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Precaution Strategy of Moral Hazard Practice in Agricultural Insurance in Indonesia: An Approach of Soft Systems Methodology

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ABSTRACT: This paper uses Soft Systems Methodology (SSM) to formulate strategies to prevent moral hazard acts in agricultural insurance in Indonesia. Agricultural insurance takes place, mainly, through Rice Crop Insurance and Cattle Insurance. Generally, the strategies that can be performed to minimize moral hazard practice in agricultural insurance programs are: Developing the capacity of human resources, improving field communication, enforcing penalties, institutional strengthening, and adding new products through Islamic agricultural insurance. Specifically, this paper proposes that the prevention of moral hazard practices can be done by implementing Islamic agricultural insurance systems with the concept of risk-sharing instead of risk transfer.

Estrategia de precaución de la práctica de riesgos morales en los seguros agrícolas en Indonesia: un enfoque de la metodología de los sistemas blandos

ABSTRACT: Este trabajo utiliza Soft Systems Methodology (SSM) para formular estrategias para prevenir el riesgo moral en los seguros agrícolas en Indonesia. El Seguro de Cosecha de Arroz y el Seguro de Ganado son los más utilizados. Las estrategias son: desarrollo de la capacidad de los recursos humanos, mejora de la comunicación sobre el terreno, aplicación de sanciones, fortalecimiento institucional e incorporación de nuevos productos a través del seguro agrícola islámico. En concreto, se propone que la prevención del riesgo moral puede realizarse mediante sistemas de seguros agrícolas islámicos basados en el concepto de compartir el riesgo en lugar de transferirlo.

KEYWORDS / PALABRAS CLAVE: Islamic agricultural insurance, livestock insurance, Moral hazard, rice crop insurance, soft systems methodology / Seguro agrícola islámico, seguro de ganado, riesgo moral, seguro de cultivo de arroz, metodología de sistemas blandos.

JEL classification/ Clasificación JEL: G22, Q18, R11, Z12.

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1. Introduction

Agricultural insurance is an effort from the government to protect farmers from any risk probability of crop failure losses that might happen caused by natural disasters, pests attack, outbreaks of livestock infectious diseases, climate changes, or any other risk that are regulated in Minister of Agriculture Regulation (Ministry of Agriculture, 2017). Implementation of agricultural insurance program in Indonesia has been performed since 2015. The main focus of this program is on Rice Crop Insurance (AUTP), locally called Asuransi Usaha Tani Padi (AUTP) and Cattle Insurance, Asuransi Usaha Ternak Sapi/Kerbau (AUTS/K). In the application of this program, the government subsidizes the premium payment by 80 %, while the rest is paid independently by the farmer. Government collaborates with Limited Company (PT) Jasindo as the insurance company to handle rice crop insurance (AUTP) and cattle insurance (AUTS/K) (Yanuarti *et al.*, 2019). During its implementation from 2015 to 2019, various problems were still found; one of them was the high number of moral hazard practices, committed either by an insurance member or by the insurance provider.

Moral hazard in insurance activity comes from the act and settlement of transaction claims to benefit from the proposed policy contract. The practice of moral hazard could not be separated from the asymmetric information problem which the financial institution faced in lending to customers. The behaviour of the customers and financial institutions regarding the relationship between debtor and creditor has raised various conflicts of interest, which may affect the contract and monitoring. The moral hazard comes when the insured party will reduce their level of caution in the management of the farming business so that the potential for the risk rising will be higher. In other words, moral hazard in the agricultural context can be described as changes in the behaviour of the insurance member, which are deliberately done in purpose to increase the probability of receiving compensation (Asmirawati & Sumarlin, 2018; Fabrianus, 2019).

The moral hazard practice that the farmers commonly commit is a change in cultivating methods that will affect crop failure risk (Fabrianus, 2019). Moreover, Nurmanaf *et al.* (2007) stated that the lack of perseverance of the farmers who have registered in the insurance program, and the intentional act in doing various pre-harvest and post-harvest activity in order to gain insurance claim, are forms of moral hazard practice which are commonly found in the implementation of agricultural insurance. Evidentiary effort to prove that the farmer's element of intent to submit an insurance claim is very difficult to perform so that these moral hazard practices keep happening.

The practice of moral hazard is not only committed by the insurance customer or farmer but also by the provider of rice crop insurance (AUTP). This can be seen from a finding by Fabrianus (2019), one of the moral hazard practices in agricultural insurance in the Province of East Java that was committed by the provider of rice crop insurance (AUTP) program was purposed to meet the target stipulated by the government. The provider of rice crop insurance (AUTP) program in districts, through the

department of agriculture, collaborate with agricultural sector state-owned enterprise (BUMN) to pay the premium that is supposed to be paid by the farmer, so that the membership of the farmer in rice crop insurance (AUTP) program becomes free. The problem that arises later is that the interest of the farmer in the rice crop insurance (AUTP) program has not increased even though it has been made free.

