

# Survey on Sustainable Agricultural Insurance Scheme in Indonesia

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# FOREWORD

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Climate changes are expected to have adverse impacts on agricultural production. For instance, the production of rice, a major staple in Indonesia, is vulnerable to changes in the onset and length of the wet season influenced by El Niño events which are projected to increase from climate change. Also, rice production is sensitive to temperature changes. Some study estimates that an increase of 1°C could reduce national production by 10%–25%.<sup>1</sup>

The negative impacts of extreme climate conditions on agriculture production will likely increase food prices, and this has a serious implication to food security and poverty in Indonesia. The World Bank study shows that a 100% increase in food prices would increase the number of Indonesians in extreme poverty by more than 25%.

Agriculture insurance is one of the risk management instruments which the Government of Indonesia strategically employs to protect our farmers from climate risks. Law number 19 of the year 2013 on protection and empowerment of farmers stipulates that one of the strategies to protect farmers is through agriculture insurance (article 7 clause 2) and that the central and regional governments are obliged to protect farmers in the form of agriculture insurance (article 37 clause 1). Agriculture insurance is also referred as one of the priority projects in the presidential regulation number 18 of the year 2020 on the national medium-term development plan (RPJMN) 2020-2024.

Japan International Cooperation Agency (JICA) is one of our long-standing development partners who has been accompanying the process of developing agriculture insurance in Indonesia. Their support to agriculture insurance in Indonesia started in 2013 as a sub-component of the Project of Capacity Development for Climate Change Strategies and assisted in piloting an indemnity-based insurance product for paddy which is now being rolled out as the national scheme of paddy farming insurance (AOTP) by the Ministry of Agriculture.

Ministry of National Development Planning (BAPPENAS) collaboration with JICA conducted the survey through the Project of Capacity Development for the Implementation of Agriculture Insurance and illustrated the scale-up scenarios to provide the protection for rice-producing farmers with insurance throughout the nation in a sustainable manner. While we are still on this long journey, committing ourselves to continue further efforts in the development and improvement of agriculture insurance schemes in Indonesia, it is hoped that the results of this survey will also foster the understanding of success and challenges in Indonesian agriculture insurance among those who are interested in joining our journey and further cooperation and collaboration.

Deputy Minister for Maritime and Natural Resources  
Ministry of National Development Planning (BAPPENAS)  
Republic of Indonesia



**Arifin Rudiyanto**

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<sup>1</sup> The World Bank Group and Asian Development Bank (2021). Climate Risk Profile: Indonesia.





# ABBREVIATIONS

<b>AI</b>	AgroInsurance International
<b>API</b>	Application Program Interface
<b>AUTP</b>	Agricultural Insurance Program for Paddy Rice Production
<b>AYI</b>	Area Yield Index
<b>BAPPENAS</b>	National Development Planning Agency
<b>BMKG</b>	Agency for Meteorology Climatology and Geophysics
<b>BPS</b>	Central Bureau of Statistics
<b>BULOG</b>	Indonesian Bureau of Logistics
<b>CAT</b>	Catastrophe (event)
<b>CCE</b>	Crop Cutting Experiments
<b>CNES</b>	French National Centre for Space Studies
<b>ENSO</b>	El Niño Southern Oscillation
<b>ESA</b>	European Space Agency
<b>EVI</b>	Enhanced Vegetation Index
<b>GDP</b>	Gross Domestic Products
<b>GLR</b>	Gross Loss Ratio
<b>GoI</b>	Government of Indonesia
<b>GPS</b>	Global Positioning System
<b>JICA</b>	Japan International Cooperation Agency
<b>LA</b>	Loss Adjustment
<b>LAPAN</b>	Indonesian National Institute of Aeronautics and Space
<b>MIS</b>	Management Information System
<b>Kementan</b>	Ministry of Agriculture
<b>Kemenkeu</b>	Ministry of Finance
<b>NASDA</b>	National Space Development Agency of Japan
<b>NDVI</b>	Normalized Difference Vegetation Index
<b>OJK</b>	Financial Services Authority
<b>OPT</b>	Pests and Disease
<b>POPT</b>	Pests and Diseases Controller-Pests and Diseases Observer
<b>PPL</b>	Agricultural Extension Worker
<b>PPP</b>	Public Private Partnership
<b>R&amp;D</b>	Research and Development
<b>RASKIN</b>	Subsidized Rice for the Poor Programme
<b>RPJMN</b>	Medium-Term National Development Plan
<b>SIAP</b>	Program's Data Center

<b>UMK</b>	Small and Medium-Sized Enterprises
<b>TBD</b>	To Be Determined
<b>TLR</b>	Target Loss Ratio
<b>ToR</b>	Terms of Reference
<b>USD</b>	US Dollar

# EXECUTIVE SUMMARY

The Government of Indonesia requested to review the experiences of pilot AOTP rice insurance scheme and to study other countries experiences to reform the current agricultural insurance scheme making it more sustainable in the future. At the beginning of 2019 JICA has initiated a consultancy assignment to analyze the currently running AOTP insurance program for paddy rice in Indonesia and develop two possible scenarios for further development of paddy rice insurance program.

AgroInsurance team was requested to review AOTP-related regulation, the product underwriting/pricing methodology, claims management principles and associated procedures for the improvement of AOTP. The Consulting team was asked to develop a product design and pricing methodology for a yield-index based insurance for paddy. The consulting assignment included the requirement to produce a package of recommendations for two scenarios with suggestions for necessary capacity-building and associated financial envelope to realize each scenario.

Indonesian government is working on introduction of new technologies for agricultural sector needs including for policy analysis purposes. This refers to satellite remote sensing, mobile technologies, drones, etc. Consultants were to provide an analysis of the existing applications of new technologies with a special focus in using them for underwriting rice/crop risks under AOTP and AYI programs and for enhancing claims handling processes.

## AOTP program

Based on the work done, consultants recommend continuing running AOTP program according to the current design until October 2020 applying a reviewed portfolio-based rate the soonest possible time.

The key program enhancements to be developed in the period of November 2019 – October 2020 with the implementation starting tentatively from November 2020. By that time it is highly recommended to consider adoption of special legislation and regulation for the agricultural insurance program supported by the government (See Section 3.4.4). Such legislation must recognize the principle of continuous government support to assure sufficient funding and dedicated resources for the program in the future. The key recommendations for AOTP program include :

- Revise the regulatory documents (specifically Premium Aid Guidelines) to specify the actual goals and purposes of the rice insurance program which partially compensates farmers for the loss of their rice crop;
- Revise terms and definitions currently provided in Premium Aid Guidelines to be in line with AOTP product design;
- Set-up straightforward program rules and procedures to correspond to the updated product design.

A wider list of recommendations is suggested in stages: (i) immediate changes, (ii) Changes until October 2020, and (iii) Strategic changes required based on further decisions on program's strategic objectives.

Government of Indonesia is recommended to continue using premium rate methodology as initially suggested by Indonesian actuaries. The premium rates must be revised annually using the updated rice production master dataset using BPS data. The loading factors for catastrophic events and adverse selection, suggested in this report by consultants, need to be revised annually based on AOTP program performance and advice of the international reinsurers.

The portfolio-based premium rate for AOTP program must be increased within the soonest possible time. This will assure the sound and sustainable program performance in the long run. The rate for all provinces should be changed from 3% to 4%, based on the updated rating structure - the key output of current assignment. Portfolio-based rate change is considered by the regulator as a minor change to the product and does not require significant review process on the side of the regulator (OJK). Alternatively, it is possible to retain 3% premium rate but introducing a 50% limit to pest and disease payouts. Such measure would have positive impact on AOTP performance.

It is also recommended to further apply risk-based rating on a seasonal basis, with a differentiation of provinces by 4 risk zones and consider the type of rice growing technology. Modification of AOTP terms of insurance to correlate with the production season specifics is of an extreme importance. Coverage per each production season (wet, dry, intermediary) with defined application deadlines and final insurance period end-date per season.

Such a change requires more thorough preparations, major review and approval by the OJK. Consultants suggest to immediately start working on preparations for the major product change, which should require up to 12 calendar months. The updated AOTP product is tentatively considered to come into effect starting from November 2020. The suggested timeline is challenging but realistic, should the necessary resources in the ministries and directorates are made available to streamline the process of AOTP change.

The stabilization period for AOTP is considered to take 2-3 years (at least 4 production seasons) after all major changes are applied. When the program performance is stabilized, it is recommended to start offering several coverage options for sum insured based on the production season, production practice, irrigation regime and types of seeds used.

Current underwriting, loss assessment and claims handling procedures require a detailed revision and elaboration of a set of documentation for the future program. The key improvements required: (a) more stringent risk acceptance criteria and better risk profile data capturing by the insurer; (b) elimination of unnecessary paper work and simplification of AOTP reporting via e-authorization in SIAP; (c) enhancement of loss assessment procedures to capture all important features of each claim; (d) proper identification of crop damage, yield loss estimation and reporting; (e) seasonal reporting principles for insurance and agricultural policy analysis purposes. (See recommendations provided in Section 3.4.2, Underwriting)

Expansion of AOTP program in the future may represent a higher exposure risk from the insurance perspective, especially for catastrophic events. Consultants recommend considering risk transfer mechanisms to better manage crop portfolio. One of the advisable options is - transfer of a share of risks to the international reinsurance markets. While this will be beneficial from the risk management perspective, Indonesian insurance sector will get access to specific professional knowledge and technologies available with the key international reinsurance companies.

#### **Area Yield Index (AYI) – tentative program**

AgroInsurance team was requested to assess the viability and options for introduction of AYI insurance program. Consultants analyzed the experience of AYI insurance program in India and some particular features common to the programs in South-East Asia countries. As an outcome of such an analysis it is suggested to initially pilot the AYI program in one province. This suggestion is based on several limiting factors that include a lack of reliable yield data for provinces and districts in Indonesia, introduction in 2019 of new statistical procedures for rice production data reporting by BPS (still to be validated for the use of insurance), conduct a demand assessment for index insurance solutions with farmers.

Consultants must indicate three key challenges for AYI insurance program in Indonesia. **Firstly**, there is a significant basis risk. Rice production data provides low variability of rice production in administrative units however due to small size of individual rice farms there may be numerous cases when the individual farmer may suffer crops loss while the district or province average yield may be average. **Secondly**, the current rice yield estimation process is not in place. The new monthly rice production stages reporting procedure is being launched by BPS in 2019. It involves the crop-cutting experiments, but the guideline for this and data granularity need to be assessed at fields to decide on its suitability for yield estimates to handle future AYI claims. **Thirdly**, currently rice production data is collected and reported on a monthly basis. The AYI program will require yield data per season which may be challenging under the new rice data collection process.

The product design is based on the traditional AYI concept. The insured yield is recommended to set at 80% of the average annual rice yield. The insured yield must be calculated per each province, district and sub-district based on the data available. The crop value must be set per each season based on the expected rice value (IDR per ton) at harvest time. The insured farmers are to get payout in case the average rice yield in the district will be below the insured yield. According to the product design, all insured farmers must get the same payout sum per hectare. The insurer and government agencies (especially BPS as the owner of rice reporting procedure) must assure the yield estimates are done accurately and reported in a timely manner.

AgroInsurance team has analyzed rice production data provided. This data is currently not sufficient for accurate premium rate estimates. However, consultants suggest to pilot AYI insurance program in West Java based on available data. The annual rice area loss in West Java is 1,67% which is much higher than the average loss for all Indonesia (1,08%) and higher than for Central and East Java (1,00% and 0,62%). Based on this data, consultants assume lower basis risk and higher probability of claims being paid to individual farmers in West Java. Consultants suggest applying a 30% loading

for catastrophic events, data inconsistency and high loss volatility. This results in the net rate of 2,18%. The calculated AYI gross premium rate for West Java is 3,1% which is based on the average area loss for the period of 2003-2017. Consultants expect administrative and operational costs to be lower for area yield based program. The gross premium rate was calculated on a basis of 70% target loss ratio (accepted by Jasindo).

AgroInsurance team recommends piloting AYI program in West Java at least for 2 years. This time is necessary to test program design, communication and marketing activities and to calibrate underwriting, average yield reporting and claims handling procedures. With a stable performance of AYI program and establishment of efficient data infrastructure and procedures a further upscale to other provinces may be considered.

### **Program bundling**

Consultants recommend bundling both AOTP and AYI products with other government supported programs, like subsidized fertilizers, season credits and the like. This will increase the product uptake and provide additional protection to farmers and the government. Ultimately this approach will increase farmers resilience which must result in more stable rice production, introduction of better technologies and stabilize rural population income from their rice crop production.

### **Modern Technologies**

Understanding the needs of agricultural insurance sector in Indonesia, AgroInsurance team recommends applying modern remote sensing technologies (satellites, drones, mobile applications, etc.) which may be highly beneficial for AOTP and future AYI program, as well as for general crop monitoring at the country scale. Satellite remote sensing solutions provide numerous options for insurers including, but not limited to, crop monitoring, risk event and loss severity assessment, early warning for insurers and government on possible large losses, etc.

Mobile technologies have significant potential for optimizing certain insurance processes like application for insurance, risk event and claim notification, claim payment to clients by insurers. The government may need to fund the development of a special application like the application portal or mobile cabinets for clients, as a part of existing SIAP system. Additional funds will be required to assure trouble-free migration of mobile data to program's data center (SIAP).

Drone technologies may be applied for agricultural insurance purposes. However, from consultants' point of view application of drones in Indonesia is rather limited. The best value of drone technologies may be the supplementary assessment of rice production areas (crop monitoring and loss assessment) if satellite remote sensing is impacted by dense cloud cover or natural events (volcanic eruptions). Military-grade drones would be the most appropriate for these purposes due to extended flight life and equipment used similar to installed at satellites.

### **General recommendations**

The suggested infrastructural and capacity changes involve large number of activities as well as will take extensive timeline to finalize with an output expected. In order to implement the changes suggested, Government of Indonesia should make certain high-level decisions on further regulatory environment, status of insurance premium subsidy program, involvement of other insurers into the scheme, etc. Development of a PPP approach is recommended, that may handle all future agricultural insurance issues, becoming the key center of competence and insurance-related data for other market players from the Private and Public Sectors. As the development of the PPP is not among the objectives for current research, this should be studied further to assess the proper PPP model applicable for Indonesia.

Current findings, approaches, methods, recommendations and the necessary steps for agricultural insurance programs (AOTP and AYI) development in Indonesia are provided further in this report and its annexes.



# I. INTRODUCTION

On behalf of the Government of Japan, the Japan International Cooperation Agency (JICA) has provided funding to conduct a Review of the Agriculture Insurance Scheme for rice paddy in the Republic of Indonesia. The Indonesia government currently operates a multi-peril insurance program for rice paddy production. The Ministry of National Development Planning, Directorate for Food and Agriculture (Bappenas) is interested in ways to advance participation in the rice paddy insurance scheme.

