) program which was started to support unemployed youths with subsidized loans to start small businesses has also made their program with mandatory insurance. In this program all the borrowers of the loans provided under YSEF should be insured mandatorily and the premium of the insurance has been paying by YSEF. Moreover, Ministry of Agriculture Land management and Cooperative in different provinces has also started to develop agriculture program linking with agricultural insurance (communication with ministry secretary and senior officials, October 2018). Description of the government's agriculture programs and its linkage with agricultural insurance in Nepal are given in Table 2.

Table 2: Examples of government's/other agriculture programs linked or made compulsory with agriculture insurance in Nepal

Name of government/other programs compulsorily linked with agricultural Insurance/Duration	Remarks/ Purpose, coverage and support
1. Youth focused program (<i>Yuba Lakshit</i>) supported by DoA through DADO/started since 2014	To provide grants to youth for creating employment and support on their livelihood. Different lucrative enterprises (schemes) like vegetables, honey, mushroom and fish production were selected for this program. There was variation in grants amount per scheme from NRs 40000 to NRs 80000 based on ecological domain and types of schemes. DADO of respective districts were responsible for program implementation based on youth focused program implementation guidelines 2014. (MOAD, 2014; http://www.doanepal.gov.np/downloadfile/Yuba%20laxit%20DOA_1414924823_1416729488_1435209729.pdf .)
2. Mega Rice (Spring Rice) Production Program supported by Crop Development Directorate (CDD)/started since 2015/16	To expand the area of spring rice to 3, 00,000 hectares from the base year (2015) area 1, 11,000 hectares while the productivity would be increased to 5.0 t/ha from 4.0 in base year (CDD 2015). The mega rice production program is a typical output based facilitation program that provides NRs 5000/ha cash incentive after the farmers/farmers' group/cooperatives grow spring rice in a line and ensure their crop via crop insurance program. It covered 15 terai districts in 2015/16 and expanded to 35 terai districts in 2016/17 (Bhandari et al., 2017).
3. Mega Projects of Ministry of Agriculture	
3.1 Project for Agriculture Commercialization and Trade (PACT)/ 2009-2018	To improve the competitiveness of smallholder farmers and the agribusiness sector in selected commodity value chains in 75 districts supported by world bank
3.2 Raising Income of Small and Medium Farmers Project (RISMFP)/ 2011 -2018	To assist small and medium sized farmers to diversify into high value commodities (HVCs) by establishing market linkages; providing capital for inputs and improved technology; and for building post-harvest value chain infrastructure including storage, packaging, grading, and processing in 10 districts supported by Asian Development Bank
3.3 High Value Agriculture Project (HVAP)/2010-2017	To integrate the rural poor, especially women and marginal groups in high value agriculture and Non-Timber Forestry Products (NTFPs)/Medicinal and Aromatic Plants (MAPs) value chains and markets, and improve income, employment opportunities and ability to respond to market demand and opportunities based on marketing agreements with private agribusiness in 7 districts supported by IFAD
3.4 Irrigation and Water Resources Management Project (IWRMP)/ 2008-2018	To improve irrigated agriculture productivity and management of selected irrigation schemes, and enhance institutional capacity for integrated water resources management in 44 districts supported by World Bank
4. Youth and Small Entrepreneur Self-Employment Fund (YSEF)	Helps to provide unemployed youths with subsidized loans to start small businesses. Any unemployed individual aged 18-50 is eligible for the loan and can receive up to NRs. 5, 00,000 and a group of 20 people can receive up to NRs. 1, 00, 00,000. YSEF provides loans to concerned Bank and financial Institutions (BFIs) and cooperatives at the rate of 4-5%. All the borrowers of the loans provided under YSEF should be

insured mandatorily and the premium of the insurance will be paid by YSEF (Maharjan, 2018).

