

## RISK MITIGATION FOR RICE PRODUCTION THROUGH AGRICULTURAL INSURANCE: FARMER'S PERSPECTIVES

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**Abstract:** Rice farming is susceptible to failure due to several risks including natural disasters of flood and drought as well as pest and disease attacks. Risk mitigation such as agricultural insurance is required to cope with the risks. This study aims to portray rice production risks to failure and farmer's perception on the implementation of agricultural insurance in Bali province. Three regencies were selected purposively based on the area insured. A survey was conducted to 180 respondents who paid for the agricultural insurance (AUTP). Data were analyzed using descriptive qualitative analysis and chi-square test. Results of the research show that most rice farming risks to failure in Bali were blast and rat attacks. In terms of agricultural insurance implementation, all farmers accept the program as a mitigation risk to bridge rice farming failure. However, most farmers (85 %) asked for fully support of premium subsidy from the government while the rest agreed to pay for a-20 % of the premium. The result from the Chi-square test shows insignificant, implying that the distribution of farmers' perception towards full subsidy of agricultural insurance is indifferent across locations. Implication of the study noted that the government and insurer need to socialize the agricultural insurance program more intensively covering premium payment, coverage and claiming.

**Keywords:** production risk, agricultural insurance, farmer's perception, AUTP, Chi-square

**Abstrak:** Usaha tani padi sangat rentan terhadap kegagalan panen yang disebabkan oleh berbagai faktor seperti bencana alam banjir dan kekeringan serta serangan hama penyakit tanaman. Mitigasi risiko seperti asuransi pertanian diperlukan untuk menjembatani risiko kegagalan tersebut. Penelitian ini bertujuan untuk menggambarkan risiko kegagalan panen dan persepsi petani tentang penerapan asuransi pertanian di Provinsi Bali. Lokasi penelitian dilakukan di tiga kabupaten yang dipilih secara sengaja dengan pertimbangan luas lahan sawah yang diasuransikan. Jumlah responden ditentukan sebanyak 180 orang yang telah mengikuti program asuransi usaha tani Padi (AUTP) dengan metode pengumpulan data berupa survey. Data dianalisis secara deskriptif dan uji Chi-square. Hasil penelitian menunjukkan bahwa usahatani padi di Bali menghadapi risiko utama dari kegagalan panen adalah adanya serangan blast dan hama tikus. Dalam penerapan asuransi, seluruh petani menganggap bahwa AUTP merupakan program mitigasi risiko terhadap kegagalan panen. Namun sebanyak 85% petani mengharapkan subsidi sepenuhnya dari pemerintah untuk pembayaran premi dan hanya 15% yang mau membayar premi penuh. Hasil uji Chi-square menunjukkan tidak ada hubungan yang nyata persepsi petani antar kabupaten yang meminta subsidi penuh dari pemerintah. Implikasi kebijakan dari penelitian ini adalah perlunya sosialisasi yang lebih mendalam dari pemerintah dan perusahaan asuransi tentang pembayaran premi, biaya tertanggung dan klaim asuransi.

**Kata kunci:** risiko produksi, asuransi pertanian, persepsi petani, AUTP, Chi-square

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## INTRODUCTION

Rice farming faces harvest failure due to uncertainty factors such as natural disaster of flood and drought as well as pest and disease attacks. The issue of risk mitigation in crop production in developing countries has long been raised. This included the scheme, coverage, type of agricultural crops (UNCTAD, 1994; Mandal et al. 2009). Raju and Chand (2008) noted that agricultural insurance is one method by which farmers can stabilize farm income and investment and guard against disastrous effect of losses due to natural hazards or low market prices.

Developed-economic countries like the United States of America and Japan have long implemented schemes to support farm price and farmer income through agricultural insurance. In the US, Farm Bill 2014 is the recent act for the US agriculture safety net for farmers dealing with production and price risks. Meanwhile in Japan, crop insurance was established in 1947. Agricultural insurance in Japan has been compulsory for farms greater than three-fourths acre while coverage has been available on a plot basis (Reyes et al. 2017).