Agroinsurance International LLC. (AI) comprises a team of individuals with considerable experience in the design and operation of agriculture insurance schemes. AI has been contracted to examine the current multi-peril insurance scheme (AOTP) in Indonesia, recommend changes for improvement and to offer opinions on the practical value of alternative insurance designs, such as AYI structures.

Representatives from various Indonesian project counterparts provided a set of documents and data to serve as background and primary source information for the review process. As such, this report is based on the analysis results and recommended modifications for the current AOTP scheme (Scenario 1); and, results of the research on opportunities for introduction of the Area-based Yield Index (AYI) insurance program and recommended further activities and infrastructural changes in Indonesian agricultural insurance landscape.

## 1.1. Background and objective

The Law No. 19 of 2013 on the Protection and Empowerment of Farmers stipulates agricultural insurance as one of the instruments to protect farmers. Ministry of Agriculture (MOA) of Indonesia conducted a pilot indemnity-based agricultural insurance program for paddy rice production (AOTP) since 2011.

Envisaging the next RPJMN 2020-2024, the Government of Indonesia requested to review the experiences of pilot AOTP rice insurance scheme and to study other countries experiences in order to reform the current agricultural insurance scheme making it more sustainable in the future. Against this backdrop, the Government of Indonesia represented by the Ministry of National Development Planning/National Development Planning Agency (BAPPENAS), MOA, the Ministry of Finance (MOF), the Agency for Meteorology Climatology and Geophysics (BMKG), PT Asuransi Jasa Indonesia (Jasindo) (Project Implementing Agencies) and Japan International Cooperation Agency (JICA) started the Project of Capacity Development for the Implementation of Agricultural Insurance in the Republic of Indonesia. This 5-year Project started in October 2017 aims at enhancing the capacity of the key ministries to promote sustainable implementation of agricultural insurance in Indonesia.

AgroInsurance team was requested to provide recommendations to the Government of Indonesia on enhancement of the existing insurance program or/and launching a new insurance program, based on yield index insurance concept to provide improved insurance cover for paddy rice in the period of 2020-2024.

Ministry of Agriculture (MOA) of Indonesia has delivered a pilot indemnity-based agricultural insurance program for paddy rice production (AOTP) since 2015. During the Mid-term National Development Plan (RPJMN) 2015-2019, MOA expanded the pilot activities to 23 rice producing provinces, with the annual target of paddy fields to be insured at 1 million hectares. Although the extent is limited, AOTP program has so far attained some success in mitigating financial impacts of farmers affected by multiple-perils with insurance payouts and raising the willingness-to-pay of some AOTP beneficiaries.

Due to its design as a voluntary, indemnity-based insurance, AOTP pilot program suffers from typical challenges such as moral hazard, adverse selection, and high transaction costs. In addition, the rapid expansion of geographical insurance coverage has aggravated the operational and administrative burden of service delivery to reach out rice producing farmers. More manpower and infrastructure for service delivery are necessary to be in place in the future. The associated institutional, financial and operational capacity need further development practical skills that are currently not available in the country.

The objective of this consultancy work provided by AgrolInsurance experts was to develop two possible scenarios of paddy insurance and associated recommendations for the Government of Indonesia to endorse and implement in the next RPJMN period (Year 2020-2024).

Specifically, for AOTP, it was requested to:

- Review current AOTP related regulation, product structure, underwriting/pricing methodology, claims management;
- Suggest actuarially-sound pricing and associated procedures for the improvement of AOTP;
- Develop product design and pricing methodology for a yield-index based insurance for paddy;
- Produce a package of recommendations for two scenarios with suggestions for necessary capacity-building and associated financial envelope to realize each scenario;
- Evaluate use of technology (remote sensing, mobile applications, drones, etc.) to underwrite rice risks under AOTP program and assess claims;
- Collect from Indonesian government agencies and analyze yield, disaster risk and insurance data;
- Review and suggest improvements in general conditions (level and conditions of payout, franchise point, etc.);
- Study and suggest improvements in distribution channels;
- Compile all the results of the aforementioned work and produce recommendations with required capacity building and financial envelope for realization of the scenario as well as new/modified/improved (technical) guideline(s).

The experts were also tasked to assess possible strategies for the introduction of AYI insurance, that included:

- Study the AYI product design and implementation from India and other markets (Canada, countries of the South-East Asia) using similar product structure;
- Collect and Analyze available yield data, define current data granular level to be used for AYI product;
- Study various distribution channels and propose suitable channel for launching pilot;
- Develop prototype AYI Product;
- Develop an actuarially-sound pricing methodology;
- Explore the possible utilization of technologies such as mobile-IT and remote-sensing to settle claims;
- Compile all the results of the aforementioned work and produce recommendations with required capacity building and financial envelope for realization of the scenario as well as draft proposed (technical) guidelines.

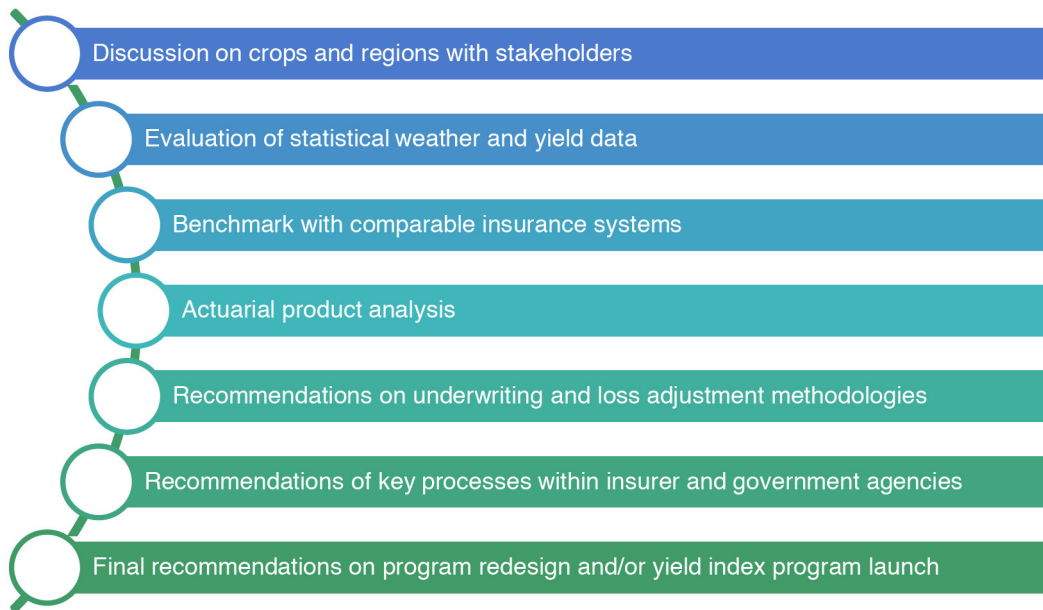
Current research work has been conducted mostly on the national level for AOTP program. Local level discussions conducted with MOA district office (Karawang, West Java) on potential for AYI program revealed that a more thorough data collection and research activities are required and highly recommended for the future activities. The choice of localities should be determined at later stages to address the modified structure and objectives of AOTP, and while preparing for piloting AYI.

## 1.2. Methodology

Consultants employed several techniques to complete this assignment. This included the review of the documents provided by JICA project office in Jakarta and Indonesian counterparts, analysis of the rice production data, benchmarking the received results with the comparable insurance programs, application of standard assumption techniques for large, unusual and catastrophic events. Estimates of probable development of both AOTP and AYI program based on the country information were reviewed and considered to elaborate a set of recommendations on the most appropriate direction for development of future agricultural insurance programs in Indonesia.



Figure 1. Steps for analyzing agricultural insurance system in Indonesia



AgroInsurance team worked together with insurers, government agencies, farmers and farming organizations and other parties to fully recognize the challenges of the current AOTP program and to identify the workable options for piloting AYI insurance program for paddy rice. Consultants have conducted a number of meetings with the insurers and government agencies during the number of visits to Indonesia in March, April and July 2019 (See Annex #4).

During the country visits AgroInsurance team was able to collect data necessary for completion of the assignment. The data was received by JICA project and provided to the AgroInsurance team. The data used by consultants included the following set:

**Table 1. The data received and used by AgrolInsurance team**

Institution	Requested Data	Status
Jasindo	AUTP program performance data (2015-2018 years)	Received
	Initial premium rate calculation dataset based on BPS rice area loss data for years 2003-2012	Received
	BPS data for rice area loss for years 2013-2017.	Received
	Program data (policy wording, underwriting and loss assessment guidelines, standard reporting (internal/external) templates)	Received
Ministry of Agriculture	Area planted for paddy rice (ha)	Received
	Area harvested for paddy rice (ha)	Received
	Yield data with district/subdistrict granularity	Not provided
	Gross production for paddy rice (ha) (2015-2017)	Collect on sub-district level and analyze
Central Bureau of Statistics (BPS)	Area planted for paddy rice (ha) (2003 – 2015)	Received
	Area harvested for paddy rice (ha) (1993 – 2015)	Received
	DYield data with district/subdistrict granularity	Not provided
	Gross production for paddy rice (ha) (1993 – 2015)	Collect on sub-district level and analyze
		Received
Meteorological, Climatological and Geophysical Agency (BMKG)	Sample data per month per weather station	Received
	Information about weather station locations	Received
	Daily precipitation data for the longest consecutive data series available	Received

AgrolInsurance team requested basic data for rice production in Indonesia including area planted, area harvested, commodity produced and average yield of paddy per season. Consultants received the aggregated data per province and per districts for area planted, area lost/affected and harvested area but no actual yield data on the necessary level of granularity (district/sub-district) has been provided. Absence of yield data makes ratemaking particularly for AYI program practically impossible as the concept of the AYI insurance requires accurate average yield data per administrative unit. Although, this was not available in Indonesia at the time of this assignment, or at least consultants couldn't obtain this data. Local rice yield data on sub-district level has been confirmed as available at district Dinas offices (MoA). This data exists in hard copies and requires digitalization and further analysis for consistency and applicability for AYI and possible future needs of AUTP.

#### **Actions undertaken on AUTP program :**

- Analysis of AUTP Premium Aid Guidelines;
- Analysis of Jasindo internal underwriting and claim management guidelines;
- Assessment of the net premium rate and cost structure for the gross premium based on information provided by Jasindo;
- Analysis of the initial rating methodology, update of the dataset with the data for 2013-2017 years as provided by BPS and calculation of the average rice production area loss per year;
- Assessment of high-loss years (production area lost) and estimation of the average volumes of production based on BPS data;
- Evaluation of the required loadings based on the production and AUTP program data sets;

- Analysis of the AOTP program results per province (2015-2018) to assess the risk zones and estimate the required loadings based on province performance;
- Working out the updated methodology for AOTP program rate making using the results of the data analysis;
- Elaboration of the list of comments and drafts of AOTP guidelines and data gathering guidelines;
- Assessment of current distribution approaches and feasibility for future insurance bundled solutions (fertilizers, agricultural loans, etc.);
- Analysis of current remote sensing approaches considered by Jasindo and attracting international remote sensing providers possessing functionality applicable in agricultural insurance.

Based on the research work done, the AgrolInsurance team elaborated recommendations based on the requirements of the ToR: (i) AOTP premium rate modifications and enhanced product pricing methodology that could be applied in the future; (ii) the recommendations for enhancement of underwriting practice, claim management and AOTP program administration approaches. Some of the recommended actions can be introduced by Jasindo while the recommended technical program enhancements (premium rate diversification by season/production technology, etc.) are subject to additional consideration and further authorization by the involved government agencies and market regulator.

#### **Actions undertaken on the AYI insurance program:**

- Analysis of rice production data as provided by the Indonesian government agencies. These datasets provided information about area planted, lost/affected and harvested by month. This is a significant challenge because the insurance program required production data by the production season and not by the reporting month;
- Some files provided to consultants had yield simulation data based on assumptions, but the source of assumptions and the methodology is not clear, making it impossible to use this data for rating exercise;
- Consultants analyzed rice production data used for AOTP program rate making. Although, this data is not ultimately correct for AYI insurance purposes, it represented the most reliable dataset available for further reference. The data set allowed estimation of the rice production area loss due to certain perils (similar to AOTP, including drought, flood, pests and diseases) for the period from 2003 to 2017;
- Working out the assumptions for AYI program based on the similar programs in South-East Asia, based on the guidance and recommendations of Swiss Re. Assumptions for CAT events and payout structures have been developed which may serve now as the starting point for introduction of the AYI program in Indonesia. (For recommendations on AYI see Section 3.2.2.).

AgrolInsurance team was requested to assess the viability and options for introduction of AYI program. Consultants analyzed the experience of the AYI insurance program in India, as specified by the ToR (See Annex #2 for an overview of India experience in AYI programs). Additionally, consultants considered the Canadian approaches, as this country's insurance programs successfully develop for decades. Canadian agricultural insurance practice is internationally considered to be among the most technically advanced and sustainable. AgrolInsurance team conducted numerous consultations with Swiss Re to seek for the company's professional experience and advice on AYI practice in the South-East Asia to conduct regional benchmarking for similar programs. The aim of such a complex analysis was to suggest possible re-use of those programs' components if found applicable for Indonesia.

From consultants' point of view, current yield data required better granularity and development of consistent data collection and management approaches in the future. It is necessary to continue data collection and research efforts in key paddy rice producing regions of Indonesia to identify the data availability and reliability. It is also important to continue research activities to match the expected scale of the future program with real demand for index products with the targeted farmers (groups and individual). The interviews with farmers or farming organizations will be instrumental for such a future research.

Later in this report AgrolInsurance team suggests possible approaches for modification of AOTP program and introduction of AYI program in Indonesia based on the data analysis (See Annex 10). It is necessary to outline the importance of having the appropriate infrastructure, capacity, sound procedures and processes in place for successful implementation of the future agricultural insurance programs in Indonesia.

## II. SURVEY RESULTS

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### 2.1 Agricultural insurance considerations applied in survey

#### The Uniqueness of Agricultural Risk

The agricultural sector is unique to other insurance markets in that many forms of agricultural risk are highly correlated among insured farms. For example, commodity price risk affects most farms simultaneously. When prices are low for a commodity, they are generally low for all producers of these commodities. A downward price trend in one agriculture commodity often coincides with a similar decline for many other commodity prices. While some natural perils such as frost or hail are generally localized, others such as drought and flood can be widespread and impact the production of many insured farmers at the same time.

Agricultural production is highly technical and specialized, susceptible to weather, pests and diseases, impacted by an international trade environment and dependent on management techniques employed by each individual producer (e.g. seed bed preparation, seeding dates, fertilizer and hybrid seeds application, water and manure management, etc.). Underwriting provisions and loss adjustment techniques are unique to the agricultural industry and not readily adapted from other insurance markets.