These moral hazard practices will very much affect the continuity of the agricultural insurance programs in Indonesia. This is because the implementation of indemnity-based agricultural insurance contracts can provide opportunities for moral hazard and adverse selection in endemic areas. A study conducted by Yusuf *et al.* (2021) revealed that the target of subsidized AUTP land must consider the risk profile to maintain the sustainability of the insurance company. Its implementation is not only carried out in endemic areas – anti-selection. With moral hazard practice, both insurance providers and customers are more likely to suffer losses. The insurance provider will potentially go into bankruptcy due to the large number of claims that exceed the premium they received from member registration. Meanwhile, the insurance buyer also has the opportunity to experience the risk of failure due to the low level of farmer's caution in managing their farm because of the absence of burden to pay a premium (free).

Based on those, it is very necessary to make a strategy design that can minimize the practice of moral hazard in implementing agricultural insurance in Indonesia to achieve the goal of farmers' protection and empowerment. The soft systems methodology (SSM) approach is used to make the strategy. SSM is a holistic approach that can be used to see every real and conceptual aspect that grows in the community. This method has been widely used to generate the right strategies for solving various managerial problems that grow from human activity systems (Bergvall-Kareborn, 2002; Martin, 2008; Fadhil *et al.*, 2017). The application of the SSM method for intervention strategies in the agricultural sector and the agricultural industry was developed by Fadhil *et al.* (2018) in the development of coffee farming industry and Fakhurrazi *et al.* (2018) in the development of cacao farming industry

This study aims to formulate a strategy that can minimize moral hazard practice in the implementation of agricultural insurance in Indonesia with a systematic approach using soft systems methodology (SSM). The research results are expected to contribute to generating the development strategy of agricultural insurance implementation in Indonesia in the form of an intervention strategy that the government could carry out to protect the farmer by implementing rice crop insurance. In addition, the agricultural insurance policy offered will provide policymaker benefits to the government and agricultural insurance companies through the formulation of an agricultural insurance system that minimizes the occurrence of moral hazard behavior.

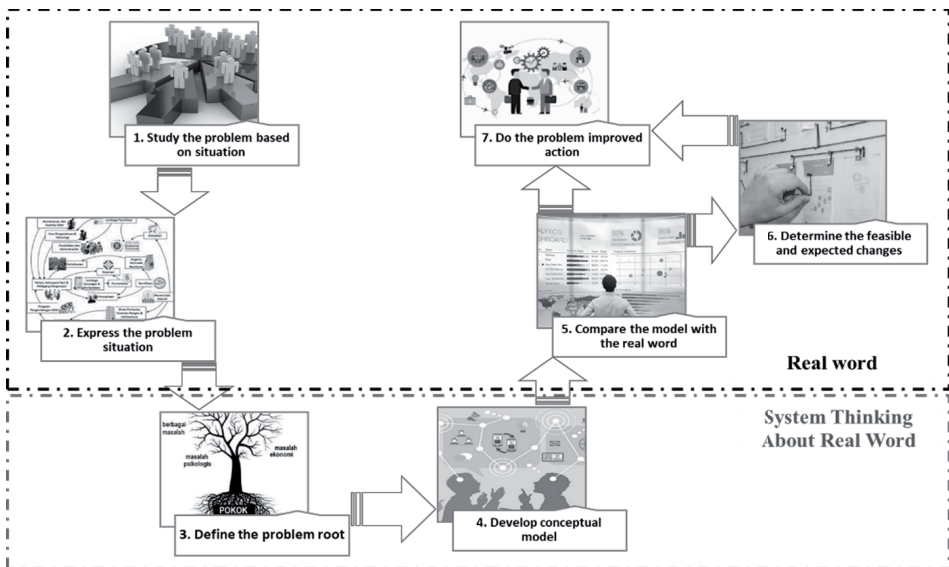
2. Methods

The formulation of strategy to minimize moral hazard practice in agricultural insurance implementation in Indonesia was carried out with soft systems methodology (SSM), which was developed by Checkland & Poulter (2010); Checkland (2013).

This research will involve experts from 11 different institutions as key sources of information to formulate a strategy to obtain the right decision. The involved interviewees are researchers from the Ministry of Agriculture of the Republic of Indonesia, researchers from the Indonesian Center for Agriculture Social Economic and Policy Studies (ICASEP/PSEKP) Ministry of Agriculture of the Republic of Indonesia, PT. Jasindo, PT. Bumi Putera, PT. Sun Life Syariah, Lecturers from Universitas Syiah Kuala (USK), Lecturers from State Islamic University Ar-Raniry, Farmers and Insurance Practitioners, Regional Development Planning Agency (BAPPEDA) of Aceh, Department of Agriculture and Plantation (Province of Aceh, Province of Central Java and Province of East Java), and Department of Animal Husbandry (Province of Aceh, Province of Central Java and Province of East Java).