Agricultural insurance in many developing countries has also been implemented including Nigeria, India and Thailand. The types of agricultural risk mechanisms implemented vary by country. In Nigeria, an Agricultural Insurance program has been made available to Nigerian farmers to mitigate risks from climate change by the Federal Government since 1987. The aim of the scheme is to ensure payment of appropriate compensation is sufficient to keep the farmers in business after suffering from the loss (Aina and Omonona, 2012; Helin et al. 2015).

Raju and Chand (2008) described progress and performance of crop insurance in India based on several index insurance programs from pilot crop insurance scheme to the National Agricultural Insurance Scheme (NAIS). Reyes et al. (2017) updated performance of agricultural insurance in India presenting the modified National Agricultural Insurance Scheme (mNAIS) as the replacement of NAIS, and the Weather Based Crop Insurance Scheme (WBCIS). Premium subsidies vary, but often the farmer pays between 25% and 40% of the premium and the government provides a subsidy to cover the remainder.

Jeerachaipaisarn (2012) reported that in Thailand micro-insurance scheme was provided for rice in 2011. That scheme covered six natural disasters such as flood, drought, windstorm, frost, hail and bush fire. Bank for Agriculture and Agricultural Cooperatives (BAAC) played a major role since the crop insurance started.

Pasaribu (2014) argued the importance of agricultural insurance in Indonesia to protect farmers from harvest failure as the scheme is actually risk shifting that guarantee farmers to obtain compensate due to a loss. There is guarantee for loss from natural disaster and pest/disease infestation through agricultural insurance.

The government of Indonesia (GoI) launched crop insurance system implemented in 2015 to mitigate farmers from failure of rice production. Implementation of agriculture insurance in Indonesia, known as Asuransi Usaha Tani Padi (AUTP) has a legal basis after the announcement of the Farmer Protection and Empowerment Act of the Law No. 19/2013 (Ampri, 2013).

The agricultural insurance scheme is based on indemnity of the rice production cost. It is stated in the agreement that farmers can claim maximum compensation of IDR6 million per hectare land insured for one rice planting season. The premium rate is 3% of the total claim and will be paid by the state-owned insurer (PT Jasindo). The total premium is IDR180,000 and it is shared between the government and the farmers. The government bears 80% of the premium (IDR144,000) and farmers are required to pay a premium of IDR36,000 (20% of the premium). In the implementation of the scheme, the government supports the premium as a subsidy (Ampri, 2013; Pasaribu, 2014).

The insurance covers flood, drought and several pests and diseases subject to the intensity of damage reaching 75% as per criterion set by the insurer, and the acreage of such damage reached 75%. This arrangement is designed to encourage farmers to stick on to good farming practices and to minimize loss pertinent to the rice planting practices among farmers. In the occurrence of 75% crops failure, farmers are entitled to get compensation for IDR6 million/ha which can be used in preparation for the next planting season.

The GoI started the implementation of agricultural insurance/AUTP at the end of 2015. Aditya et al. (2016) noted that as of May 2016, 23.7% of land was

insured across Indonesia from the target of 1 million hectare. Among land insured, 47.09% was claimed for insurance for several calamities covering in the scheme. It is suggested from the study that the government needs to more optimally allocate resources for socialization of the AUP program for better information of the farming community.

Farmers in Bali participated in the program covering 5,675.57 ha during the planting season of October 2015 and January 2016. The government paid IDR817.282 million, and farmers paid IDR204.32 million of the total premium of IDR1,021,602,600. The total area claimed for the insurance payment in March 2016 was 34.06 ha (PT Jasindo, 2016). It was only 0.6% of the total insured in Bali. In terms of rice production, it implies that rice farming in Bali works well as only small amount was claimed as failure. In addition, farmers received compensation for their rice farming failure in the form of insurance.