The unique aspects of agricultural risk impact the way in which the insurance industry views their participation in this market, that could be due to a variety of factors, including:

- the nature of the risk(s) in the agricultural sector and need for capacity to cover widespread and accumulated losses;
- the role of the public sector in risk management within the agricultural industry both in a planned fashion and in ad hoc assistance;
- the ability to derive sufficient and consistent premium income over time that is commensurate with risk exposures; and
- the ability to spread risks outward to the reinsurance industry in order to reduce risk exposures

#### Terminology - Program versus Product

A few terms are often used interchangeably to describe aspects of agriculture insurance. For clarity in this report, an agriculture insurance program or scheme is meant to encompass all aspects of the agriculture insurance process. In brief, this includes:

- the structure of the insurance process, governance, the role of stakeholders their interaction and responsibilities (including government, producers and any private sector groups/firms/agencies);
- Insurance purpose and desired objectives;
- Insurance regulation, guidelines and contract of insurance;
- Communications – marketing and pro-active interaction with stakeholders;
- Data management – gathering data (consistency and documentation), quality control (accuracy and integrity), storage (cost efficiency, security) and presentation/query tools (accessibility, value in research and policy development);
- Product design, research and ongoing improvement;
- Unbiased presentation of risk exposure;
- Loss adjustment processes;
- Claims processing;

- Appeals process;
- Dedicated resources – human, capital, etc. including training, succession planning and technology adaptation;
- Reinsurance;
- Audit and overall quality control (transparency).

An agriculture insurance product focuses on the design and elements of what is offered to the insurance client – the primary commodity producer. The design concentrates on how insurance coverage is determined, what triggers a claim, and how legitimate losses are verified.

The insurance product often receives the most attention in discussions of agriculture insurance. Pros and cons of alternative designs should be considered: multi-peril, index-based or area-yield products. However, an alteration to design as a primary focus can often overshadow other elements of the entire program.

As such, moving too quickly to alter or favour one design over the other can create unexpected issues unless all aspects of the program are considered, well thought out and planned properly. Producers, who are the recipient of “the end-product”, don’t make a distinction between product and program. A great product design will not work well or have the desired outcome if it is “delivered poorly”. Conversely, a well-managed and efficient administration cannot overshadow a product design that does not meet the needs of the producer client.

### Principles and Key Factors of Success

Agriculture insurance in the countries with developed agricultural insurance programs is predominately based on individual farm yield designs. Examples of AYI programs do exist and individual insurance programs are AYI programs with the “area” defined as a single farm or a farm unit. Many of the coverage and premium assessment techniques deployed in an individual yield insurance design are readily transferable to an area-yield approach. While the developed agricultural insurance systems differ in their administration structure, they usually employ **fundamental principles necessary to sustain a viable agriculture insurance program** that include:

- a clear purpose and role within the broader agriculture policy framework of the country;
- transparency and consistency in program design and operational elements;
- adherence to actuarial and business principles;
- mandatory time frames and responsible for actions; and
- a requirement for good farm management practices of program participants.

In addition to these fundamental principles, **key influencing factors** that have contributed to the success of successful agriculture insurance programs globally include:

- a mandated commitment for reliable government funding to support the insurance initiative;
- ongoing research and development efforts supported by an efficient and effective data management network;
- effective delivery mechanisms supported by personnel with dedicated insurance expertise and steady participation growth with sufficient time to develop and “operationalize” program enhancements.

When these key influencing factors are lacking, the value of the crop insurance program to all stakeholders can be negatively impacted.

### AUTP Program

Several elements of the agriculture insurance program provided reasons for comment and potential recommendation for improvement in this section.

Other recommendations identify potential ways to improve either:

- **program administration** – e.g. streamline application and claims processing, develop canned **and consistent communications materials, pro-actively interact with farmers to gain their input;**

- **product design** – e.g. set premiums to reflect actual portfolio risk, consider expansion of the insurable peril list after program stabilization, develop a catastrophic cover with the potential support by the government, increase the coverage (higher trigger for damaged plants) after program stabilization.

### **AYI Product**

In addition to a review of the current AOTP program, consultants were asked to offer opinions regarding alternative AYI product that might foster increased participation in agriculture insurance.

Underlying the discussion of AYI product design and recommendations for improvements to the current AOTP program form key factors known to have contributed to the success of mature agriculture insurance systems that have existed already for over 50 years. These **key influencing factors** are:

- a mandated commitment for reliable government funding to support the insurance initiative;
- ongoing research and development efforts supported by an efficient and effective data management network;
- effective delivery mechanisms supported by personnel with dedicated insurance expertise;
- steady participation growth with sufficient time to develop and “operationalize” program enhancements.

Throughout the review of the current AOTP program for rice production in Indonesia, it is evident that the components to support these key influencing factors for success are not fully evident in Indonesia yet. This is not surprising given the length of time AOTP program has existed on the market. However, AgroInsurance team believes it is in the best interest of the Indonesian agriculture insurance system that some time should be taken to first develop these capacities before making significant alterations to product design.

### **Data Management**

Accurate, timely and consistent data organized and managed efficiently is a crucial element in all aspects of the design and administration of an agriculture insurance program. The topic of data underlies many of the issues discussed in this report. Data and its analysis are crucial to: (i) understanding the results within the program; (ii) defining future direction; (iii) developing program enhancements; (iv) mapping risk; (v) monitoring operational inconsistencies; (vi) identifying and solving “hot spots”; (vii) defining equity among districts; (viii) pooling risk and accessing private reinsurance markets.

Data and data collection methodology was graciously provided by Indonesian counterparts. Some of that information was not available in English and could not be reviewed within the timing of current assignment other than at a very cursory level. However, it is important to realize that data (i.e. numbers) alone is not highly valuable without a clear understanding of how that data was collected and if data collection methods remained consistent overtime and across regions. At a high level, data management includes:

- Data gathering - (consistency and documentation);
- Quality control (accuracy and integrity);
- Data storage (cost efficiency, security); and
- Data accessibility and ease for end-users (presentation/query tools; value in research, policy development, education and enhancing risk management and transparency for producers).

Indonesian counterparts provided significant amounts of data in a number of files. No one data file is available that compiles all information for the agriculture insurance program. Similarly, no one document appears to outline how data for the rice paddy agriculture insurance program is currently gathered or was gathered historically as a basis for the AOTP design.

In various documents, historical rice yields are referenced yet no specific methodology for accessing rice yields historically is available. The current AOTP program is based on a cost-of-production payment triggered by a percentage damaged plants to a portion (75% or more) of planted acreage. However, there does not appear to be any historical data that compiles a percentage of damaged plants to rice paddies. As such, there is no assessment of “normal expected” plant damage nor an ability to determine the frequency/likelihood of an AOTP policy triggering a loss or differentiation

of loss across region. Premium rate table was provided to consultants with differentiated premium rates by province/region. The accuracy of that table cannot be assessed. Alternative suggestions on the province-based rates are provided in Section 2.3.3.

It is most likely that historical data in Indonesia is compiled at an area level without any link between actual field or area planted and yield harvested from that same specific field or area. Without a specific link between harvested yield/damaged plants to a specific “production entity” it is difficult to assess the accuracy of data and suitability to agriculture insurance with confidence. Trends in data can be helpful in the assessment process if they demonstrate levels of accuracy and consistency over time and across data levels.

From the data files reviewed to date it would help to have one continuous data set to the finest resolution possible (e.g. by province, district, sub-district, Village, farm group) for:

- Geographic resolution (province, district, etc.);
- Year;
- Land coordinates for rice production fields;
- Planted rice production;
  - » Major practice – wetland, dryland;
  - » Season – wet, dry;
  - » If available: by seed type – hybrid, non-hybrid;
- Area planted that is damaged due to a natural peril;
  - » Extent of damage to damaged area (e.g. area damaged and percentage of plants damaged in that area);
- Yield from total harvested area (both primary yield – grain; and secondary yield (plant material or straw).

With this type of data and a description of how the data was gathered and quality controlled at each level the reviewer can determine if the sequential levels of data make sense and have a consistency of flow across provinces, districts, etc. Consistency of flow and effective unbiased data gathering methodology is as important as the actual numbers generated from the process.

Future data collection should be designed to accommodate development of specific agriculture insurance products. As such, data collection should be focused on capturing yield and/or plant damage data at an identical resolution to the “insured geographical entity”. For example, if a single field is to be the “insured geographical entity” under AUIP then some method should be in place to capture data at the field level. This might be a yield measurement from the harvesting process where grain is threshed for the entire field as part of the normal production process. Or random sampling areas within the field could be selected to assess the standing crop (plants – percent damaged and undamaged) and a yield estimate derived from an average of the sampled plots.

However, if an area such as a farm group or village of sub-district is the insured geographical area (as in an area-based yield design) then all rice paddy fields within that area should be identifiable and included in a “random selection process” from which to estimate a yield for that area. That yield might be estimated by averaging harvested production from those selected fields or estimating yield from sample plots taken from standing crop in the randomly chosen fields. A correlation made between plant (grass) and yield used will estimate the area average yield.

In addition, future data gathering activities suggested in Annex #1 should make distinctions or specifically seek data that identify field management techniques that impact rice production and variability (risk) – such as: hybrid seed, seedbed preparation, etc. Data quantifying the impact of these management distinctions can be used to enhance coverage options in future agriculture insurance designs.

**Recommendation: Modify existing SIAP by creating a central dataset and storage depository that can be used specifically for agriculture insurance. Historical yield and plant damaged data should be included with description of the methods used to gather this data with inconsistencies or alterations in data collection noted across time and regions.**



## Education and Role of Farmers/Farm Groups

The purpose of agriculture insurance should be clear and if government participates in premium funding, the operating structure, research and product design then it should be an integral component of a country's agriculture policy framework. As such, pro-active interaction with farmers forms a crucial element for success. This should apply at all levels in the program processes with a focus on education, transparency and clarity.

Farmers and farm leaders should be actively engaged in product design and program details as much as possible. Education and developing the role of farmers is an ongoing and long-term process especially when agriculture insurance is a new concept and farmers lack formal education and pro-active engagement.

In many mature agriculture insurance programs, there is a mechanism that allows farmers an ability to appeal a decision (usually a claim). Material provided by Indonesian counterparts does not describe an appeals process. There is a suggestion that since the claims adjusting process involves many individuals that agree on the loss assessment there is little need for an appeal process. However, at the same time, the farmer who is the end-client for the policy may or may not be present during the claims assessment but may be represented by the farm group leader. In reality, the claims adjustment process may be well run and even slanted toward the farmer but as an educational tool, farmers should be present to understand the process.

As the program matures and perhaps adds more elements to design, an appeal process could be a useful tool in advancing farmer understanding. Appeals can also identify "hot spots" where program clarification or alterations may prevent further misunderstanding or increase the value of the product being offered or aspects of the operating processes.

**Recommendation: Review program management structure and operating processes to find pro-active means to engage farmers, regional or commodity leaders. Socialize solicitation of input from farmers who can see that their input is being considered and even implemented. Consider an appeal process as an integral part of farmers' education. This adds to the transparency of the claim settling process, especially if it is accessible by farmers to monitor the status.**

## 2.2 Overview of Rice Production and Production Risks in Indonesia

### Rice production areas and seasons

The majority of Indonesian rice production is concentrated on the islands of Java, Sulawesi and Sumatra (Map 1.), with Java alone contributing about 47.5%<sup>2</sup> share of the total rice production in Indonesia.

Rice is cultivated in both lowlands and uplands, with the upland crop typically being rainfed, receiving low amounts of fertilizers. Irrigated lowlands are both well-watered and sufficiently fertilized, accounting around 80%<sup>3</sup> of total national rice area and 93%<sup>4</sup> of total production.

There are three rice growing periods in Indonesia: wet season, followed by possible two production periods during the dry season. The wet season rice (the first crop) is cultivated from October to January and harvested from February till March. In many regions wet season is the main rice production season. The second crop (1st period in dry season) is planted right after the wet season, between April and May. The third rice crop (2nd period in dry season) is planted

Map 1. Rice cultivation in Indonesia (1 dot = 10,000 ha<sup>1</sup>)



1 Ricepedia.org, Indonesia

2 Market Study on Food Sector in Indonesia, 2018

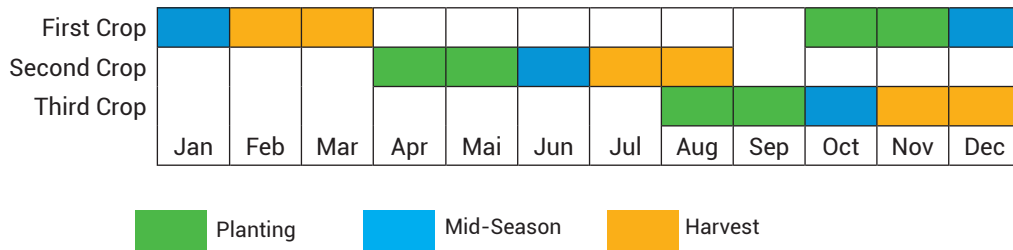
3 INDONESIA: Rice Production Prospects Reduced by El Nino, USDA 2016

4 INDONESIA: Rice Production Prospects Reduced by El Nino, USDA 2016



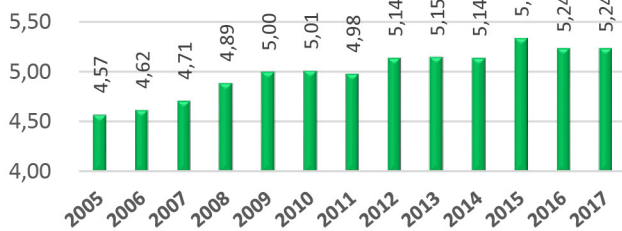
between August and September (Table 2). Farmers in irrigated lowlands plant rice in two or three planting periods per year, whereas those in non-irrigated upland practice only one or two crops per year <sup>5</sup>.

**Table 2. Seasonal rice crop calendar<sup>6</sup>**



Rice is cultivated by 77%<sup>7</sup> of all farmers in the country. Around 90% of rice production in Indonesia comes from smallholders that operate on farm size of less than 1 hectare, with the majority of farmers cultivating between 0.1–0.5 hectares<sup>8</sup>. Most of smallholders in Indonesia cultivate rice without applying any modern machinery or improved seed varieties. It is estimated that only about 10%<sup>9</sup> of the country’s smallholders use a relatively high level of mechanization. Human and animal remain predominant power sources of farm work in the country.

**Figure 2. Rice Average Yield in Indonesia (ton/ha), 2005-2017**



**Figure 3. Rice Production in Indonesia (million ton), 2005-2017**



Sources - BPS Statistics Indonesia, [www.bps.go.id](http://www.bps.go.id); ASEAN Agricultural Commodity Outlook, AFSIS, 2017

There were 13.15 million<sup>10</sup> households (out of which 10.1 million<sup>11</sup> households performed rice cultivation as a main activity) registered in 2018 as those that cultivate rice crop in Indonesia. In Java alone the number of households growing rice reached more than 7 million<sup>12</sup>, amounting to 55.5% of total number of households cultivating rice in the country.