FIGURE 1

Steps in soft systems methodology



Source: Own elaboration.

There are 7 steps in the modelling using SSM (Figure 1) (Checkland & Poulter, 2010; Fadhil *et al.*, 2017; Fadhil *et al.*, 2018; Fakhurrurazi *et al.*, 2018):

1. Situational Analysis. Studying factual and actual problems in the field by collecting some information regarding the implementation of agricultural insurance in Indonesia. In addition to actual information on the field, point of view and assumption from the involved parties also become important information to be considered. This data was obtained from field observation, interview, discussion with experts, and the search of various information

collected from current data and data from the previous year to gain the developing information and thoughts.

2. Express the problem situation. Data and information obtained from the previous step were then interpreted into the form of a rich picture or a representation of the current situation.
3. Define the system root that is related to the problem situation. Formulation of root definition was done in this step by using a short sentence which stated that "a system does P by using Q to achieve R". This formula will answer the question of what, how, and why about those things in the studied system. The root definition was then examined and enhanced using analysis aids CATWOE (C = customer, A = actors, T = transformation, W = world-view, O = owners, E = environmental constraint) as shown in Table 1.

TABLE 1

Element and description of CATWOE

Element of CATWOE	Description
Customer	Who will benefit from the goal activity?
Actors	Who will carry out the activity?
Transformation	What must change for the input to become output?
World-view	What perspective makes the system meaningful?
Owners	Who can stop the activities?
Environmental	What constraints exist in the system environment?

Source: Own elaboration adopted from Checkland & Poulter (2010).

4. Develop a conceptual model. The result from the root definition was then made as a basis in the making of a conceptual model that is needed to achieve the ideal goal. The conceptual model can be defined as a set of logically structured activities in a notion system bounded by root definition.
5. Compare the conceptual model with the real world. The conceptual model that has been formed was then compared with the real world to highlight the probability of changes in the real world. This step aims to mark the difference between the actual situation with the perceived reality. The involved participants were given the freedom to rethink their assumptions, either to be defended or to be revised.
6. Define the expected changes. The result from the previous step was then identified to find the expected systematic and feasible changes. These changes might happen in structure, procedure, or in people behaviour.
7. Formulate the changes to fix the condition. This step is a step to carry out all recommendation of the resulted strategy of changes to obtain a model of implementing ideal agricultural insurance in Indonesia.

3. Results and Discussions

3.1. Situational Analysis

The causes of moral hazard practice in the agricultural insurance system in Indonesia cannot be separated from the character of the farmers participating in the insurance itself and the limited information known by the insurance provider, in this case, Jasindo insurance company (Agustina, 2018). Furthermore, Sayugyaningsih (2018) added that, besides the factor of the location of Jasindo company office that is far from the farm location, the lack of motivation and role of extension agent as field officer from local government who connects farmers with the insurance company in delivering information, also become one of the implementation constraints and a chance for moral hazard practice to happen in agricultural insurance in Indonesia. The same thing was stated by Fadhil *et al.* (2020b); according to his findings, it showed that there are several causes of the occurrence of moral hazard practice in the implementation of agricultural insurance in Aceh, they are; 1. The insurance company has difficulty getting actual and factual information on the field, either regarding the cattle insurance program's farming land or condition; 2. The low knowledge of field officers, extension agents, and farmers about risk management; 3. The lack of socialization causes a low understanding of farmers regarding the regulation in the agricultural insurance system. Due to the excess information owned by only one of the parties, either by the insurance participant or the insurance provider, the possibility of moral hazard practice happening by one of these parties will be even higher.

In the implementation of agricultural insurance, there are various forms of moral hazard practices carried out by farmers. After joining the insurance program, the farmers tend to do more risky activities in managing their farming business (Nelson & Loehman, 1987; Ahsan *et al.*, 1982). These risky activities could be in the form of reduction in chemicals or other materials used to reduce the production cost in rice farming management (Smith & Goodwin, 1996; Babcock & Hennessy, 1996; Horowitz & Lechtenberg, 1993). Moreover, Fabrianus (2019), in his observation on the implementation of agricultural insurance program in the Province of East Java, found there was no moral hazard practice that happens in the form of reduction in fertilizer and pesticide use. Still, the farmers tend to do moral hazard practice in the form of changes in planting schedule, which can raise the risk of crop failure.

Several studies on moral hazard also concern the spiritual or religious aspect, which is relevant in some countries' culture and regulations. A study performed by Rahmawati (2012) shows that Islamic law or Islamic affects the economic behaviour of its believers. In Islamic law, moral hazard practice is known as hypocrisy. As Oktariana *et al.* (2019) explained, the moral hazard act can be categorized as a form of ruthlessness because there is a violation of the agreement in the contract. Considering that the moral hazard problem comes unidentified, aspect of assistance and supervision become one of the keys to reducing the moral hazard practices (Simtowe *et al.*, 2006; Hermes *et al.*, 2005).