5. Others programs

Different organizations/institutions such as NGOs, Bank, and community based organizations i.e. cooperatives, dairy are linking their agriculture programs with insurance

Agriculture insurance and lessons from compulsory agricultural insurance programs in different countries

Agricultural sector has very low insurance uptake as compared to other economic sectors like manufacturing, mining and services sectors. Farmers have a perception of insurance as an unnecessary expense rather than a future risk mitigating measure. Various factors such as age, experience, level of education of the farmer, size of land, reputation of insurer and satisfaction with insurance determine farmer's preferences that directly relates to risk aversion of the farmer, which ultimately determines the demand for insurance product (Tsikirayi *et al.*, n.a.). The probability of insurance adoption increases with the awareness of insurance scheme among the farmers (Mohammed & Ortmann, 2005). Extension contact of the farmers and knowledge about the premium subsidy schemes were the key factors affecting the livestock insurance adoption (Kandel & Timilsena, 2017). The social participation and education level of the farmers were found to be significantly influencing farmer's awareness of insurance schemes. Awareness of farmers on insurance product increases with increased participation in social and community-based organizations like farmers association, self-help groups, watershed association, and cooperative credit societies (Kumar *et al.*, 2011).

In India and the Philippines government legislation makes crop insurance compulsory for farmers who borrow seasonal crop production credit from the national and commercial and cooperative banks, but is voluntary for non-borrowers. It is also understood that in Pakistan, crop insurance is compulsory for farmers accessing loans from the private, commercial and state banks. Some private sector MFIs or NGOs also use compulsory insurance to protect their loans to livestock producers. In Bangladesh, India and Nepal it is interesting to note that several private NGOs/MFIs and cooperative banks that are involved in providing livestock investment loans (most commonly for dairy cattle or buffalo, but also for small ruminants and poultry) have also developed livestock loan protection guarantee programmes and in these cases insurance is compulsory for the livestock owner until their loan has been repaid in full (FAO, 2011). Government tries to make agricultural insurance compulsory in the case when farmers borrow credit from national bank and financial institutions. Farmers perceived compulsory insurance may be unattractive unless it is accompanied with premium subsidies and/or the farmers is able to gain access to bank credit that he would not otherwise have been eligible for, and where credit is sometimes provided at concessionary interest rates. From the insurers prospective there are two potential benefits when insurance was made compulsory to the farmers: the reduction of adverse selection, which is a major problem on voluntary agricultural insurance program and the ability to generate a larger and more balanced agricultural insurance portfolio (FAO, 2011).

In 1985, Government of India launched Comprehensive Crop Insurance Scheme (CCIS). This was a credit linked insurance scheme which was compulsory for loanee farmers but not available to non-loanee farmers and was heavily criticized as a loan insurance scheme. This

scheme did not perform well because of the highly subsidized premium rates and the claim-premium ratio was greater than one i.e. unfavorable for most of the seasons. To combat the demerit, National Agricultural Insurance Scheme has been implemented since 1999. This scheme compulsorily covers loanee farmers and unlike CCIS, non-loanee farmers growing insurable crops can also participate in the scheme (Raju & Chand, 2008; Swain, 2014). Sweden started its crop insurance program in 1961, which was a compulsory insurance, and insurance premium were paid as levies on farm deliveries with subsidy provision of more than double the farmers' contribution from Swedish government. During the period between 1961 and 1987 Swedish government supervised the agriculture insurance and was made mandatory with farms more than two hectares. Huge loss occurred in this program with average deductible of 15.5 percent. Thus, this insurance system was abolished in 1987. At present, there is no governmental involvement in agriculture insurance and is provided by three private mutual insurance companies. Agriculture insurance is delivered through producer and crop associations with higher penetration rate of 60-80% among farmers and that is voluntary in nature (Reyes *et al.*, 2017). Voluntary crop insurance is prevalent in New Zealand but the insurance is compulsory to kiwi fruit industry as decided by the industry association. Insurance brokers and producer associations are the primary delivery channels for crop insurance especially the fruits. Agricultural insurance in New Zealand does not have any public support, thus, no premium subsidies are available. In 2007, the penetration rate was only 5% with the average loss ratio of 50% for crop insurance including forestry (Reyes *et al.*, 2017).

Crop Insurance Act in Japan was established in 1938, which was implemented as a multi-peril crop insurance program. However, Japanese government started providing 50% subsidy in insurance premium only after 1947. The agricultural insurance in Japan had been compulsory for the farms greater than three-fourths acre (Reyes *et al.*, 2017). The credit linked insurance named PROAGRO was implemented in Brazil. Under this insurance program, insurance was mandatory to access official credit and the amount of farmer's credit determined coverage. However, this program experienced huge loss with the overall loss ratio of 3.87 from 1975 and 1981 (Reyes *et al.*, 2017). But instead, more innovative insurance product named as agricultural income insurance was piloted in 2010 in Parana, Brazil that offers productivity coverage with a price guarantee (Reyes *et al.*, 2017).