5 Developing Parametric Insurance for Weather Related Risks for Indonesia, January 2018  
 6 Indonesia: Country water assessment - Asian Development Bank, 2016  
 7 Developing Parametric Insurance for Weather Related Risks for Indonesia, January 2018  
 8 Developing Parametric Insurance for Weather Related Risks for Indonesia, January 2018  
 9 Small Family Farms Country Factsheet, Indonesia – FAO, 2018  
 10 Inter-Census Agricultural Survey, 2018, BPS - Statistics Indonesia  
 11 Inter-Census Agricultural Survey, 2018, BPS - Statistics Indonesia  
 12 Inter-Census Agricultural Survey, 2018, BPS - Statistics Indonesia  
 13 Inter-Census Agricultural Survey, 2018, BPS - Statistics Indonesia

**Table 3. Top 10 provinces by the number of households cultivating rice in 2018<sup>13</sup>**

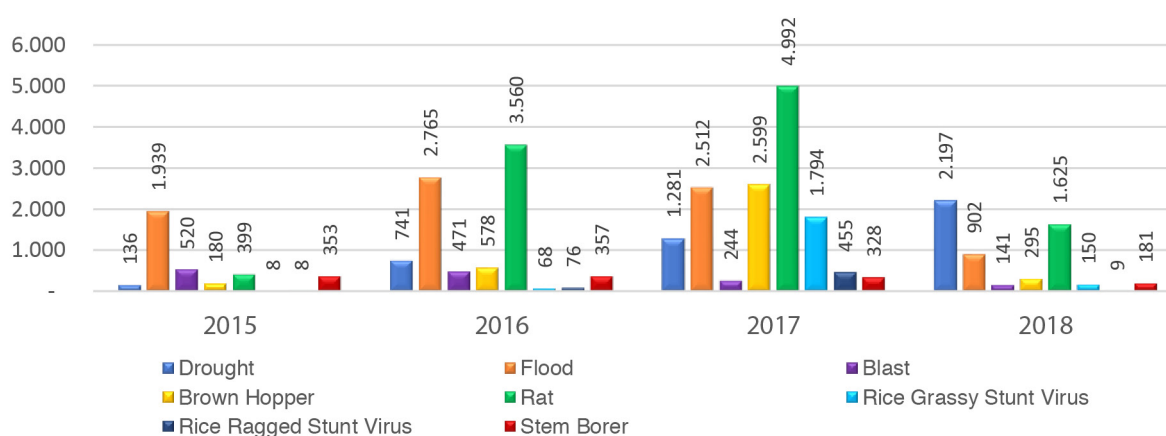
Province	No. of households cultivating rice	Share of total No. of households cultivating rice
EAST JAVA	2.604.811	20%
WEST JAVA	2.249.012	17%
CENTRAL JAVA	2.431.077	18,5%
NORTH SUMATRA	538.281	4%
WEST SUMATRA	374.047	2,8%
SOUTH SUMATRA	315.285	2,5%
SOUTH SULAWESI	596.427	4,5%
CENTRAL SULAWESI	109.826	0,8%
WEST SULAWESI	66.476	0,5%
SOUTHEAST SULAWESI	58.458	0,4%
<b>TOTAL</b>	<b>9.343.700</b>	<b>71%</b>

### Rice production risks in Indonesia

Indonesia's rice sector is highly exposed to risks, such as droughts and flash floods, related to the El Niño Southern Oscillation (ENSO). In El Niño years the lack of rain and droughts cause delayed plantings and decrease area cultivated. As a result, this leads to a severe production shortfall. In La Nina years the excessive rains cause flash floods and riverine floods impacting rice production through lower yields<sup>14</sup>. Strong El Niño effect in 1997-1998 caused rice production area decrease by 700,000 hectares with an estimated production loss of 3.2 million tons of rice<sup>15</sup>.

The total rice area affected by floods under the AOTP program during the period 2015-2018 estimated about 8,118 ha<sup>16</sup>. During the same period, drought has affected 4,335 ha<sup>17</sup> of rice lands. The main areas of rice loss due to flood and drought included the islands of Java, Sumatra and Lampung. Around 60% of rice farming households experienced crop loss due to pests and diseases for the period 2015-2018 under AOTP program. Invasion of rats destroyed 10,576 ha<sup>18</sup> of rice, amounting 33% of total damaged area. Brown planthopper outbreak damaged 3,652 ha<sup>19</sup> of rice lands (11% of total damaged area). The islands of Java, Sumatra and Lampung were the areas most affected.

Figure 4. Sum of Damaged Area under AOTP Program (2015-2018), ha



13 Inter-Census Agricultural Survey, 2018, BPS - Statistics Indonesia

14 Developing Parametric Insurance for Weather Related Risks for Indonesia, World Bank 2018

15 Developing Parametric Insurance for Weather Related Risks for Indonesia, World Bank 2018

16 AOTP insurance data, Jasindo (2015-2018)

17 AOTP insurance data, Jasindo (2015-2018)

18 AOTP insurance data, Jasindo (2015-2018)

19 AOTP insurance data, Jasindo (2015-2018)

According to BPS production data (15 years) flood is the main peril for rice production in Indonesia with approximately 55% of loss occurring due to this peril. Drought results in 40% of loss while the share of OPT (pests and disease) is only 5%. However, AUP data provides totally different arguments where 54% of claims are for pests and diseases (2015-2018 time period), drought delivering 13% of claims and flood responsible for 33% of claims.

Figure 5. Area failure annual rate based on BPS rice production data for the period 2003-2017

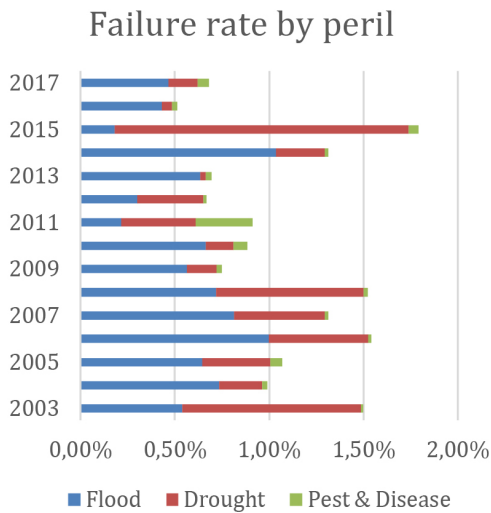
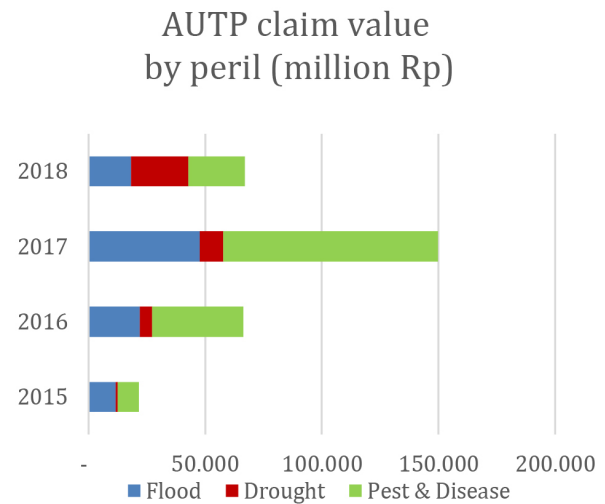


Figure 6. AUP annual claim results by year for the period 2015-2018



According to the BPS data, flood represents working losses with regular occurrence while drought is more an unusual (CAT-nature) risk event which impact may be underestimated. Significant drought events have been identified for years 2003, 2008, 2015.

## 2.3 Review of the Current Public Paddy Insurance Scheme (AUP)

### 2.3.1 Current product design, procedures, regulation and guidelines

#### Program Purpose

A review of the AUP Premium Aid Guideline (2019) identifies its' current purpose as:

- Provide protection to farmers in case of harvest failure as caused by flood, drought, and OPT risks;
- Transfer losses due to flood, drought, and OPT risks to other parties through insurance.

Current wording does not specify the provision of protection of "what exactly": farmer's income, farmers' revenue or farmers production (costs). Specifying the exact objective targeted will help in structuring further program approaches and find best-fit insurance solutions for Indonesia. As this is a matter of reflection on the key objectives of the Indonesian government's agricultural and crop protection policy frameworks, it needs a further revision and specification of rice crop protection targets to reflect on the actual purposes of the future AUP.

In the process of discussion with Bappenas during the stakeholders' meetings in Jakarta (September 12-20, 2019) the following objectives were articulated:

- Protect poor farmers (smallholders with up to 2 ha under rice production per household);
- Upscale agricultural insurance penetration in Indonesia (through AUP, as the largest insurance program in the country);
- Develop a stable growing agricultural insurance market in Indonesia.

Each purpose listed above requires a specific approach. For protection of subsistent smallholders, it is required to review and adjust the product structure and coverage options (See suggestions in Section 2.3.3). To upscale the AUP uptake by

farmers it is advised to involve larger farmers (commercialized smallholders, larger commercial enterprises), in addition to the suggested differentiation of the coverage under AOTP.

For the point of a stable growing agricultural insurance market, a complex approach is required that includes respective regulatory and legislation changes (see Section 3.4.4), development of the market's capacity to further operate on a sustainable basis (see Section 3.4.3, Annex #5), streamline the administration and operations via SIAP enhancements.

Agriculture insurance develops in many countries, but only in few it is identified as an integral part of government's agriculture policy framework. Funding and dedicated resources are identified in legislation to ensure the future success. Data gathered in the agriculture insurance process is valued and used by government, producers and private firms providing services in the agriculture industry. AOTP may be seen by financial institutions as a form of collateral in the future, when the regulatory improvements will assure a long-term strategy for rice crop insurance support.

**Recommendation: Identify a clear purpose specific to AOTP, based on the actual objectives of the government for this particular program. The actual wording for the purpose of the program, as currently formulated by consultants, should sound: "to partially compensate farmers' production costs in cases when paddy rice is lost due to occurrence of the insured risk events". The future purpose has to be defined more specifically, reflecting on the government's objectives. Redefined AOTP program's purpose should be properly reflected in the AOTP premium Aid Guideline.**

### Structure of the program, Role of Government and Budgets

The central government of Indonesia has taken the lead in offering limited agriculture insurance for rice paddy production. Central government subsidizes eighty (80) per cent of rice producers' premium. It potentially would like to see provincial governments to contribute to the premium aid (subsidy) in the future to reduce exposure to the central government and/or sustain expanded coverage to producers. Some of participation of provincial governments for farmers' premium part has been already tested in West Java province, as well as similar attempts were noted for Central and East Java provinces.

Current AOTP program is administered and operated by various state-owned institutions: insurer, reinsurer, various agencies of the Ministry of Agriculture (pest/disease control, extension service, etc.). Despite of the AOTP program's fifth year of operation, dedication of responsible personnel on all levels is still a serious issue that requires proper attention. Capacity gap is significant and needs reconsideration and proper attention (Section 3.4.3.)

The current structure and processes used within AOTP are complicated. There are several layers of bureaucracy to apply for insurance and similar layers to verify a claim and approve indemnity payout. As each layer of bureaucracy is added to the process there is an increased likelihood of less understanding of conditions on the ground and small value added in the complicated authorization process applied in AOTP.

Despite the existence of SIAP (management system for Indonesian government-supported agricultural insurance programs) there is a significant portion of work still performed on paper. At the same time Jasindo already has good experience with acceptance of digital signatures or electronic authorization for the purposes of other programs. Digitalization of the documentary turnover and program administration is essentially required in the nearest time.

MoA is expected to transfer monthly premium aid portions based on AOTP policies bordereaux. However, multi-level authorization and procedural control extends the indemnity sum transfers for months. It is the fact that Jasindo often did not receive the full portion of government's "premium aid" for AOTP program in the past, due to various reasons. This is a good example of negative after-effects of the cumbersome procedures and inefficient administration that require actions towards better efficiency.

**Recommendation: Ensure sufficient funding, dedicated resources and adequate time to continuously improve the AOTP program. Examine the ways to streamline activities of personnel on province and district levels for insurance application, claims survey and timely authorization of indemnity payouts. Enhance SIAP for authorization functions, loss adjustment, administration and reporting, to streamline the key AOTP processes with paperless approach via SIAP.**

## Coverage under Current AOTP Program

### a) Coverage – Sum Insured

The current level of coverage is based on partial compensation of cost of production which is set at 6,000,000 IDR per hectare. This is a standard Sum Insured per one hectare which is offered to all rice growers applying for insurance cover.

In a household survey<sup>20</sup> total costs for 2017 are indicated to be a bit higher than in 2014 survey<sup>21</sup>, but are still in the same range:

- Total costs per wetland hectare of rice production 13.56 mln IDR (some differences for rainy and dry season) – labour and agricultural services make up 48% of the total. In this survey<sup>22</sup> (page 41) agriculture services seem to include paid labour, unpaid labour and “other services”;
- Dryland paddy costs – 8.5 mln IDR per hectare with wider difference than wetland between seasons due to land rent and fertilizer use.

There appears to be significant differences between seasons and households with respect to cost of production. This will be true as more households adopt better technology in the future to improve production which is an apparent desire in Indonesia. This indicates that there may be opportunities to educate farmers about increased use of technology and to use agriculture insurance coverage (and premium) as part of the education process. For example, farmers could be trained in the use of technology and be able to purchase in future higher levels of agriculture insurance coverage as an option to better reflect their cost of production.

**Recommendation: Consider providing different coverage levels (sums insured) under future AOTP program terms, after its stabilization. This approach will encourage improved production management practices and use of coverage reflecting better on the actual cost for different production techniques.**

### b) Trigger (loss event)

The current trigger for an insurance loss under AOTP is set at over 75% of the insured field to sustain damage equal to or in excess of 75% of plants. The definition of “damage” is not clear in the Premium Aid Guidelines which makes the loss assessment confusing. For example, the damage to rice plants may be broken stems, missing tassel, missing grains in a tassel, underdeveloped plants, etc.

In addition, farmers must report damaged fields so that a field technician can visit the site to inspect the damaged field. However, it is not clear from the documents provided what level of plant damage is considered “normal” for rice paddy production in Indonesia, or at what level of damage a farmer should consider notification under the insurance policy. It also vivid from data provided that once the “75%/75% trigger” is reached the farmer receives a claim payment (once the claim is verified eligible) of 6,000,000 IDR / ha for the paddy production land insured.

The level of damaged plants considered normal or acceptable for rice paddy production should be defined and specified. Define a specific point at which farmers are expected to report a claim. The 75%/75% trigger for an agriculture insurance claim seems to be quite high. If damages have to be that high to generate any claim for insurance the insurance coverage may be of limited value to farmers.