From an Islamic perspective, moral hazard practice can be prevented by elaborating aspects of Islamic compliance in the system of risk-sharing in finance (Mili & Abid, 2017). Asmirawati & Sumarlin (2018) emphasize the importance of spiritual motivation to build human character and behaviour. Steps in moral hazard management by Islamic financial institutions were carried out to mitigate pre-and post-contract as preventive action and early warning towards the prospective customers (Asmirawati & Sumarlin, 2018). In Islamic banking transaction itself, an indication of moral hazard, according to Suciningtias (2017), can be seen from the level of financing problem as measured by non-performing financing.

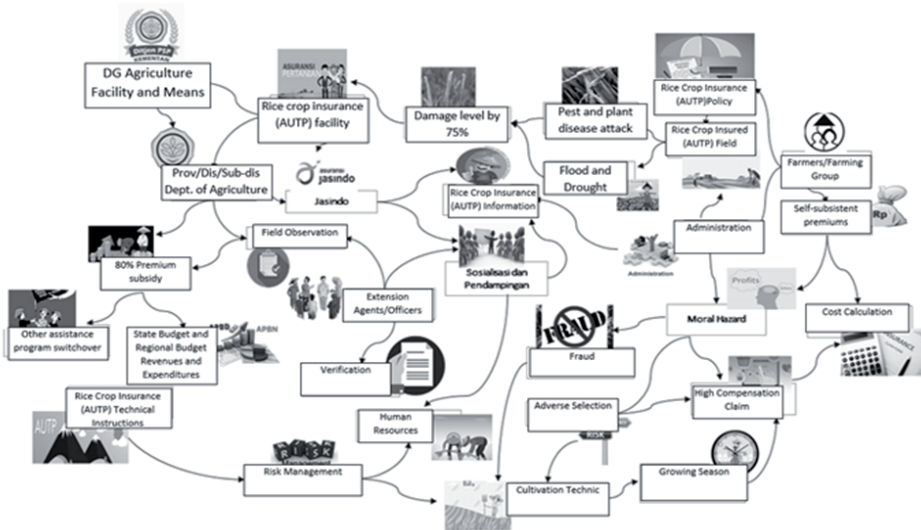
Another perspective to create the paradigm of agricultural development that is free from moral hazard behaviour is established through Indonesian farmers' local wisdom, which mostly is a community of Muslim farmers. According to Syamsuri (2016), the realm of agricultural development with the shade of Islam influences communities' beliefs by offering Islamic economic principles in the approach of farmers philosophy. Some of them are: 1) Concept of *tawhid* (The Oneness of Allah); 2) Concept of *rububiyyah* (The Oneness of Allah in sustaining the universe and sustenance); 3) Concept of *a'dalah* (equality and harmony); 4) Concept of *khilafah* (human role in their environment); 5) Concept of *tazkiyyah* (purification and growth). The study of moral hazard cannot be disentangled of cultural and religious background in agricultural communities.

3.2. Problem Mapping

A rich picture or picture that is rich in problems is made to make it easier to understand the practices of moral hazard in the implementation of agricultural insurance in Indonesia. This rich picture was formed based on the result of direct observation on the field, literature review, and discussion with the experts. The rich picture shows a thorough view of the activities that occur in the agricultural insurance system in Indonesia so that the actors, processes, problems, conflicts, and uncertainties in the agricultural insurance system can be clearly seen in the picture. The researcher can unimpededly visualize that problematic situation with pictures, lines, or symbols (Checkland & Poulter, 2010). A rich picture of the problematic situation can be seen in Figure 2.

FIGURE 2

Rich picture of agricultural insurance



Source: Own elaboration.

3.3. Root Definition

Root definition is used to describe the process of system modelling that is under development. The arrangement of root definition itself is using equation PQR, namely: do P, by Q, in order to help R (Checkland & Poulter, 2010). In this studied problem, the system makes efforts to achieve an agricultural insurance system in Indonesia that is free from moral hazard practices (P) by applying various effective and efficient strategy with involving various parties (Q) to create an insurance system that is integrated and sustainable in Indonesia (R). After that, the descriptions of every component in the system were made to describe the relationship of the elements that are being developed in CATWOE (Table 2).

TABLE 2
Analysis of CATWOE

Components	Definition of each component
Customer: The person that affects/ is affected by the system.	Crop farmers through crop farmers group, livestock farmers through livestock farmers group.
Actor: Person and system role in an activity.	<ul style="list-style-type: none"> - Crop/livestock farmers: Actors who cultivate/raise rice/cattle. - Crop/livestock farmers group: A group of farmers that cultivate/raise rice/cattle. - Insurance Provider: Insurance company/party responsible for the risk of crop failure from the insured (Farmers who join the insurance program). - Extension agent: A person responsible for giving instruction, giving information, and counselling the farmers in doing the farming activities. - Government: The actor that contributes in connecting between the farmers and the insurance provider.
Transformation: Process and changes.	Establish a strategy to reduce practices of moral hazard from happening in agricultural insurance in Indonesia.
World -view: Impact from the system implementation.	The birth of a policy and intervention strategy can create an agricultural insurance system in Indonesia that is free from moral hazard practice.
Owner: All of the parties.	Farmers, farmers group, insurance provider, extension agent, college/ research institution, and local government.
Environment: An environmental constraint that surrounds the system and the implication.	The reluctance of the parties, particularly the farmers who already feel pleasant getting benefits from the habit they had done so far, is a challenge that must be wisely and carefully overcome.