Farmers participation in agricultural insurance programs, reasons of their participation and its continuation in Nepal

The study shows that about 48 percent and 20 percent of the crops³ and livestock insurers, respectively were participated in insurance program due to compulsory nature of the agricultural program. On average 34 percent insurers were compulsory insurers (Figure 1). Rest of the insurers were participated from their own interest. Crops insurance is new compared to livestock insurance thereby government wants to increase number of crop insurers as soon as possible. Therefore, Government initiates strategy to link different agriculture programs with the agricultural insurance programs, which is described in above

³Crops includes vegetables, rice, mushroom, cauliflower, tomato, cucurbits in the study area

section. Thus, the percent of compulsory crop insurers were found more compared to livestock.

The percentage of compulsory crop insurers among total crop insurers in different district were varied from zero (Tanahu and Kaski) to hundred (Jhapa and Rupandehi) percent. All of the crop insurers in Jhapa and Rupandehi were participated in the programs due to compulsory nature/linking of the government's agriculture programs with agriculture insurance. Among 41 crop insurers in Jhapa, 15 were mushroom growers. In case of compulsory/linking insurance with agriculture programs, different cases were found where mostly insurance is mediated through local level organization/cooperative, which received total subsidy/support from the government. Furthermore, compulsory insurance has been implemented by issuing single insurance policy under the name of local level organization/cooperative which coordinated with individual farmers for farming particular crop. In some cases, individual farms receiving grant/support from government also have to insure to receive grant. In that case, farmers joined insurance only to receive grant and support.

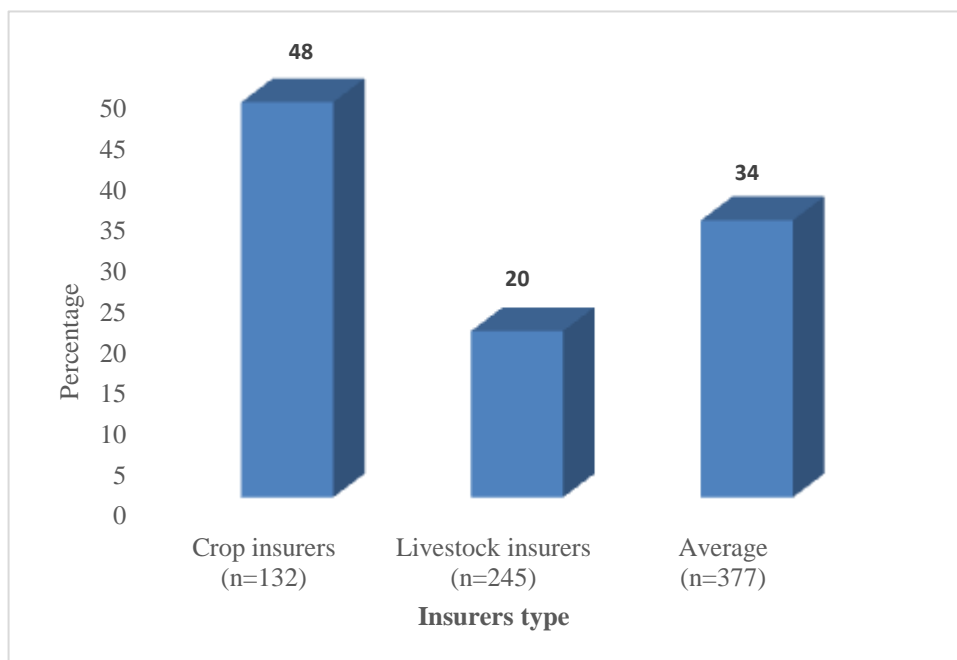


Figure 1: Percentage of crop and livestock insurers involved through mandatory insurance