Conversely, “normal” losses may be so high that only very excessive losses (75%/75%) are worthy of recognition for insurance. The damage trigger may be reconsidered when program results are stabilized and the historical performance would be close to the target loss ratio at least for 3 continuous years (6 production seasons) since the first modifications applied. The target loss ratio must be clearly specified by Jasindo and agreed with the insurance regulator to assume sound performance of AOTP to be achieved in the future.

20 Results of Cost Structure of Paddy Cultivation Household Survey 2017, BPS-Statistics Indonesia

21 The Cost Structure of Paddy and Secondary Food Crops Cultivation 2014, BPS-Statistics Indonesia

22 Results of Cost Structure of Paddy Cultivation Household Survey 2017, BPS-Statistics Indonesia

**Recommendation: (i) Introduce a new definition of a “damage”; (ii) Reconsider requirements for damage to qualify for a reportable risk event; (iii) revise damage trigger later after program performance stabilization; (iv) Set a transparent procedure for the farmers to notify POPT/PPL at proper timing in case of risk event (SIAP e-form, online app, etc.).**

### Perils Insured

The primary perils insured under the current AOTP program are **drought, flood, and OPT risks**. The list of disease exclusions in the insurance policy are quite extensive and landslides and earthquakes which may be fairly common in parts of Indonesia are also excluded. If any of these “excluded perils” (fire, lightning, electric storm resulting in fire) may be compensated under an ad hoc program, then there should be some consideration for inclusion these risks under an agriculture insurance policy. This could be provided under the basic insurance policy or as a rider or option for coverage that might be added on to the basic policy.

Some of these perils may be considered difficult to insure but since this is a largely government-funded agriculture insurance program and government may be expected to cover such losses under an ad hoc approach including them as an insurance peril. This approach may be a way to increase farmers participation in AOTP, especially if the catastrophic loss coverage is provided.

**Recommendation: Continue AOTP program with the current peril list. Consider inclusion of additional perils after program stabilization, subject to sufficient data availability for rating purposes.**

### Premium Rates

Premium rate for AOTP program has been calculated on a basis of rice production area lost data for the period of 2003-2012 years. The premium rate of 3% was set as a portfolio rate with the same rate applied to all provinces where AOTP program was offered. No adjustment for insurance program performance or premium re-calculation was done since the start of AOTP operations in 2015.

**Recommendation: Recalculate premium rate using the same methodology as initially suggested by Indonesian actuaries but include the recent years data (2013-2017). Consider the suggested rate adjustment for program performance in each province if agreed to move from portfolio-based rate to risk-based rate (risk zones). It is recommended to move to risk-based premium setting using differentiated premium rates for provinces with further by-season division since November 2020. Recommend differentiating premium rates per risk zones grouping provinces based on their AOTP performance for 2015-2018 years. When 2019 AOTP program data is available, adjust the rates based on the most recent performance (see details in Section 2.3.3).**

### Guidelines and Regulations

The Consulting team understands that “Premium Aid Guideline” (2019) by Directorate General of Agricultural infrastructure and Facilities, Ministry of Agriculture is the major regulatory document specifying the objectives and implementation mechanism specifically for AOTP program. This document is adopted every year since the program launch in 2015. The Guidelines provide definition of the key program terms, indicate the organizational structure and institutions involved in AOTP program implementation at the central, provincial and district level. The eligibility criteria, the list of perils insured, the period of insurance and other key components of the program are explained in chapter 3 of the Guidelines. The document specifies funding sources for premium aid and the implementation mechanism.

The Premium Aid Guideline sets a number of forms to be used by the government agencies and insurance company involved in operation of AOTP program. Most of these forms (AOTP1 – 5) are very similar while collecting nearly the same information with minor differences. Consultants will recommend reducing the number of forms used for AOTP program.

The forms used for claim handing purposes need significant improvement to capture all the information required for effective claim payments and recoding claim data for future analysis and program enhancements. Enhancement of SIAP functionality for paperless loss adjustment should be considered among key priorities.



AgroInsurance team considers that certain provisions of the Guidelines require substantial enhancements to assure effective development of AOTP program in the future. Consultants worked out the list of tactical (short-term) and strategic (longer term) actions suggested to support AOTP program in 2020 season and modifications needed in the succeeding years. The recommendations for the Guidelines enhancement will be provided further in this report (see Annex #7, Section 3.4.2).

### Procedures (Guidelines continued)

Certain underwriting criteria are being established by the Premium Aid Guideline. However, the general underwriting guidelines are not clearly specified. For example, the AOTP location is to be recognized as an "irrigation field" or "rainfed field" but there are no straightforward recommendations how this production data to be captured by the underwriting of insurance company and represented in the insurance policy.

It is being observed that while the Guidelines define an insurance policy as a "binding document between the insured and insurer" the document prescribes involvement of other institutions, agencies and individuals<sup>23</sup> to perform certain activities for servicing the AOTP program policies. This ambiguity and some other aspects need to be addressed in the nearest future with further modifications to AOTP program and procedures. The following package of documents needs to be put in line: Guidelines, Insurance policy regulatory and legislative rules, operational and reporting procedures of the insurance company.

Jasindo has provided internal procedural "Claim Manual" documents for AgroInsurance team's review. This document sets the internal rules for underwriting and claims handling as adopted by Jasindo company's management. Consultants established difference in underwriting rules for AOTP and commercial crop insurance policies with the latter to have more stringent requirements for accepting risks. The document shared with AgroInsurance team (translated into English) revealed that specific AOTP-attributed processes and procedures are more simplified than procedures provided for other Jasindo's programs (non-subsidized).

However, the AOTP program manager in Jasindo has indicated that in practice the processes are similar between AOTP and other programs. This definitely needs to be reflected properly in the future, considering the plans for AOTP program expansion. **Limited control of underwriting acceptance criteria and quality of AOTP risks potentially may result in high losses in the future. This may undermine the future performance of AOTP program and have long-term negative impact on program acceptance by the farmers and support by the Government.**

**According to the "Acceptance procedure" document, branch offices of Jasindo must assess adequacy and validity of data to ensure conformity between the provided data and the accepted risk for AOTP program. For non-government program the requirements are wider, including assuring the risk is to be profitable for the company, limited adverse selection possibilities, and risk mitigation program is in place.**

AOTP claim settlement procedures are outlined in the Premium Aid Guidelines with a number of required authorization actions to be performed by the government agency(ies) employees before the insurer gets involved. Jasindo has its own claims handling procedures which are in line with the requirements set by the Premium Aid Guideline. It is recommended to reconsider the current claims settlement procedure and processes to bring it closer to the usual claims handling practice as already established by the insurance companies. Ultimately, it is the insurance company that makes payouts for eligible claims and it is recommended to give higher level of control over the claims handling to the insurer.

**Recommendation: Current guidelines could be in effect for AOTP operations till October 2020. By October 2020 it is required to develop a new set of modified and amended program guidelines and methods for key operations. Conduct field test for validation of a proper loss assessment and calculation methodology, compile loss adjustment guidelines specific to AOTP product structure (plant count).**

### Insured Entity – Farmer or Farm Group

AOTP program is offered to farmers through farm groups. Jasindo reported the following figures of farmers (households) participation in AOTP since 2015:

<sup>23</sup> Agriculture Extension Worker, Pests and Disease Controller, POPT-PHP Coordinator, etc

2015: 401.408 households

2016: 917.309 households

2017: 1.550.389 households

2018: 1.297.036 households

2019: 601.678 households (as of 17 September 2019)

The figures provided above count the tentative number of farmers households, all of which are the members of farmers' groups throughout the Indonesia. However, it should be noted that the household survey<sup>24</sup> (2017) states that only 56% of farmers are members of any farm group. In some areas farm groups are non-existent or not stable. Survey respondents also suggest that in some cases there is no value belonging to a farm group. If this survey is correct, increasing participation in agriculture insurance may be problematic if farmers must belong only to a farm group in order to be eligible for AOTP insurance coverage.

While farm group participation may be a desired approach, it may be difficult to expand agriculture insurance participation in the future with limited eligibility criteria.

**Recommendation: It is recommended to consider offering modified AOTP coverage options (since November 2020) for farmers producing rice on 2+ ha (review AOTP eligibility guidelines). Review the requirement of farmer participation in a farm group to be eligible for agriculture insurance. Work out transparent guidelines on how eligible farm groups should be formed and registered**

### Communication

A number of communication materials (papers, power-point presentations, etc.) were provided by Indonesian counterparts for review. While this array of materials was extensive, many questions remained regarding the structure of the current AOTP design, operating structure, actual role of government, etc.

This could be a result of several factors or combinations of factors including: the translation of documents, use of program lexicon (local descriptions, acronyms), interpretation by the reviewers or simply a lack of clarity in the material. Regardless, if experienced agriculture practitioners are unsure of design characteristics or operating processes from reading an array of materials, it may be that farmers, government personnel, elected and appointed officials (Ministries / Directorates), local stakeholders and international partners may also have similar difficulty.

If so, there could be significant consequences over time that are not evident in the short term. For example, if local communications to farmers is inconsistent across regions or not well structured and understood by farmers, then household surveys may show a tendency toward "cumbersome operations" and "ineffective design" as a means not to participate in agriculture insurance. For example, a lack of access to loans by agriculture households appears to be based to some extent on "cumbersome processes" and a lack of clarity in communications between extension workers and farm households.

Communication and socialization of the program among individual farmers and group leaders should be delivered via a trusted way. Extension service officers currently perform functions on AOTP from the policy data entry and premium sum transfer to participation in claim reporting and further loss adjustment procedures. These extension officers and POPT/PPL are in contact with farmers every day, being the best channel to consider for communication of insurance program details, news, insurance payout facts to the farmers in their districts.

**Recommendation: Produce a "canned" set of communications materials with varying degrees of complexity for public dissemination and internal technical use. Materials should focus on education, transparency, clarity and continuity across processes. Ideally these documents should: a) form the basis of any communications used by agriculture insurance personnel b) help to instill a sense of confidence for central managers of the program of responsibility and authority for decision making is apportioned regionally and c) set criteria for internal auditing of operations processes for all stakeholders in an oversight process.**

<sup>24</sup> Results of Cost Structure of Paddy Cultivation Household Survey 2017, BPS-Statistics Indonesia.



## Reinsurance

Indonesia Re (a government agency) is the leading reinsurer for AOTP program. Currently there is quota-share agreement between Indonesia Re and Jasindo where 70% of AOTP risks is being reinsured and 30% of risks is being kept by Jasindo. Indonesia Re does not have the sufficient expertise in agricultural risk and they are very conservative in evaluating exposures.

The premium rate calculation methodology as developed by the Indonesian actuary provides a 10% load for catastrophic events for AOTP program. This loading does not seem to be sufficient from the point of view of consultants. Jasindo advised that the reinsurance cover constitutes 5% in the premium rate structure for AOTP program. According to Indonesia Re, Jasindo is not locked in with Indonesia Re and potentially can seek for reinsurance protection with other reinsurance providers.

**Recommendation: Set the transparent and clear requirements for reinsurance protection. Consult with the international reinsurance brokers and reinsurers for alternative reinsurance coverage options with involvement of international reinsurers. Seek for international reinsurers' expertise and advice on CAT loadings for AOTP.**

### 2.3.2 Analysis of yield, disaster risk and insurance data

The scope of the data analysis was set out in the terms of reference and comprised three tasks:

1. A review of reports from actuarial experts including the main report that formed the basis for the scheme that was implemented;
2. Analysis of the AOTP programme results for the last four seasons 2015/2018;
3. Analysis of paddy rice production data.

The information available for the premium rating methodology included the actuarial report, history of harvest damage loss ratios by major perils from 2003 to 2012 and details of the rice rating structure. The general issues recognized were

- (i) weaknesses in the premium rating methodology;
- (ii) the treatment of key perils;
- (iii) adverse selection and asymmetry of information;
- (iv) the provision made for large and catastrophic losses;
- (v) additional assumptions for rating purposes. .

The documents were reviewed for reasonableness. Paddy rice production data was submitted in a series of additional files. The data covers planted and harvested areas plus production broken down by year, by province and district and by quarter and/or month. The files are not comprehensive in that not all years and not all sub-analyses are included. As such the information is not sufficient to form a basis for rate making. It is also not in a form that can be readily integrated into the rate calculation spreadsheet for years 2014/2017(2018). Additional information is required on the large loss experience to improve provision made in the premium structure. The rice production data is sufficient to test but not to determine accurately premium rate structures for AOTP program.

The information available for the AOTP program included a history of premium and claim data by policy for the period of 2015-2018 years. The Consulting team managed to derive analytical data covering programme results at summary level by province, by peril and by year. The summary analytical data is comprehensive. In contrast the per-policy files had some omissions. There were two major issues arising from the review of the summary data.

**First**, the effect of changes from year to year in number and make up of provinces means that the analysis may not be comparing data sets like with like. Total area insured doubled in 2016 (from 2015), doubles again in 2017 and then fell back 20% in 2018. The loss experience deteriorated in 2015/2017 to levels that are uneconomic both on the original premium basis and on the updated basis advised by Jasindo. 2018 results were breakeven albeit on the reduced level of activity.

The **second** issue is there are many incomplete records and changes in per-policy records that have occurred over the period to classification of districts. It is possible, although also unsatisfactory, to make general assumptions about missing data prior to additional AOTP data analysis is conducted together with the dedicated Indonesian experts from Jasindo and responsible government agencies.

**Recommendation: Start collecting rice yield data at the finest possible administrative unit level. The yield data must be organized per production season. It is recommended to capture the key production practices by farmers to assure adequate risk analysis. Assure yields estimates to be done in a uniform manner across all production regions in the country. Create a master yield data set with insurer having access to this data when necessary.**

### 2.3.3 Actuarial pricing methodology and necessary procedures for the introduction of the developed pricing

Actuarial rate-making methodology as set by the Indonesian actuary was based on the paddy production area data for the period of 2003-2012 years. This data was structured by the province and by the area lost annually per insured peril (flood, drought and pests/diseases). The total area lost was summed up to calculate the average paddy crop area lost (failure) per year. The actuary applied 95% confidence level for rate calculation. The expected claims ratio was calculated using the average area lost for the period of 10 years with adjustment to area loss deviation (standard deviation) for the same period. After that, the net rate was loaded by 10% for catastrophic losses and adjusted for the target loss ratio of 45%.

Consultants consider that the target loss ratio of 45% is extreme. From our practical experience, many agricultural programs internationally are running at 55%-65% of target loss ratio for indemnity programs and at 70%-75% for index programs.

Consultants received information from Jasindo on their current premium rate structure which provided the estimated target loss ratio of 55%. The required loading, according to Jasindo data, includes 15% of operational expenses, 15% of administration expenses, 5% allowance for loss adjustment, 5% for reinsurance and 5% for profit margin<sup>25</sup>.