As a new scheme, it is interesting to find out the continuation of the program in the long run from farmer's perspective of the premium payment whether they are willing to pay according to the current condition. Currently farmers receive subsidy of 80% premium, and farmers could ask for more. This study aims to portray rice production risks to failure and farmer's perception on the implementation of agricultural insurance in Bali province.

## METHODS

Implementation of agricultural insurance program in Bali in 2015 and beginning 2016 was followed by six out of nine regencies and municipality (Dinas Pertanian Tanaman Pangan Provinsi Bali, 2016). Based on this information, research sites were selected purposively in two regencies and one municipality including Tabanan, Jembrana and Denpasar City. The site locations were selected based upon the followings:

- Tabanan regency is the center of rice production in Bali, and this regency has the biggest land insured for the insurance covering 2,811.47 ha (49.45% of the total land insured).
- Jembrana regency is the second largest area participating in the insurance program covering 1,766.82 ha (31.13% of the total insured in Bali). This area is susceptible to rice production failure due to drought.

- Denpasar city is the fourth largest area to participate in the agricultural insurance. It covers 259 ha (4.56% of the total land insured). The main consideration to select this site is that this city is the capital of Bali province, and a fast land shifting from agricultural land to non-agricultural land use occurs in this place. It is interesting to note how farmers in this area participate in the agricultural insurance scheme.

Population in this study was all farmers participating in the agricultural insurance for the period of October 2015 and January 2016 in three site locations in the abovementioned. Samples were selected purposively namely 60 farmers in each regency/municipality using random sampling. Total samples in this study were 180 farmers. Respondents in this study were the owner of land and the members of subak at each site research study. They were willing to answer the questions in the survey.

A structured farmer survey was conducted at each study site to obtain primary data on rice production risk and farmer's perception on the implementation of agricultural insurance. Secondary data were collected from reports and records from previous research on the following policies and activities on agricultural insurance.

This study used quantitative and qualitative methods to explore farmer's risk in rice production as well as to find out farmer's perception on agricultural insurance. Analysis of quantitative and qualitative primary data gathered in this research was undertaken to investigate factors causing crop failure in production and farmer's perception on agricultural insurance.

A chi-square test was conducted in this study for quantitative analysis to find out if there was any difference across the regency of farmers' perception on agricultural insurance.

- H0 : The distribution of farmers' perception towards agricultural insurance is the same across locations (Jembrana, Tabanan, Denpasar)
- H1 : The distribution of farmers' perception towards agricultural insurance is different across locations.

Qualitative methods were used in this study design to provide complementary data to support the quantitative data. The in-depth interview was conducted to Agricultural Extension workers at respective site research selection to find out further information on agricultural insurance's perception. All this information is the ways to ease researchers in the analysis to achieve the goals of the study. Lincoln and Guba (1985) noted that qualitative inquiry allows exposure to the breath and details of information to be gathered, which is not available in the quantitative research design.

## RESULTS

Table 1 displays implementation of agricultural insurance according to regencies in Bali. Six out of nine regencies participated at the beginning of this scheme launched. Three regencies did not participate yet at that time due to preparedness of the regencies to include farmers in the programs. As this was a new scheme, it took a while for all regencies to participate in the program including socialization the program to farmers and other stakeholders in the area.

Based on Table 1, it can be seen that 10,591 farmers participated in the agricultural insurance covering 5,675.57 ha land. It can also be seen that the average of land size insured was 0.44 ha, implying that farmers in Bali are small-scale rice producers. Looking at each regency, we found that farmers in Jembrana have the highest average land size insured compared to other regions. Tabanan regency known as the center of rice production in Bali has the second position in terms of average land size insured. In the urban area such as Denpasar city, where a fast land shifting occurs, surprisingly the average of land size insured is the same as that of the average of Bali.