Source: Own Elaboration.

3.4. Conceptual Model

The conceptual model that was formed based on the root definition result is identified to obtain a series of activity processes that can reduce moral hazard problems in the implementation of agricultural insurance. A conceptual model illustrates the relationship between activities and the role of the actor of agricultural insurance provider that consists of government/regulator, insurance institution, extension agents for crop/livestock farming, and the benefit recipients (crop/livestock farmers). All actors involved have their own purposes and goals. The established conceptual model seeks to prevent moral hazard behaviour from achieving the goal of farmers' protection and empowerment. The result of observation and interviews carried out to all actors of agricultural insurance providers gave a comparison between model and real-world that occurred during the implementation of agricultural insurance since 2015. The developed conceptual model can be seen in Figure 3.

institution strengthening, and (9) implementation of Islamic agricultural insurance. More details can be seen in Table 3.

TABLE 3
Comparison of Model with Real World

Activity	Real World Condition	Recommendation
Increase in quantity and quality of human resources who perform insurance.	- The insurance company has information limitation in selecting insurance customers to determine the premiums only based on average risk and not suitable with the actual risk that the insured party will face.	- Increase in quantity and quality of human resources as field officers in selecting and recording insurance customer data so that they can analyse any problem on the field in a more actual and factual manner.
Increase the role of extension agents for crop/livestock farming.	- Lack of motivation and role of farming extension agents who connect farmers with the insurance company in delivering information.	- It is necessary to have a program to increase the motivation of farming extension agent by providing incentives from the insurance company so that the extension agents have a bigger responsibility.
Supports from group members.	- Most of the farmers tend to support the practice of moral hazard that the other group members committed.	- Supports for information transparency from group members is necessary. This can be done by increasing communication and trust between farming and insurance providers.
Modification on insurance contract.	- There is no more detailed clause in the insurance contract regarding the possibility of behaviour that leads to the practice of moral hazard.	- It is necessary to put details in the insurance contract clause by adding a clause of input use and farming management that meet the standards.
In addition to an insurance contract.	- To date, the insurance provider only offers one kind of insurance product to every insurance member, even though the risk possibilities that each member will face are different.	- More various insurance products are necessary to select the type of possible risk they will face and buy an insurance product suitable for the type of risk.
Implementation of recurring or long-term insurance contract mechanism.	- Insurance contract registration is held every growing season, so many farmers who already registered as insurance members and had submitted claim do not register again in the next growing season.	- It is necessary to make a long-term contract or clause which states that if a farmer filed a claim, he is obliged to register in the next year so that the insurance company can do the repairment in the next growing season.
Enforcement of penalty.	- There is no penalty for insurance member or provider who practices moral hazard behaviour to date.	- It is necessary to give a social penalty or any penalty to insurance members or providers who practice moral hazard behaviour to have a deterrent effect. - A criminal penalty can be necessary so that moral hazard practice will not be easily committed and will not repeatedly happen.

Activity	Real World Condition	Recommendation
Institutional strengthening.	- There is an intersectoral problem that has not well done, such as the presence of a complete agricultural facility, information transparency from every involved party, and so on.	- Supports strengthening from every party involved in the agricultural insurance system must be more systematic and purposeful, including the provision of funds devoted to institutional strengthening involved in the agricultural insurance.
Implementation of Islamic agricultural insurance.	- Implementation of conventional insurance has a high potential to harm one of the parties, either the farmer or the insurance company. If there is no claim, the farmers will feel lost because they did not get back the money paid for premiums, and if the compensation claim is high, the insurance company will lose because the premiums collected are fewer than the compensation given.	- Implementation of Islamic agricultural insurance in association to the concept of mutual cooperation and the implementation of corresponding ethical values can minimize the practice of moral hazard to happen. - A change in a governance system regulated by the minister of agriculture of the Republic of Indonesia for the Islamic Agricultural Insurance system. - Change in the concept of agricultural insurance policy contract from Transfer of Risk become Sharing of Risk.

Source: Own elaboration.