Consultants consider there are ways to optimize Jasindo expense structure and it is realistic to achieve the overall required cost loading of 40% to derive the target loss ratio of 60%.

The suggested cost structure is received from Jasindo and adjusted by consultants for transparency reasons (See Annex #11). The suggested structure brings more clarity for the MoA and other governmental agencies if applied in AOTP annual audits. However, further adjustments to administration and operation loadings should be considered on annual basis. Future portfolio growth may not be proportionate to actual costs incurred by Jasindo and MoA agencies to service the AOTP program. Consultants believe further adjustments based on actual costs may potentially increase of the target loss ratio.

The initial AOTP rating spreadsheet has been updated by consultants with additional data for years 2013-2017 as provided by BPS (See Annex #11). The updated dataset generated average loss per year of 1.08% (1.11% for initial 2003-2012 data set). While the average loss per year went down, the standard deviation actually went up to 0.39% (comp 0.33%).

<sup>25</sup> Based on data provided by Jasindo. Consultants assume 5% to be sufficient to cover the costs of reinsurance. If the cost of reinsurance is subject to change in the future, the premium rate structure and reinsurance costs to be reassesses and modified.

Table 4. Area loss ratio by year and by peril

Year	Area Loss Ratio (based on BPS data)			
	Flood	Drought	Pest & Disease	Total
2003	0,54%	0,95%	0,01%	1,50%
2004	0,73%	0,23%	0,03%	0,99%
2005	0,65%	0,36%	0,06%	1,07%
2006	1,00%	0,53%	0,01%	1,54%
2007	0,81%	0,48%	0,02%	1,31%
2008	0,72%	0,78%	0,02%	1,52%
2009	0,56%	0,16%	0,03%	0,75%
2010	0,66%	0,15%	0,07%	0,88%
2011	0,22%	0,39%	0,30%	0,91%
2012	0,30%	0,35%	0,02%	0,67%
2013	0,63%	0,03%	0,03%	0,70%
2014	1,04%	0,26%	0,02%	1,31%
2015	0,18%	1,56%	0,05%	1,79%
2016	0,43%	0,05%	0,03%	0,51%
2017	0,47%	0,15%	0,06%	0,68%
Avg to 2012	0,62%	0,44%	0,06%	1,11%
Average updated (2003-2017)	0,60%	0,43%	0,05%	1,08%
Max loss	1,04%	1,56%	0,30%	1,79%

Consultants would question if the level of confidence of 95% is reasonable. Understanding the issues with the data and not knowing how accurate the historical data is, the level of confidence should be lower though this is a discussion point for the future modifications.

AgroInsurance team is concerned with the difference in risks performance based on the production data (BPS) and AOTP program. It is evident that **AOTP program has significant issues with adverse selection and loss estimation**. According to BPS production data (15 years) flood is the main peril for rice production in Indonesia with approximately 55% of loss occurring due to this peril. Drought results in 40% of loss while the share of OPT (pests and disease) is only 5%. However, AOTP data provides totally different arguments where 54% of claims are for pests and diseases (2015-2018 time period), drought delivering 13% of claims and flood responsible for 33% of claims.

**The following rate calculation is recommended:**

- (a) average cost per year is 1.08% (based on 15 years of rice production data provided by BPS);
- (b) based on the initial rate estimation methodology the net rate (expected claim) is 1.32% which is believed to be adequate to cover most losses with 95% level of confidence;
- (c) suggested to apply 15% CAT loading to cater for 5% of probable events outside of 95% of confidence level;
- (d) due to the voluntary nature of AOTP program combined with eligibility to choose seasons, it is strongly suggested to apply 50% loading for adverse selection unless the program achieves better geographically diversified risk portfolio across the country due to future bundled solutions with offers from other governmental support programs in agriculture;
- (e) due to discrepancies revealed on the losses from pests and diseases between BPS data and AOTP historical results, additional 20% loading is imperative to be applied;
- (f) considering the latest AOTP results (2018), the target loss ratio is suggested to be 60%. This is based on 40% overall loading requirements (25% admin and operational costs, 5% allowance for loss adjustment, 5% for reinsurance costs, and 5% required profit).

Based on the comments in Section 2.1, Agrolnsurance team recommends applying 15% loading for CAT events to the loss cost (15 years' timeline), 50% for adverse selection and 20% for high pest and disease claims ratio for AOTP during 2015-2018. This results in the overall required loading to the net rate of 85% which was applied to recalculate AOTP premium rate (portfolio-based).

It is recommended to conduct rate calculation based on 60% target loss ratio for AOTP program as discussed in this section above.

Table 5. AOTP Rating Methodology

Rating methodology	
Expected claim (P) (average area loss per year)	1,32%
Catastrophe and adverse selection, pest and disease loadings	85,00%
<b>Net premium rate</b>	<b>2,44%</b>
Required loading to net rate	
Operational and Admin costs	25,00%
Loss adjustment allowance	5,00%
Reinsurance costs	5,00%
Required Margin	5,00%
<b>Total Costs (b)</b>	<b>40,00%</b>

<b>Gross Calculated Premium</b>	<b>4,07%</b>	<b>per season of 120 days</b>
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The approach suggested above results in 4.07% gross rate per each production season. However, the calculated rate based on loss cost for AOTP program provides the required rate of 4.01% (2% loss cost @ 60% TLR (target loss ratio) plus additional 20% loading for high ratio of pest and disease claims).

Performance of AOTP program per province varies a lot for the period of 2015-2018. Some provinces had reasonably high volumes of business but ran at acceptable loss ratio (e.g. Jawa Tengah, Sumatera Barat) while some provinces have very high loss ratios (Jambi, Kalimantan Timur, Sulawesi Barat, etc.). It is a standard insurance practice to introduce additional loadings to the loss-making regions to balance insurance program performance. As an alternative, the insurer may not offer crop insurance in high-loss provinces however the Consultant does not consider this to be a practical option for Indonesian from the agricultural policy perspective.

**Table 6. Loss ratio within AUTP program by province**

	Province	Loss Ratio
1	ACEH	223,61%
2	BALI	69,21%
3	BANTEN	118,46%
4	BENGKULU	260,51%
5	DI YOGYAKARTA	87,17%
6	GORONTALO	107,62%
7	JAMBI	390,70%
8	JAWA BARAT	72,67%
9	JAWA TENGAH	26,53%
10	JAWA TIMUR	26,97%
11	KALIMANTAN BARAT	12,86%
12	KALIMANTAN SELATAN	107,65%
13	KALIMANTAN TENGAH	34,59%
14	KALIMANTAN TIMUR	997,47%
15	KEP. BANGKA BELITUNG	899,87%
16	LAMPUNG	322,94%
17	NANGROE ACEH DARUSSALAM	99,60%
18	NTB	67,68%
19	NUSA TENGGARA BARAT	37,92%
20	RIAU	0,00%
21	SULAWESI BARAT	566,87%
22	SULAWESI SELATAN	173,86%
23	SULAWESI TENGAH	79,50%
24	SULAWESI TENGGARA	116,21%
25	SULAWESI UTARA	189,97%
26	SUMATERA BARAT	37,18%
27	SUMATRA BARAT	40,00%
28	SUMATRA SELATAN	300,17%
29	SUMATRA UTARA	203,66%

**Recommendations:**

**1. Apply the adjusted premium rate of 4.00% as the unified portfolio-based rate for AUTP program the soonest possible time (November-December 2019). Rounding-up of 4.07% to 4.00% is used for convenience. This rounding will not have significant effect on risk rating.** Alternatively, it is possible to retain 3% premium rate but introducing a 50% limit to pest and disease (OPT) payouts. Such measure would have positive impact on AUTP performance. The Government of Indonesia may also decide not to immediately increase premium rate though in such a case AUTP losses incurred by Jasindo will need to be compensated from agreed sources. It is also recommended to reassess program performance when 2019 year data will be available. Based on this analysis, the premium rate strategy is to be updated.

**2. Consider differentiated premium rates per province to be applied in the future (suggested since November 2020). The basis for the rates is to be 4% base rate with loading factors applied per risk zone. The risk zones are suggested to be based on the loss performance as per description provided below. The differentiated premium is to be revised for phase 2. Additional loadings applied according to 2015-2018 AUTP performance.**

**Premium rates divided by 4 zones:**

**Zone 1** – Apply base rate of 4% for province with historical GLR (gross loss ratio) below or equal to TLR (target loss ratio) 60%

**Zone 2** – Apply additional loading of 10% for provinces with historical GLR above target 60%, but below 100%

**Zone 3** – Apply additional loading - 20% for provinces with historical GLR above 100% but below 300%

**Zone 4** – Apply additional loading - 50% for provinces with historical GLR above 300%

*Note: Calculations have been done on a basis of the sum insured for 2015-2018 years combined.*

Zone loading factors, as suggested above, are based on the practical experience of the Consultant. There is no much of factual data provided to the Consultant to design data-backed loading policy, however, it is believed that such loading factors will allow achieving more reasonable AOTP performance. With more performance data available in the future, it will be possible to use loss cost/loss ratio data for setting risk zone factors. At the present time the AOTP data set is too short to suggest data-based loadings.

**Table 7. Suggested AOTP premium rates divided by zones**

	Province	Performance based rate	Zone
1	ACEH	4,80%	Zone 3
2	BALI	4,40%	Zone 2
3	BANTEN	4,80%	Zone 3
4	BENGKULU	4,80%	Zone 3
5	DI YOGYAKARTA	4,40%	Zone 2
6	GORONTALO	4,80%	Zone 3
7	JAMBI	6,00%	Zone 4
8	JAWA BARAT	4,40%	Zone 2
9	JAWA TENGAH	4,00%	Zone 1
10	JAWA TIMUR	4,00%	Zone 1
11	KALIMANTAN BARAT	4,00%	Zone 1
12	KALIMANTAN SELATAN	4,80%	Zone 3
13	KALIMANTAN TENGAH	4,00%	Zone 1
14	KALIMANTAN TIMUR	6,00%	Zone 4
15	KEP. BANGKA BELITUNG	6,00%	Zone 4
16	LAMPUNG	6,00%	Zone 4
17	NANGROE ACEH DARUSSALAM	4,40%	Zone 2
18	NTB	4,40%	Zone 1
19	NUSA TENGGARA BARAT	4,00%	Zone 1
20	RIAU	4,00%	Zone 1
21	SULAWESI BARAT	6,00%	Zone 4
22	SULAWESI SELATAN	4,80%	Zone 3
23	SULAWESI TENGAH	4,40%	Zone 2
24	SULAWESI TENGGARA	4,80%	Zone 3
25	SULAWESI UTARA	4,80%	Zone 3
26	SUMATERA BARAT	4,00%	Zone 1
27	SUMATRA BARAT	4,00%	Zone 1
28	SUMATRA SELATAN	6,00%	Zone 4
29	SUMATRA UTARA	4,80%	Zone 3

### 2.3.4 Suggested modifications for AOTP terms and coverage

This section summarizes the key modifications recommended by Agroinsurance team. Modifications are divided into several phases:

- **Preparatory - Phase 1 (November 2019 – March 2021)** – adjust portfolio rate to 4% (the soonest). Prepare major modifications for Phase 2 – review and compile set of guidelines and regulatory framework, adjust to seasonal rates by province (consider technology), streamline AOTP administration and loss adjustment via SIAP (paperless);
- **Stabilization - Phase 2 (April 2021 – October 2022)** – review seasonal and yearly performance, assess opportunities

for: (i) several options of sum insured, (ii) assess potential to apply a lower damage threshold (farmer-oriented, eg. 50%), (iii) assess potential to switch from plant-damage count to yield count;

- **Up-scale – Phase 3 (November 2022 – TBD (to be determined))** – – implement, if feasible at a time: (i) apply several options of sum insured, (ii) apply lower damage threshold (farmer-oriented), (iii) apply yield count methods in loss adjustment and claims management instead of plant-damage count practice.

**Table 8. Suggested modifications for AOTP terms**

<b>Crop type:</b>	<b>All rice varieties in Indonesia (no change)</b>
<b>Farmers' eligibility:</b>	<p><b>Phase 1: No change. Review larger farmers eligibility for next phase</b></p> <p><b>Phase 2: Differentiate between subsidized and non-subsidized AOTP :</b></p> <ul style="list-style-type: none"> <li>• From 0.5 ha – 2 ha (subsidized<sup>26</sup>, diversified premium rates by province and by wet/dry seasons);</li> <li>• Over 2 ha (unsubsidized<sup>27</sup>, diversified premium rates by province and by wet/dry seasons).</li> </ul> <p><b>Phase 3: Review and adjust eligibility requirements based on the program performance during Phases 2</b></p>
<b>Insurance period:</b>	<p><b>Phase 1: No change</b></p> <ul style="list-style-type: none"> <li>• Adjust differentiation capabilities in SIAP for Phase 2;</li> <li>• Review and approve seasonal differentiation, as suggested: <ul style="list-style-type: none"> <li>» WET SEASON: November 1 - March 31 (tentative);</li> <li>» DRY SEASON: April 1 – October 31 (tentative);</li> <li>» INTERMEDIARY SEASON: Dates require clarification and approval from MoA and Jasindo before October 2020.</li> </ul> </li> </ul> <p><b>Phase 2: Apply differentiated province-based premium rates between seasons</b></p> <p><b>Phase 3: Continue with adjusted seasonal differentiation by province</b></p>
<b>Premium aid (subsidy):</b>	<p><b>Phase 1: Maintain 80% subsidy rate (at current level)</b></p> <p><b>Phase 2: No change. Review feasibility for catastrophic layer of coverage introduction along with higher coverage levels offered with less government subsidy (larger farmer's premium portion)</b></p> <p><b>Phase 3: Review and adjust subsidy rate based on program performance (penetration rate, loss ratio, portfolio exposure) during Phase 2</b></p> <ul style="list-style-type: none"> <li>• (if confirmed feasible) introduce catastrophic layer of coverage along with higher coverage levels offered with less government subsidy.</li> </ul>
<b>Risks covered:</b>	<p><b>Phase 1: Maintain same risk coverage according to current AOTP – flood, drought, pests and diseases</b></p> <p><b>Phase 2: No change</b></p> <ul style="list-style-type: none"> <li>• Review program's risk portfolio performance for each season.</li> </ul> <p><b>Phase 3: Adjust to risks considered based on Phase 2 performance</b></p>
<b>Risks excluded:</b>	<p><b>Phase 1: Maintain same risk exclusions</b></p> <p><b>Phase 2: No change</b></p> <ul style="list-style-type: none"> <li>• Review program's risk portfolio performance for each season;</li> <li>• Conduct farmers survey after each production season (additional socialization) to identify potentials for growing product uptake in case of excluded risks are modified (e.g.: birds)</li> </ul> <p><b>Phase 3: Adjust the list of exclusions based on Phase 2 performance (penetration rate, loss ratio, portfolio exposure)</b></p>

<sup>26</sup> Based on regulation by Law No.19/2013

<sup>27</sup> At current time the farmers cultivating over 2 ha under rice are not eligible for participation in AOTP. In order to upscale the participation in AOTP and stimulate the growth of agricultural insurance penetration and farmers' experience in the future it is recommended not to offer AOTP coverage to all farmers in the country – subsidized for up to 2 ha (smallholder farms), and non-subsidized for over 2 ha (commercialized/commercial farms).