Area claimed for the insurance by March 2016 was 34.06 ha, accounting for only 0.6% of the total area insured in Bali. It implies that rice farming in Bali works well. Farmers paid IDR1.226 million for the premium and get paid IDR204.36 million for the insurance claim (Table 2). Data of the agricultural insurance implementation in Bali show that the program is workable in terms of premium and claims. PT Jasindo as the insurance company gets the difference from the total premium of IDR10.216 billion from the premium and paid IDR204.36 million for the claims.

Table 2 informs that farmers in Tabanan had the highest claim for the insurance (49.53% of the total area claimed in Bali). This is in line with the area size insured. The second claim came from Jembrana regency accounting 31.12% of the total area claimed in Bali. The third claim came from Klungkung regency, not in Denpasar city as the research site of this study. Claim from Denpasar accounted for 4.55% of the total Bali claimed.

In terms of rice production risks to failure, this study finds that the main issues of harvest failure from rice production in Bali were pest and disease attacks, ranging from light to severe level. Data from PT Jasindo were recalculated according to the claims. Blast and rats caused to a large extent of harvest failure in Bali. Drought during planting season was another issue to cause harvest loss (Table 3). All these causing factors of more than 75% failure are paid in the claim as stated on the agreement in the insurance program.

Table 1. Regencies participating in agricultural insurance in Bali province, October 2015–January 2016

Regency	No. of farmers	Land insured (ha)	Average land size insured (ha)
Jembrana	2,179	1,766.82	0,81
Tabanan	5,151	2,811.47	0,55
Badung	720	194.34	0,27
Denpasar	609	259	0,43
Klungkung	1,643	516	0,31
Buleleng	289	127.94	0,44
Total Bali	10,591	5,675.57	0.44

Source: PT Jasindo Cabang Denpasar (2016), recalculated

Table 2. Area claimed and payment of agricultural insurance in Bali province, October 2015–January 2016

Regency	Area claimed (ha)	Premium paid by farmers (IDR)	Claimed covered (IDR)
Jembrana	10.60	381,600	63,600,000
Tabanan	16.87	607,320	101,220,000
Badung	1.17	42,120	7,020,000
Denpasar	1.55	55,800	9,300,000
Klungkung	3.1	111,600	18,600,000
Buleleng	0.77	27,720	4,620,000
Total Bali	34.06	1,226,160	204,360,000

Source: PT Jasindo Cabang Denpasar (2016), recalculated



Table 3. Main claims for the agricultural insurance as in March 2016

Cause of claim	Percentage
Blast	43.75
Rats attack	37.5
Drought	12.50
Brown planthopper	6.25

Source: PT Jasindo Cabang Denpasar (2016), recalculated

There was no insurance claim from flood damage in Bali, implying that farmers are not prone-flood risk taker. It is contrasted to the result of the study by Apriana et al. (2017) in the area of Bengawan Solo that farmers are risk takers from the use of chemicals, land size and the occurrence of natural disaster.

Various dimensions of perceptions of agricultural insurance including benefit of the program, opinion on premium rate and improvement for the scheme were asked to farmers. Results of the study show that all farmers perceived that agricultural insurance program developed by the government is a mitigation risk towards harvest failure. This program has been disseminated by the stakeholders in Bali including regional office, head of farmers group (subak), agricultural extensions and PT Jasindo as the insurer. According to respondents, dissemination of the program will increase farmer's knowledge on sharing the risk between farmers and the insurer in facing harvest failure.

The implementation of agricultural insurance program in Indonesia is actually giving minimum protection from the insurer from harvest loss. If farmers do not follow the program, all the risks will be burdened by the farmers. Claim paid by the insurer has benefited farmers from failure risk. Involvement of farmers in the agricultural insurance reflects government consideration through insurance claim. This claim can be used for the next planting system.

In the AUTP scheme, farmers obtain premium subsidy of 80% and only pay for 20% from the total premium. This study finds that to a large extent (85%) of respondents asked for full premium subsidy from the government, while the rest were willing to pay the 20% premium (Figure 1). In addition, farmers asked for more than Rp 6 million per hectare for the compensation.