Implementation of agricultural insurance involves actors of cross-agency policy-making that are coordinated through the Ministry of Agriculture (Directorate General of Agriculture Facility and Means), Centre for Agriculture Social Economic and Policy Studies - Ministry of Agriculture, and Ministry of State-Owned Enterprises. In addition to the coordination, this Agricultural Insurance Program also runs delegation function to the Regional Department of Agriculture (Province and District/City) and Jasindo Institution of Insurance. An agricultural insurance program is delivered to the farmers as beneficiaries in the agricultural insurance program through the process of land administration and coaching by agricultural instructors. If it is illustrated, then based on the conceptual model, the practice of moral hazard can occur in several ways as following:

1. The farmers deliberately damage a part of a whole insured land to receive compensation for the losses. This first illustration occurs if there is a price agreement from the level of damage to the land with compensation when handling technical management of farm production due to pest attack, diseases, and climate change. The high cost of risk management is not proportional to the remaining rice yields. The farmers then let the land damage increase to 75 % as required in the agricultural insurance claim submission. Candradijaya (2018) explained that insurance implementation would encounter insurance claim fraud (moral hazard). A case like that will hurt insurance company that do not have experts to oversee the running of agricultural insurance.
2. Insurance institutions are not careful in doing field assessment when registering the insurance policy. The second illustration happens when the insurance

institution is not careful in inspecting the adequacy of irrigation channels, mapping the potential of climate change in the growing season, and checking the use of disease/pest-resistant seeds. These problems happened in the District of Asahan, North Sumatera, where the farmers that experienced planthopper attack did not use seeds that are pest-resistant and also lack of control so that the preventive action was already too late and the damage to rice crops reach 100 % (Saragih *et al.*, 2018).

3. Process of land administration in the registration of agricultural insurance policy. The third illustration happens due to the weakness in the process of land administration of the policyholder of agricultural insurance. Herizal & Hafliisyah (2017), who researched practices of agricultural insurance in the District of Pidie, Province of Aceh, resulted in findings that there are a lot of dishonest farmers when showing the rice fields with crop failure, for instance, the fields that failed to harvest is not registered as a member of rice farm insurance policy. Chances of moral hazard practices could happen when showing the damaged land to be claimed, which is different from the registered policy.
4. Submission of Agricultural Insurance Claim in the level of damage above 75 %. The fourth illustration happens due to the initially minor damage, but because of the long claim settlement time, the level of damage got bigger. The land damage that was initially minor and repairable was massively increasing until above 75 % due to a long time of claim submission. Based on an interview with farmers in sub-district Indrapuri, District of Aceh Besar, the claim submission could take 3 weeks, so the Mantri tani (an agricultural data collection officer from the district department of agriculture who are provided in every sub-district) submits the claim as soon as possible even though the damage has not reached the level required, which is above 75 %. The same thing happened in Sub-district East Pariaman, Province of West Sumatera, where the farmers objected to having to wait for the total damage of their land to reach 75 % of each field. The farmers felt they had wasted money for paying premiums because when the land has been damaged or attacked by pests, they already experienced losses even though the damage has not reached 75 % (Elhusna *et al.*, 2019). This problem gives a chance for moral hazard practice to happen in the form of dishonesty in mitigating the risk of land damage. The compensation amount by Rp 6,000,000/ha/growing season is deemed insufficient to cover the mitigation cost during the process of claim administration to the insurance institution, which was predicted to have failed to harvest.

3.6. Planning for Change

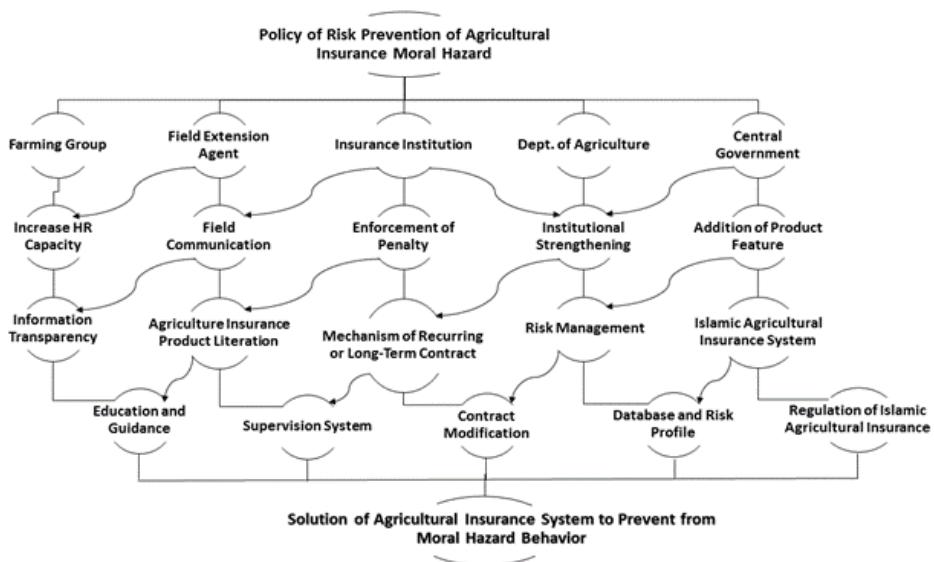
Moral hazard behaviour that occurred in many activities of agricultural insurance implementation, from comparison result between model and the real world, will generate several plans of change. Plans of change are necessary to be done in a plan of strategy that eliminates the probability of a moral hazard and achieves farmers'