**Table 8. Suggested modifications for AOTP terms (continued)**

<b>Sum insured:</b>	<p><b>Phase 1: IDR 6,000,000 - Farmers' production costs (approved by the MoA in AOTP Guidelines)</b></p> <ul style="list-style-type: none"> <li>Review and approve production cost by season for next phase.</li> </ul> <p><b>Phase 2: Apply production costs differentiated by season</b></p> <ul style="list-style-type: none"> <li>Assess possibilities for introduction of differentiated price options for dry/wet seasons, e.g. 6 million, 8 million, 10 million (could be based on production cost or (possibly) on yield value);</li> <li>If switch to yield value is agreed for next phase, adjust coverage options to address yield value options accordingly.</li> </ul> <p><b>Phase 3:</b></p> <ul style="list-style-type: none"> <li>Recommend introduction of several sum insured levels (based on yield value). Example (non-binding): <ul style="list-style-type: none"> <li>» IDR 6.000.000:</li> <li>» IDR 8.000.000:</li> <li>» IDR 10.000.000:</li> </ul> </li> <li>Review (program uptake by farmers groups and options chosen, program socialization impact) and adjust coverage options to better meet the farmers' needs for insurance coverage required. Use policy data for program review. Jasindo is to capture all policy features in the reporting system for further analysis;</li> <li>Apply different price options differentiated by wet/dry seasons (targeted at farmers applying more productive technologies with higher levels of yields and production costs);</li> <li>Consider switching to yield value options.</li> </ul>
<b>Insurance rate:</b>	<p><b>Phase 1: Apply 4% portfolio-based premium rate</b></p> <ul style="list-style-type: none"> <li>Review and approve diversified premium rates by risk zones and by wet/dry seasons for next phase;</li> <li>Re-evaluate the rate based on 2019 program performance.</li> </ul> <p><b>Phase 2: Apply differentiated rates by risk zones for wet/dry season</b></p> <ul style="list-style-type: none"> <li>Adjust premium rates by risk zone and by wet/dry season (consider technology application for next phase);</li> <li>Assess possible adjustment of seasonal and provincial rates per each sum insured level.</li> </ul> <p><b>Phase 3: Apply agreed adjustments based on decisions made based of Phase 2 assessments and program's stable performance</b></p>
<b>Damage trigger :</b>	<p><b>Phase 1: Maintain current AOTP approach (75/75)</b></p> <p><b>Phase 2: No change</b></p> <ul style="list-style-type: none"> <li>Asses opportunities for introduction of new crop damage trigger in the next phase (farmer's needs and feedback survey, matching targets for program upscale and farmers actual needs, etc.);</li> <li>Assess opportunities for moving from plant damage estimation to yield estimation (farmer needs oriented).</li> </ul> <p><b>Phase 3: Adjust to any alternative option agreed based on the assessments during Phase 2</b></p>



**Table 8. Suggested modifications for AOTP terms (continued)**

<p style="text-align: center;"><b>Damage Assessment / Loss Adjustment</b></p>	<p><b>IMPORTANT: Simplification of rice crop damage survey and loss adjustment guidelines and procedures required, for optimization and cost reduction reasons. Advised to review the soonest possible.</b></p> <p><b>Phase 1: Maintain current AOTP approach (75/75)</b></p> <ul style="list-style-type: none"> <li>• Enhance regional/district capacity with POPT/PPL;</li> <li>• Develop new set of guidelines and methodology for loss assessment;</li> <li>• Test simplified loss adjustment guidelines, train loss adjusters on new methodology and guidelines before the next phase;</li> <li>• Adjust and prepare for next phase SIAP's infrastructure for paperless loss adjustment;</li> <li>• Adjust SIAP for API application of remote-sensing solutions for loss adjusters;</li> <li>• Assess viability of deploying of commercial loss adjustment service providers with possible accent on their services applied for individual farmers with 2+ ha of rice production during next stage. Train commercial loss adjusters. (If such providers interest is confirmed, further considerations to be clarified with Jasindo).</li> </ul> <p><b>Phase 2: Apply changes based on results and decisions made during Phase 1</b></p> <ul style="list-style-type: none"> <li>• Enhance regional/district capacity with POPT/PPL;</li> <li>• Assess Phase 1 performance - adjust procedures, if applicable;</li> <li>• Deploy SIAP paperless loss adjustment;</li> <li>• Deploy remote-sensing for loss adjustment;</li> <li>• Assess opportunities for yield-based loss assessment methodology (crop count vs. yield estimation – decision pending with stakeholders based on results of further assessments).</li> </ul> <p><b>Phase 3: Adjust based on decisions made and performance of adjusted guidelines and methodologies during Phase 2</b></p> <ul style="list-style-type: none"> <li>• Remote-sensing application for AOTP portfolio monitoring;</li> <li>• Ownership certificate, acreage per farmer/household, crop (rice) variety, GPS coordinates of land plots (introduce obligatory requirement for commercial agricultural insurance);</li> </ul>
<p style="text-align: center;"><b>Information for underwriting:</b></p>	<p><b>Phase 1: Maintain current operations. Develop underwriting capacity for central and regional personnel. Prepare SIAP infrastructure for introducing the following data collection:</b></p> <ul style="list-style-type: none"> <li>• Remote-sensing application for AOTP portfolio monitoring;</li> <li>• Ownership certificate, acreage per farmer/household, crop (rice) variety, GPS coordinates of land plots (introduce obligatory requirement for commercial agricultural insurance);</li> <li>• Location: Cadastral certificate, map / GPS coordinates for all land plots insured (center-field location);</li> <li>• Collect data on applied rice growing technology (standardized for future data analysis).</li> </ul> <p><b>Phase 2: Introduce agreed ready-to-use infrastructural changes into operation. Monitor portfolio based on adjusted parameters (Phase 1 preparations) and application of remote sensing</b></p> <ul style="list-style-type: none"> <li>• Enhance underwriting capacity (central/regional);</li> <li>• Test technology for field boundaries identification based on GPS coordinates provided by farmers;</li> <li>• Enhance quality control for field locations.</li> </ul> <p><b>Phase 3: Introduce enhancements based on Phase 3 outcomes</b></p>

**Table 8. Suggested modifications for AOTP terms (continued)**

Other :	<p><b>Phase 1: Conduct a series of preparations suggested for Phase 2</b></p> <p><b>In-field Research – IMPORTANT</b> Conduct an in-field research with farmers, to determine their “normal” plant damage in rice, normal rice yields, establish links of rice yield decrease to the character of plant damage. This exercise is considered to compliment development of future rice damage assessment and calculation methods that would distinguish better between farmers’ “normal damage” experience and the one that goes beyond “normal” that requires insurance coverage.</p> <p><b>Remote sensing – IMPORTANT</b> Deploy remote sensing technology to assess plant damage, rice yields, validate the consistency of data gathered for agriculture insurance within an enhanced functionality of SIAP.</p> <p><b>SIAP – Data Network – IMPORTANT</b> Develop central data management system on the existing platform of SIAP, that will allow review and analyze insurance application/approval information, in-field research data and loss assessment data to be uploaded automatically with built-in quality control mechanisms. Develop query tools to assess data quality, identify geographic areas where damages and corresponding insurance claims are more likely, so in-field personnel can be deployed to enable a more efficient loss adjustment response.</p> <p><b>SIAP - Administration</b> Develop functionality in SIAP to streamline administrative bureaucracy for authorization of insurance application and claims payments to farmers.</p> <p><b>Internal Reinsurance Fund</b> Consider defining a review process for annual premium rates and its’ make-up relative to: basis risk, administration costs and building future reserves for catastrophic losses. Consider allocating annual premium portion to each of the named categories. Elaborate the guideline for redirection and “storing” of any annual premium in excess of “operation and administration costs” to an internal reinsurance fund that can earn interest and be used to cover claims in excess of losses in future years. Some portion of this fund could be considered for R&amp;D purposes, if considered. Assess reinsurance exposure to AOTP and develop a reinsurance structure that provides protection against AOTP losses in excess of amounts in the internal reinsurance fund.</p>
	<p><b>Phase 2: To avoid adverse selection, gradually start introducing the requirement for program participants to insure all land plots under their rice cultivation (avoid high adverse selection exposure)</b></p> <ul style="list-style-type: none"> <li>• Seek opportunities at Jasindo and MoA to reduce administrative and operational costs by streamlining the program administration and loss adjustment activities (SIAP/remote sensing) to increase Target Loss Ratio (TLR) from currently estimated 60% to higher level (65% or 70%). This change potentially may help to reduce base rates for AOTP program;</li> <li>• Consider bundling AOTP program with other support programs (fertilizers, fuel, subsidized seasonal loans, seeds, etc.) funded by the government that could be introduced gradually upon readiness of AOTP’s infrastructure required (capacity with personnel and SIAP’s functionality for paperless operations).</li> </ul>
	<p><b>Phase 3: Adjust AOTP elements where required, based on the performance of a stabilized AOTP during Phase 2</b></p>
Provinces:	<p><b>Phase 1: Maintain current AOTP approach</b></p> <p><b>Phase 2: Access to program by all Indonesian Provinces expanding current distribution with commercial offering on the market to commercial farmers (over 2 ha)</b></p> <p><b>Phase 3: Adjust AOTP offer in selected provinces, based on the results of the AYI pilot before October 2022</b></p>

### 2.3.5 Improvements for distribution channels

Current AOTP program is currently delivered mostly by the extension workers (PPL) who serve as the initial and the major channel of AOTP distribution among the farmers community in the country. As consultants had no chance during current assignment to evaluate the level of knowledge of AOTP specific terms with PPL, it is important to continue with the assessment on the depth of PPL understanding of the key program terms and features. Based on the assessment results elaborate future trainings on basics of AOTP (modified) and farmers' socialization for the PPL officers throughout the country.

AgroInsurance team has assessed current activities of Jasindo in attempts to bundle current AOTP with other state subsidized programs. Jasindo's activities in testing various distribution channels is a very important exercise for the future market penetration growth for AOTP. Potential future upscaling of AOTP should consider program administration costs that are not proportionate to the bundled program scale. Often bundling solutions fail to perform well due to a limited scale of the program when reviewed its administration and acquisition requirements.

Among the distribution channels, below we would like to suggest a complex approach to the concept of distribution that will assure future AOTP's sustainability and steady growth in various directions if its market penetration rate growth.

#### a. Capacity and staff

It is of a primary importance to start with proper capacity and infrastructure development. Building and managing a well-functioning agricultural insurance programs requires meeting certain operational standards. It should also possess at least the minimum required amount of dedicated personnel at various levels (operation and administration) to service the future programs. Good technical knowledge and practical experience are of the key concerns for the AOTP program at the moment (more details are available in Section 3.4.3 and Annex # 5).

Direct sales and promotion activities (socialization) with a planned and predictable growth of insurance penetration in the country is recommended to stay as a key priority for the government before October 2022. Preparation of required capacity (dedicated personnel) for future programs takes extensive periods of time. Same timeline may be required to gradually modify SIAP's infrastructure – program administration, loss adjustment, reporting).

Dedicated agricultural insurance specialists on the side of Jasindo should be able to efficiently run existing programs and have sufficient knowledge and experience in developing sustainable bundled insurance solutions with partner-organizations and state-subsidized programs for farmers. A 3-year timeline is considered by AgroInsurance team to feel the change in capacity, directly reflecting on program performance and market penetration indicators.

#### b. Bundled solutions with other government-subsidized programs

Bundled crop/yield insurance solutions target a significant number of farmers – participants of other state-supported programs. The scale of a bundled product matters. Smaller bundle programs may not be sustainable because of high administration costs. Based on this understanding our team would suggest giving the priority to the scale and potential number of AOTP participants. For governmental programs this may be the case to obligatory require insurance for all beneficiaries of various state subsidized programs, which is recommended.

Confirmed by Jasindo, agricultural team attempted several pilots for bundled solutions with Fertilizer Subsidies program and program for provision of subsidized seeds to the farmers. These programs were not formally announced yet and performance results are not known to the consultants at the moment of this report elaboration. Project counterparts may consider long-term cooperation for bundling insurance solutions in the future, should there be sufficient capacity made available to service the program.

**AgroInsurance team suggests focusing on:**

#### ***Fertilizer Subsidies***

Indonesia provides farmers with fertilizer subsidies as part of its agricultural development strategy. This scheme is the largest farm-support program in the country and accounts for around half of the total agriculture support budget in the

country. In 2017, fertilizer subsidies amounted to IDR 31.2 trillion (USD 2.31 billion)<sup>28</sup>. The subsidies allow small-scale farmers with 2 hectares or less of land to buy government-supported fertilizer at around 50-75%<sup>29</sup> of the market price. The percentage varies across fertilizer type.

**Recommendation: Consider further developments on current initiatives of Jasindo. Elaborate program administration (documents exchange) and reporting guidelines addressing the bundled program's specifics. Pilot in few provinces prior to a large-scale implementation should be considered.**

**Rice Price Stabilization**

The government, through the Ministry of Agriculture and the Ministry of Trade, conducts rice price stabilization operations to ensure that medium rice sales do not exceed the highest retail price. BULOG is a state-owned enterprise, delivering market operations throughout Indonesia to keep rice prices stable. The rice procurement serves two purposes: to sell subsidized rice to poor families through the Subsidized Rice for the Poor Programme (RASKIN)<sup>30</sup> and to stabilize the price of rice at the retail level. At the same time, the Ministry of Agriculture has established toko tani (farmer's shops), which buy agricultural products (including rice) directly from the farmers<sup>31</sup>.

**Recommendation: Research on more details for the Rice price Stabilization program and contracting structure. Identify areas for inclusion of crop/yield insurance and proper protection coverage structure. Elaborate program administration (documents exchange) and reporting guidelines addressing the program's specifics via SIAP.**

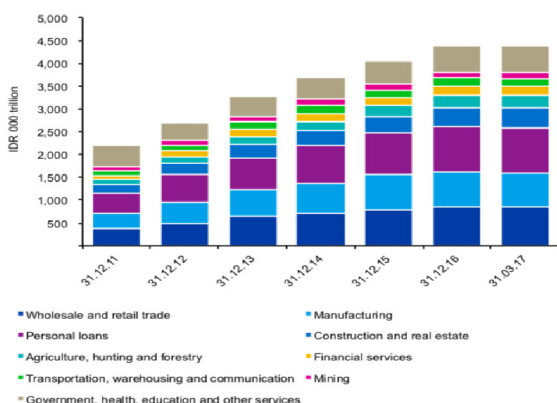
**Bundled solutions with agricultural loans / micro-credit lending programs**

Based on 2016 research<sup>32</sup> results available to consultants, it is possible to conclude that there is a lack of financing in the agriculture sector in the country. This is identified as a serious impediment to further successful development of the industry. Indonesian government (central / provincial) provides ad hoc assistance to producers in the event of emergencies that puts an additional burden on provincial/central budget and usually is not sufficiently efficient.