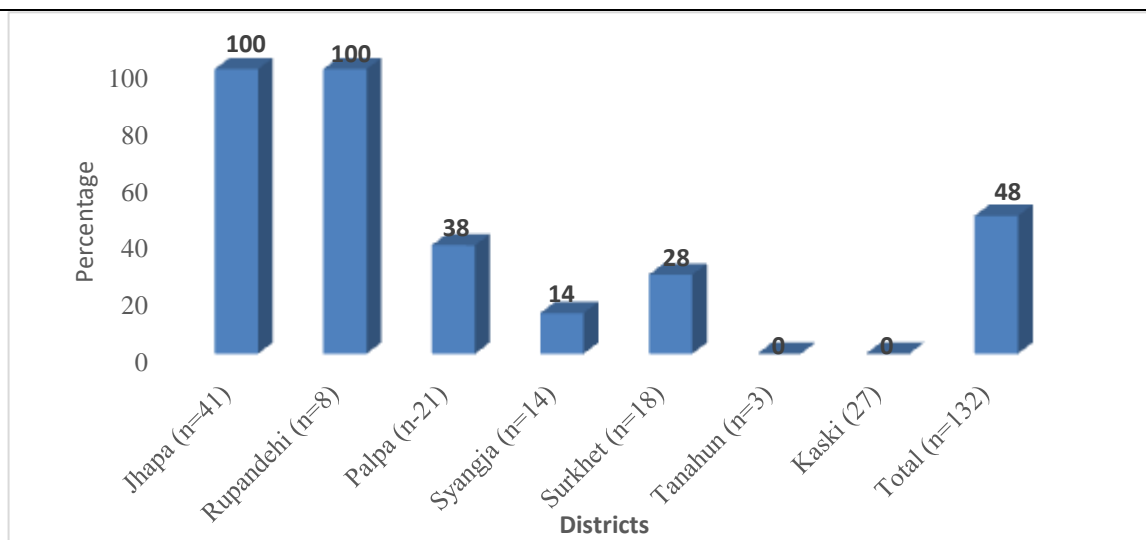


Figure 2: Percentage of insurers involved in mandatory crop insurance on total crop insurers

To know the effectiveness of those agricultural programs and its linkages with agriculture insurance, we have chosen different cases. Among them, one case of crop insurers (15 mushroom grant receivers) in Jhapa who were involved in youth focused (*Yuba Lakshit*) program supported by DoA in 2015/16 and 2016/17 was selected. Then we have made follow up survey in October, 2018 with them to know the continuity of the agriculture insurance and even the agriculture programs which was carried out by them. Result shows 100% of them discontinued the agriculture insurance when grant was withdrawn and only 65% entrepreneurs have been continuing their business (agricultural program). The details of the other cases are described below.

Insurance of Horticultural Nursery in Kavre, Nepal

Shambhu Ghising of Nasikasthan, Kavre has established horticultural nursery in 11 ropani land in Nasikasthan, Kavre. He is motivated to do something new in Nepal and came with the decision to establish horticultural nursery. Initially he followed the suggestion of technician from District Agriculture Development Office, Kavre. He registered his nursery to District Agricultural Development Office in 1998. Since its establishment, this nursery has become his source of livelihood through regular cash income. Mainly he raises the seedlings of citrus, grapes, mango, kiwi, etc. He established plastic tunnels to create favorable environment to grow seedlings of different fruit crops. Mr. Ghising experienced heavy loss to his nursery in the year 1999 due to windstorms and heavy rainfall. Later, there was the infestation of the damping off of the seedlings and all the nursery plants were damaged. The loss was equal to Rs 3, 00,000. At that time the District Agriculture Development Office (DADO) supported Rs 50,000 as a relief fund. This small amount of fund was not sufficient to cover all losses but he got encouraged to continue nursery enterprise. Government program of seedling distribution coordinated with him and he have to fulfill government demand of fruit seedlings. He was happy to share this information to us that he has regular contact with officials from government and they provide suggestion as and when required.

Beside the technical support, he has received Rs 2.3 million as a grant from Project for Agricultural Commercialization and Trade (PACT) one of the project funded by World Bank.

Under the norms of project, there was compulsion for insurance so he consulted officials from DADO and joined insurance from Himalayan General Insurance Company, Kavre in the fiscal year 2014/15. He said, he is well known of insurance procedure but has doubt when to claim and what cases are eligible to claim for indemnity. According to him, insurance should be taken as a last option for risk minimization as most of the risks can be minimized by following good farming practices. He was unsatisfied with current insurance policy for fruit crops as they are perennial and need to cover more than 1 year under the same insurance policy. To know the continuity of his involvement in agriculture insurance, we have made follow up survey in October, 2018. His involvement in nursery enterprises is still continue but he had already discontinued agriculture insurance after receiving PACT grant.