protection and empowerment. Plans of change involve many related stakeholders, consisting of the central government, regional department of agriculture, insurance institution, field extension agent, farmers/farmers group. All these stakeholders are important actors in carrying out acts of change to prevent moral hazard behaviour in the practice of agricultural insurance. According to the comparison between the model and the real world, the formation of a moral hazard practice prevention strategy can be seen in Figure 4. The policy of moral hazard practice prevention is carried out to increase human resources capacity, field communication skill, enforcement of a penalty, institutional strengthening, and development of agricultural insurance product feature.

The formulation of moral hazard prevention strategy for agricultural insurance was obtained based on the conceptual framework and practices that occurred in Indonesia. In general, Figure 4 illustrates the role of actors consisting of farmer groups, extension workers, insurance institutions, agricultural services and the central government to carry out various change plans for moral hazard prevention solutions. The following describes the strategic role of the actors in the policy of preventing moral hazard in agricultural insurance.

FIGURE 4

Strategy formulation of agricultural insurance moral hazard prevention policy



Source: Own elaboration.

3.6.1. Farmers

Farmers group can commit moral hazard practice if there is no assistance and guidance about risk mitigation with an agricultural insurance product. Moral hazard problems in farmers could be prevented by increasing human resources capacity towards agricultural insurance products. Farmers should not just be registered in crop farming insurance (AUTP) and have to understand their rights and obligation as crop farming insurance (AUTP) policyholders. According to Hidayati *et al.* (2019), this is an opinion that stated that the farmers' information and knowledge limitation regarding agricultural insurance, which is the benefits, registration procedure, and claim process, leads to moral hazard practice happen. Increasing farmer's capacity as agricultural insurance policyholders really requires information transparency. According to interview results with farmers in the Province of Central Java, farmers group collectively register their colleagues without providing clear information about technical instruction of agricultural insurance implementation. On another side, besides protection against the risk of losses, the agricultural insurance policy also has the purpose of farmers' empowerment. Educational values and guidance about risk mitigation become important elements in increasing farmers' capacity. Agricultural insurance scheme allows the formation of risk-sharing among farmers, which is synergistic with the principle of social cohesion strengthening in farmers community (Sulaiman *et al.*, 2018).

3.6.2. Field Extension Agents

Field extension agents as a mediator connecting policymaker and farmers have a high risk of raising moral hazard practice. Moral hazard risk can arise from a different perception about agricultural insurance implementation due to the asymmetric information. Moral hazard practice usually occurred because the delivery of the program information by the extension agent is not provided with effective field communication. Nurmanaf *et al.* (2007) had findings of divergence of perception between agricultural extension agents and the farmers. Therefore, the plan of change to eliminate the probability of moral hazard practice is field communication that generates information transparency and literacy towards agricultural insurance product.

Mobilization of effective and coordinated communication is necessary to prevent moral hazard behaviour between insurance institutions, extension agents, and farmers. According to a study performed by Mustika *et al.* (2018), the farmers participating in the insurance program did not feel any role of the employees of Jasindo insurance company during their participation in the insurance program. One of the causes is the limited human resources of Jasindo insurance company, so that it causes the limitation in handling agricultural insurance on the field. Another problem found is that most of Jasindo insurance company human resources do not have good knowledge in the sector of agriculture, particularly regarding the risk of pest and plant diseases. This also causes the claim submission for the damaged land compensation is not supported with accurate information about risk mitigation.

3.6.3. Insurance Institution

Potential moral hazard occurs due to the lack of field assessment by the insurance company. A survey needs to be carried out optimally by identifying the land profile, the sufficiency of irrigation channel, the use of seeds, and the growing season prediction based on climate information. The supervision system also needs to be strengthened, particularly in the area with big potential risk. A weak field assessment and supervision system can lead to moral hazard practice because, technically, there is weakness in mapping the farming potential risk.

3.6.4. Central/Regional Government

The involved Ministry of Agriculture, Ministry of State-Owned Enterprises, and Department of Agriculture need to make a policy of plan of the strategy of agricultural insurance product development in each specific area to minimize the occurrence of moral hazard practice. A strategic plan of improvement in the agricultural insurance system cannot be separated from the mechanism of a contract between an insurer and the insured in the object of the rice field. Implementation of the agricultural insurance contract in Indonesia is indemnity-based. The insurance company will compensate based on the losses or damage that actually occur and is experienced by the farmers (Vandawati *et al.*, 2019). A contract model that is indemnity-based can give a moral hazard on the step of the agricultural insurance contract.