In comparison with the study in India by Raju and Chan (2008), majority of Indian farmers (61.67%) perceived that premium rate from NAIS was high, and farmers proposed reduction in premium rate. Around one-fifth of the beneficiaries suggested the use of Crop Cutting Experiments to serve as the basis for determining indemnity carried in the presence of affected farmers.

Table 4 reveals result from the test for any difference of premium payment perception to the agricultural insurance/AUTP in Bali. It shows insignificant chi-square statistics as the p value is above 0.05. Result from this study indicates that the distribution of farmers' perception towards agricultural insurance is indifferent across locations. It means that the location of the farmers does not influence their perception towards the agricultural insurance program.

This study reveals the importance of premium subsidy in the agricultural insurance implementation. Farmers ask for full premium subsidy while in the program they have to pay for 20% of the total premium. This study also finds that there is indifferent result from the location of the farmers in terms of their perception towards the agricultural insurance program. It implies that the government needs to consider the future program in the long run.

Previous study by Ambarawati et al. (2014) on the importance of agricultural insurance to risk bearing indicated the need to socialize the program to increase farmer's awareness and knowledge of share risk in rice farming as the scheme is something "new" to farmers. Result from this study shows that farmers ask for more than IDR6 million per hectare for the claim, which indicates that they do not understand the premium rate and subsidy.

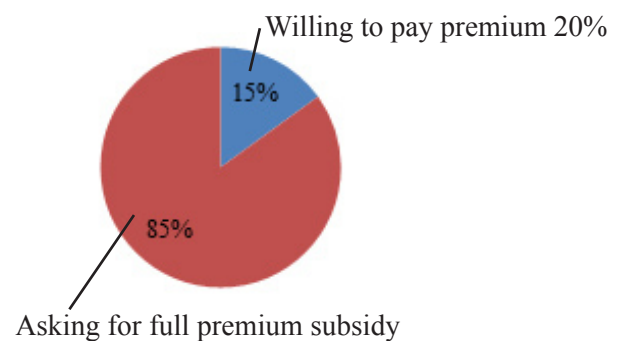


Figure 1. Comparison of respondents in terms of premium payment

Table 4. Distribution of respondents across the regencies to the premium payment

Regency	Asking for full subsidy	Willing to pay 20% premium	Total farmers
Jembrana	50	10	60
Tabanan	55	5	60
Denpasar	48	12	60
Total	185	27	180

Chi square test results:

Pearson  $\chi^2(2) = 3.3987$  Pr = 0.183

Likelihood-ratio  $\chi^2(2) = 3.6393$  Pr = 0.162

Fisher's exact = 0.175

### Managerial Implication

This study found that agricultural insurance implementation in Bali was workable in terms of farmer's willingness to participate to the national program and perceived that the scheme is one type of farmer's protection from harvest failure in rice production. On the other hand this study revealed that majority of farmers asked for full subsidy from the government instead of 20% premium payment. Implication managerial of the study indicated that the government and the insurer company need to socialize the agricultural insurance program more intensively covering 80% of government subsidy and the 20% of farmer's task to pay the premium as well as coverage and claiming.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

Based on the study findings, it can be concluded that the main factors causing harvest failure from rice farming in Bali were pest and disease attacks, like blast and rat attacks, ranging from light to severe level. Drought during planting season was another slight issue to cause harvest loss. All these risks are covered in the agricultural insurance. Agricultural insurance implementation in Bali is workable. Farmers perceived that insurance is seen as a mitigation risk from harvest failure. However, majority of farmers ask for full premium subsidy from the government instead of 20% premium payment. The distribution of farmers' perception towards full subsidy of agricultural insurance is indifferent across locations. Implication of the study noted that the government

and insurer should socialize the agricultural insurance program more intensively covering premium payment, coverage and claiming.

### Recommendations

As a new national program of risk mitigation, this study suggests to do further research on farmer's willingness to pay (WTP) for the agricultural insurance. It is expected from the research to portray farmer's expectation from the agricultural insurance in the long run.

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