Group insurance of potato in Raniyapur, Banke

Farmers of Raniyapur and Bageswori VDCs were united for agricultural development with the establishment of Hatemalo multipurpose cooperative in 2006. This cooperative has started commercial potato seed production covering 15 ha land area in 2015. They have received continued technical and financial support from Raising Income of Small and Marginal Farmers (RISMF). In 2016, they increased the area to 50 ha linked with subsidy program of RISMF. There was a subsidy program for commercial potato seed production i.e. in seed 30% and in boring (irrigation) 65%. The cooperative also help farmers to protect seed potato through facilitation of cold storage. Farmers have long experience of potato farming as a major source of income. Previously there were no provision of insurance and farmers didn't have access of insurance implemented by government. With the initiation of youth self-employment programme, insurance has become mandatory to participate in this programme. This cooperative received Rs 40 lakh⁴ in 2012 as a fund from the Youth self-employment programme. Under this provision, individual farmers could borrow loan up to 2 lakhs with 12% interest rate but 7% interest rate would be returned after paying the loan back. As being compulsion to receive loan, more than 25 farmers insured their crops and livestock.

In the fiscal year 2016, sixty farmers were trained to cultivate commercial seed potato production but only 16 of them adopted. With the support of RISMFP, all potato fields were insured in the name of *hatemalo* cooperative from NLG insurance, Nepalgunj. The premium amount which has to be deposited by farmers was also paid from cooperative. So farmers didn't have to pay premium to participate in crop insurance program. Total area under potato insurance was 15 ha. Individual farmers didn't have the information about insurance procedure and benefits. Some of them even didn't know that their potato got insured. We have made follow up survey in October, 2018 with cooperatives/farmers who were involved in *youth self-employment and RISMFP* programs to know the continuity of the agriculture insurance and potato farming. Result shows that all farmers (100%) discontinued the agriculture insurance (potato) as they no longer received support from RISMFP although they are continuously growing potato for commercial purposes after receiving loan and stopped grants.

⁴ 1 million equals to 10 lakh

Spring season rice insurance, Kobhahara, Jhapa

Sana kisan mahila cooperative of Kohabara, Jhapa was established in 2007 and got registered in 2009 under *Sana Kisan* Bank, Nepal. It was established with the objective of improving the living standard of rural farmers through group saving and investment. Cooperative at its local level has nine member steering committee. This cooperative has 850 members. It has provision of lending credit to its member up to Rs 30000 without mortgage and with interest rate of 16% whereas farmers can borrow up to 2 lakh with mortgage. Farmers have to pay loan within one year. Under mega rice production programme, cooperative has involved in spring rice production involving its own member's rice field. There was provision of 75% subsidy on seed and they have also received 2 rice planters in 75% subsidy. A total of 405 farmers were involved in spring rice production under mega rice production programme during fiscal year 2016/17. Under the norms of mega rice production programme, farmers have to insure their crops mandatorily to participate and receive any benefits from this programme. There was provision of incentive of Rs 5000/ha for those farmers who were able to maintain rice productivity of 5mt/ha. This cooperative insured all farmers rice under the name of cooperative i.e. insurance policy was issued in the name of cooperative. Farmers received subsidy amount after deduction of individual premium. In 2015/16 total of 160 ha land was insured with sum insured amount of 5.732 million whereas this area increased to 333 ha in the fiscal year 2016/17 with sum insured amount of 20.002 million. A total of 1.5 million was received as a subsidy amount for the fiscal year 2015/16 and total of 1.660 million for the fiscal year 2016/17. Sum insured was based upon the cost of production as fixed by DADO, Jhapa. Individual farmers didn't know the overall procedure and benefits of insurance because insurance policy was issued in the name of cooperative. Farmers only knew that they have to insure their crop to receive subsidy from the government. From the fiscal year 2018 onwards none of the farmers joined rice insurance. This evidence is sufficient to support the fact that farmers only joined insurance to receive support from the government program and with the end of program farmers' interest to join crop insurance also faded away. It was found that farmers didn't have previous experience of severe damage to their crops so none of them were interested for crop insurance.