Therefore, a modification of policy in the Decree of the Minister of Agriculture (Kepmentan) is considered necessary to be reviewed with changes in the contract modification. To prevent moral hazard behaviour, the department of agriculture and insurance Institutions need to do a strategy of contract modification by considering aspects of the clause of input use and farming management that are in accordance with the standard of land risk management. This contract modification absolutely needs to be supported by institutional strengthening and a database of land risk profile.

Government can also put agricultural insurance products for regions with high risk and government assistance for the farmers. Regions with a high risk of crop failure get specific clauses about the assessment of agricultural insurance facility, start from the land risk map, the boundary of damage, and determination of target of premiums subsidy assistance. Department of Agriculture in the risky region proposes regional/Governor's/Regent's/Mayor's regulation for the addition of on-targeted agricultural insurance product facilities. This action can be one of the actions of change by including agricultural insurance facility in the assistance program that is related to food security.

In addition to that, there is also an aspect of farmers' independence to not depend on government subsidy for premiums by 80 %. Moreover, Yusuf *et al.* (2021) stressed that the implication of government policy to encourage farmers' independence to participate in paying premiums must be in accordance with the information system

of ownership of insured land. Therefore, the governance of farmers' self-subsistent premium payment must be supported with a good land database.

3.6.5. *The idea of Islamic Agricultural Insurance*

Plans of change to overcome the practice of moral hazard must be started by building the value of honesty, responsibility, and mutual assistance among farmers. A significant set of local actors consulted stressed that a whole improvement move can be carried out by accommodating an Islamic-based agricultural insurance system. According to the thoughts of some farmers, insurance is a money playback with elements of gambling, *riba* (usury), and uncertainty where not all people who become customers can get compensation of claim (Herizal & Hafliyah, 2017). Based on the study with soft systems methodology, there is a moral hazard that philosophically occurs in the practice of agricultural insurance with concept transfer of risk of farming land. The action of change with the Islamic agricultural insurance system's approach changes the concept of transfer risk to become sharing of risk between farmers and the insurance institution in the management of pooling of fund of *tabarru'* funds.

The government can improve the agricultural insurance system by giving a chance for new features of agricultural insurance product to be created. Many of these new features are consistent with the values involved in the Islamic agricultural insurance. Fadhil *et al.* (2020a) explained that values in Islamic insurance such as the Oneness of Allah (*tawhid*), justice, mutual-help, and honesty are behaviour that can generate good morality for the farmers because there is human accountability to Allah ﷻ (the faith held by religion believers, particularly Islam). Sharing of risk can allow investment of *tabarru'* funds for the Islamic agricultural insurance's product if there is surplus underwriting.

Institutionally, Zakariah *et al.* (2017) indicate that in Regulation of Ministry of Agricultural number 40, the year 2015 in Article 18, an Islamic insurance company is allowed to open up the opportunity to participate in the management of agricultural insurance after obtaining a product license that is validated by Financial Service Authority (OJK). That means the central and regional government must prepare a chance to implement Islamic agricultural insurance in making policy to prevent moral hazard practice from occurring. Islamic-based agricultural insurance is, therefore, thought to prevent the chance of risk of moral hazard practice due to the risk mitigation system with sharing of risk mechanism. Said that, we acknowledge that the governance of Islamic agricultural insurance must be established in a form of specific regulation to develop a better agricultural insurance system policy. In addition, it is time for the farmers to be educated with sharing risk concepts.

4. Conclusions

Moral hazard behaviour in the implementation of agricultural insurance occurs because of the asymmetric information between farmers/farming group, field exten-

sion agent, insurance company, and central/regional government. It is necessary to improve continuously based on actual development in the field to achieve most ideal condition. Besides, the result of the study on the rich picture shows that there is the intention to increase the risk and losses in order to receive benefit from the compensation claimed. The government and Jasindo insurance company are also trying to achieve the realization of agricultural insurance implementation to increase the chance for subsidies on premium from the government by 80 %. So far, policymakers can implement two main strategies: the presence of policy of human resources development, either for farmers, insurance actors, or extension agents.

Next, it is necessary to strengthen various policies, either in the scope of insurance actors, such as new features in the insurance product, enhancement of field communication, or in the role of the regional government to make on-targeted policies, and also facilitate and encourage all the institutions involved in the systems to be more proactive and carry out their roles.

Specifically, we discussed the relevance of the Islamic agricultural insurance model for a plan of change. This relevance draws on the way the model closes the chances of moral hazard behaviour in agricultural insurance contracts. Islamic agricultural insurance stresses the risk of sharing with *tabarru'* funds from the farmers to be managed by insurance institutions, in addition to the possibility that farmers invest their *tabarru'* funds that are not paid if there is no claim in one growing season. The farmers gain revenue sharing from the returns of *tabarru'*s fund's investment of agricultural insurance products through surplus underwriting. Therefore, we suggest that the policy of the Islamic agricultural insurance system can be a new option for implementing farmers' risk mitigation that minimizes the moral hazard potentials.

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