Value based insurance of Jetho Budho rice in Kaski

Farmers of Pokhara Metropolitan City-16, Armala have been involved in cultivation of traditional rice variety *Jetho Budho*, which is famous for its superior quality in terms of taste. LIBIRD has encouraged farmers to produce the seed of *Jetho Budho* in commercial scale. This rice variety has high market value and farmers were selling rice seed as Rs 200/kg. At first, 12 farmers insured their rice seed with the beginning of commercial seed production 2015. Due to the mismatch of the seed used in commercial seed production, only one farmer became successful in production of seed of this variety. Because of this reason only one farmer (Mr. Govinda Bdr. Khadka) has continued to produce rice seed and did insurance. According to him he was motivated for rice insurance because of monetary value associated with *Jetho Budho* rice. According to farmers, major risk for rice is hailstorms as the crop growing duration is about six month. During last 4 years of insurance period, farmers didn't experience any losses but they still continue insurance program to minimize the losses from possible unforeseen risk. Previously insurance was done on the basis of production cost but from the fiscal year 2018, value based insurance was started based on the production value as recommended by the district agricultural office. Although he have to pay more amount as a

premium he expressed his happiness as he is fully aware of compensation that he will receive in case of any unforeseen future losses. In the year 2018, only two farmers insured their *jetho budho* rice based on the production value in Kaski district, Nepal. They expressed their view to continue insurance in near future too.

Table 3: *Jetho budo* insured farmers and comparative sum insured details in 2018

Name of farmers	Area (Ropani)	Sum insured based on production cost	Sum insured based on Value/Product (2018)
Govinda Bahadur Khadka	7	Sum insured: 70,350	Sum insured: 1,62,750
Jit Bahadur Basnet	2	Sum insured: 25,125	Sum insured: 46,500

Source: Siddhartha insurance company, kaski, 2018

CONCLUSION AND POLICY RECOMMENDATIONS

Agriculture insurance is most common forms of risk transfer in agriculture. Until 2018, more than 70 insurance products for vegetables, cash crops, cereals, fruits, fish, honey, and livestock's has been developed in Nepal. Based on demand of farmers and market need, about 55 insurance products (including 49 vegetable crops) has been designed based on value of production. Those value based insurance schemes in vegetable crops has also opened room to go for cost of production based insurance if farmers are interested to adopt it. Government of Nepal (GoN) has initiated agricultural programs linking with agriculture insurance so that they will continue to insure in the absence of any support program. Such programs included youth focused program, spring rice promotion program and other grant/subsidy programs under different mega projects (eg. PACT, HVAP, RISMFP etc). In different developed and developing countries, government legislation makes crop insurance compulsory for farmers who borrow seasonal crop production credit from the national and commercial and cooperative banks, but is voluntary for non-borrowers

Our study shows 48 percent and 20 percent of the crops and livestock farmers, respectively were participated in mandatory insurance program due to nature of the agricultural programs that were linked with agriculture insurance. The percentage of compulsory crop insurers among total crop insurers in different districts were varied from zero (Tanahu and Kaski) to hundred (Jhapa and Rupandehi) percent. In case of compulsory/linking insurance with agriculture programs, different cases were found where in most of the cases insurance is mediated through local level organization/cooperative which received total subsidy/support from the government. Most of farmers who were participated in government grant program have limited understanding of crop insurance so that they have discontinued insurance after the end of grant/subsidy program. But if they feel enterprises are risky, realized the importance of agriculture insurance and can get higher returns from the enterprises, they were willing to participate in agriculture insurance. This demands to revisit the existing grant/subsidy programs linked with agriculture insurance. Therefore, it is suggested to develop awareness creating programs simultaneously with different support programs that will be provided to farmers/insurers by related organizations to make it sustainable.

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Authors Contribution

KPT was the lead investigator and the initiator of the study. KPT, DD and GK were responsible for literature search. YNG and DD were responsible for the overall study design and provided critical feedback on the manuscript. GK and DD were responsible for field study and drafting manuscript. KPT was responsible for the finalization of the manuscript. All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare that they have no competing interests.

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