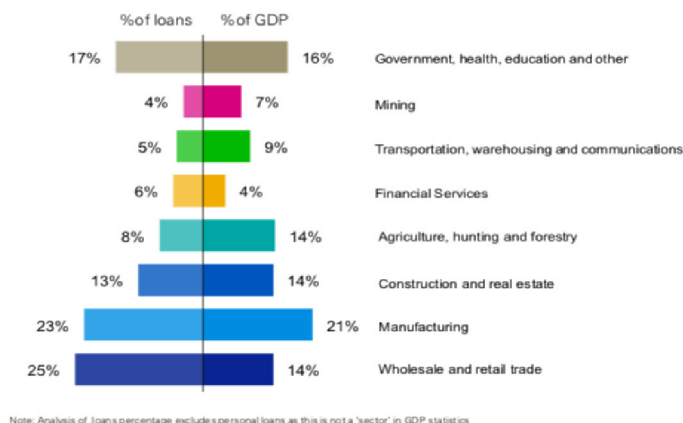
Figure 7. Commercial bank lending by sector

Figure 8. Loans outstanding versus GDP by sector

**Commercial bank lending by sector**



**Dec 2016 loans outstanding versus GDP by sector**



Source - Finance in Indonesia: Set for a new path, KPMG, 2017

28 An Overview of Indonesia's Agricultural Policies in 2018, FFTC Agricultural Policy Platform

29 Country fact sheet on food and agriculture policy trends, FAO, 2017

30 Country fact sheet on food and agriculture policy trends, FAO, 2017

31 Country fact sheet on food and agriculture policy trends, FAO, 2017

32 Finance in Indonesia: Set for a new path, KPMG, 2017, Percentage represents proportion of lending as at 31 December 2016; Source: Indonesia Banking Statistics..

The finance sector in Indonesia is led by three state owned banks and one private bank that could be considered for future bundled programs: Bank Mandiri, Bank Rakyat Indonesia ("BRI"), BNI and (private bank) BCA with common market share of 41%.

There has been significant variability in the growth in credit by sector, but overall over 60% of credit is allocated to trade, manufacturing and personal loans <sup>33</sup>.

Agricultural, Hunting & Forestry lending showed strong growth in 2015 and 2016, perhaps aided by new lending requirements from the OJK requiring micro and SME loans at 5% of total loans for 2015, rising to 20% of loan portfolios by 2018<sup>34</sup>. This segment is still considered to be under-funded relative to GDP contribution.

Potentially, insurance could be bundled to any crop production-oriented loan or micro-loan. Specific business results, significant administration and program servicing infrastructure (IT) should be ready before involving farmers into a program in key rice-producing provinces. Smaller (localized) programs are questionable for bundling based on sustainability considerations due to substantial program administration costs. The program's breakeven and sustainability may be a matter of a separate research on cost/benefit analysis recommended for the future, considering modifications applied to AOTP before October 2022.

**Recommendation: Further discussions on bundling opportunities with loan products should be additionally researched and analyzed, pending readiness of required infrastructural changes to service such programs efficiently in the future.**

### 2.3.6 Utilization of technologies

#### SIAP

Current AOTP operations involve program administration and reporting delivered partially via existing SIAP IT system that is managed on the side of Jasindo. The approved users in the system involve employees of different directorates and departments of the MoA on the central and provincial (district) levels. The system is also used by Jasindo designated staff for underwriting and loss adjustment operations. It is notable, that Jasindo also exports necessary data from SIAP into its own internal MIS Jasindo STAR, that is used for internal purposes on program management and accounting.

Further SIAP modification is required to adjust reporting and provide a platform for switching to paperless administration and loss adjustment. Jasindo IT department have confirmed to be ready to conduct the necessary IT development works in the shortest possible time. However, modifications may still take over 6 months' time. Specific timeline will be available upon the completion of the terms of reference and technical tasks, that are the matter of development during the following project phase.

#### Mobile applications

Jasindo is reported to be currently in the process of research for solutions to streamline the loss adjustment operations with the use of loss adjustment application for handling loss adjustment and claims management activities. Local Indonesian IT provider is involved in current discussions with Jasindo. No particular information is available to the consultants at the time of this report compilation if any operational application will be made available for testing in 2019-2020 rice production seasons.

#### Drone technologies

Jasindo staff has indicated to be interested in deploying drones for crop survey on damaged paddy rice within the insured portfolio of the company. Drones are considered to be a pricy option to deploy on a national scale, involving significant budget spending on equipment purchase. In addition to the price issue, drone pilots require proper practical trainings

<sup>33</sup> Finance in Indonesia: Set for a new path, KPMG, 2017

<sup>34</sup> Finance in Indonesia: Set for a new path, KPMG, 2017

on the methodology specifically developed for the purposes of the crop survey / loss adjustment. Current attempts with drones' application seem to be at the very initial stage to consider those as substantial for AOTP portfolio exposure.

Further detailed research and discussions are required to understand better the Jasindo's strategy of applying drones for the needs of AOTP in the nearest future. Application of drones will be inevitable for the future program needs and this can provide significant benefits for loss adjustment and AOTP portfolio underwriting. This requires a complex approach. The approach needs to consider authorization (licensing) of loss adjusters authorized to fly drones on the tasks assigned. Proper guidelines and methodological instructions should be considered and developed for future drone use. As an alternative for individual drone use it is recommended to research on possible application of military-grade drones due to the flight duration and quality of equipment installed on the vehicles.

### **Remote sensing**

Remote sensing is not currently applied for the needs of AOTP. Jasindo has reported that it is currently in the process of discussion of a Technical Task List with the local Indonesian remote sensing company to service the future needs of AOTP. AgroInsurance team did not receive any additional information specific to current discussions between Jasindo and the local remote sensing provider. However, based on the experience of consultants, it is highly recommended to review the current discussions and reconsider any tendering procedures to involve the international remote sensing providers to compete for servicing future needs of AOTP. Section 3.3 provides the details on consultants' suggestions and consideration for functionality needed and available on the international markets.

It is of a high importance to involve the experienced provider with global exposure of their services that will facilitate application of a verified and calibrated methods for crop vegetation assessment and data interpretation, yield estimations techniques, early loss identification capabilities, etc.

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### **2.3.7 AOTP guideline review and issues revealed**

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Current AOTP guideline creates a framework for AOTP operation and program administration. The 2019 version of the AOTP Premium Aid Guideline was analyzed. Notwithstanding the fact that current AOTP operates based on the provisions and methods listed in the guideline, it requires a substantial change in the nearest future. Considering the suggested program modifications (Section 2.3.4.) this guideline, as a core document for AOTP program will require substantial update and addressing a number of issues revealed in the document. Section 3.4.2 and Annexes #6 and #7 provide details on phased approach suggested by the consultants to apply.

However, considering the timelines for possible modifications, it is recommended not to conduct immediate changes to the guideline document, as more modifications will be required in preparations for the modified AOTP planned for introduction from November 2020. For more details on suggestions for AOTP guideline see Section 2.3.1.

## **2.4 Exploring the Possibility of Introducing Area-Yield based Index Insurance Scheme (AYI)**

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### **2.4.1 Review AYI design elements and implementation details product structure**

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AYI designs are similar to individual coverage in that they are based on an estimate of commodity yield and commodity price. However, rather than establishing a yield for an individual farm/crop an estimate of "normal expected yield" is developed for the area as a whole. Farmers often have the option of selecting coverage as a percentage of the yield value covered. Prices to establish monetary coverage can be identical to that described under the individual designs.

AYI insurance products require the same focus on data management (gathering, quality control, storage, accessibility) as the individual coverage designs. Areas should be selected to represent homogeneous production as opposed to those based on political boundaries. Fields should be known within the area so that a good random sampling of fields can be used to establish an annual area average yield.



Successive years of annual area yields average records can be used to bolster the estimate of “normal expected yield” for the area over time. Yield trending formulas might be identified if management practices are evolving as they are in some multi-peril individual coverage designs (like current suggested modifications for AOTP).

AYI product triggers the losses based on a comparison of the annual commodity yield to a percentage of the normal expected commodity yield for the area. However, it is feasible to develop an AYI design with a trigger based on damaged plants. To be accurate, some established “normal level of damaged plants” would have to be attained to correlate to the “normal expected area yield”. If that could be done, then annual average damaged plants in randomly selected plots could be compared to a normal expected percentage of damaged plants to determine if a loss exists for the area. Claims could be based on monetary coverage or cost of production.

**Individualization of area design** - Non-random yield sampling could be added to the process to establish yield estimates for specific management practices that are expected to have a quantifiable impact on production (increased production or reduced risk of production losses). For example, the use of hybrid plant stock is expected to increase rice production. Overtime, farmers could receive increased coverage in the form of a coverage adjustment relative to the normal expected yield.

### Pros and Cons

Benefits of an AYI products are:

- fewer in-field assessments of production may be required to build an annual area-based yield (or estimate of damaged plants) compared to that required for individual coverage;
- In-field inspections would not be required to assess a loss for an individual farm;
- Farmers would not have to report damaged fields and participate in a farm visit to identify management techniques to prevent further damage;
- Some private reinsurance firms that might not be able to support traditional insurance designs may be able to do so in an AYI approach;
- Farmers who are not part of a farm groups may be able to participate in AYI program since their farm yield may not “directly” influence the outcome, although they may be required to contribute to a random yield estimate process and production data reporting.

However, the downside or considerations of an area-average approach in Indonesia are:

- Planting of rice falls into two major seasons – wet and dry, but actual plantings of the crops may be fairly continuous throughout these periods (see Section 2.2). In an AYI product crops would need to be defined as either dry season or wet season in order to know which season they would contribute to a random sampling and area-average estimate as well as which season they belong to, for a potential claim settlement. So an intermediary season should also be considered, as also suggested for AOTP;
- From the review of data provided by Indonesian counterparts, it is uncertain if there is a good understanding of where all rice paddies currently exist. There are not enough insured farmers currently enrolled in agriculture insurance to get a good estimate of area-yield in all areas of the country;
- Considerable resources would be needed to gather sufficient data from random sampled fields selected from a majority of fields using consistent methodology over all regions. It is uncertain at the moment, whether the resources or consistency in data gathering currently applied by BPS could be applicable for the actual AYI needs. This requires an additional study and field validation that should be developed in Indonesia in the immediate future.

Annex #2 to this report provides an overview of AYI insurance program in India with proper references and reflections on Indonesia. Specific parallels between India and Indonesia are provided in order to show the government of Indonesia the complexity of required infrastructure and capacity, as well as point out certain areas to consider avoiding similar mistakes done by the government of India.

## 2.4.2 Analysis of yield data, level of granularity available for AYI

Consultants did not receive reliable and accurate yield data on the level requested (district/sub-district). The data sets provided by the BPS and the MoA had production and failed area data and simulated yield estimated which were the same for all provinces. Unfortunately, such simulated data is not acceptable from the actuarial point of view for rating purposes.

During the July 2019 field trip AgroInsurance team was assured that Dinas (regional agricultural offices) have paddy yield data in hard copy which can be provided in e-format at later stages. Consultants are ready to assess yield data, when available, for actuarial purposes. However, at the time of elaboration of this report consultants consider no reliable yield data is available in the country for proper rating purposes.

## 2.4.3 Prototype product concept suggested for Indonesia

Establishment of an AYI insurance program requires proper preparatory activities to ensure required infrastructure and capacity are in place. Due to the potential scale of the future program it is recommended to pilot program operation in one province only. West Java was selected based on the data analysis results.

The ultimate goals of the future program (beyond October 2022): **Provide catastrophe level insurance protection for all rice-producing farmers (including registered farming groups) in key rice-producing provinces of Indonesia.**

**Implementation of AYI product will allow the government to address several important issues at a time:**

- **Strengthen farmers' sustainable production** (ensure timely indemnity payouts);
- **Protect the most vulnerable country's rural population** (ensure sustainable production and social stability in the country);
- **Enhance integrity of governmental farmers' protection policy** (insurance of production covers risks for other state-subsidized programs, that farmers benefit from);
- **Receive an established instrument to address the issue of ad hoc emergency payouts** (transfer financial burden from budget to international reinsurers).

Emergency ad hoc payouts is a politically sensitive issue, that should be decided on the side of the government. Such payouts are provided directly (monetary) and indirectly (in kind: seeds, fertilizers, etc.). Monetary payouts may come from central government budget as well as from provincial budgets. Notwithstanding the future political decisions, AYI program is recommended to possess necessary features and elements that will be able to streamline catastrophe-related payouts when switching to transparent AYI insurance operations.

### Product challenges

The largest challenge for AYI is the data for rating purposes: its availability, infrastructure for collection of yield data, data management and storage, and provision of public access to actual yield data used for the purpose of the program. The data provided for rating purposes was very general and did not include actual yield data. Some files contained yield assumptions which were the same for all provinces and districts – this data must not be used for rating purposes. Rates were calculated per province while, district or sub-district level of data granularity will be the best rating purposes.

Another challenge is the timely yield estimates with the results to be applied for calculating indemnity payouts. According to the information received by consultants, there are 2 growing seasons for paddy rice production in Indonesia with an intermediate season allowing farmers to start growing paddy amid of a dry or wet season. The average yield estimates per district and per province must be done in a uniform manner for all areas growing paddy in each season defined. This may be a challenging task understanding that the rice growers are utilizing any planting window possible and national climate allowing flexible planting windows. BPS advised that the new rice production data collection will be implemented in 2019. The procedure and the data reported must be assessed and undergo field validation for deciding on applicability of such for insurance purposes.



## Product features

The product design is based on the traditional AYI concept. The insured yield is recommended to be set at 80% of the average annual paddy yield. The insured yield must be calculated per each province, district and sub-district based on the data available. The crop value must be set per each season based on the expected rice value (IDR per ton) at harvest time.

The insured farmers are to get payouts in case the average rice yield in the district will be below the insured yield. According to the product design concept, all insured farmers must get the same payout sum per hectare. Insurer and respective government agencies (BPS, as the owner of rice yield reporting methodology) must assure the yield estimates are done accurately and reported in a timely manner.

## The key AYI product terms suggested by AgrolInsurance team::

The tentative phasing approach for AYI is considered

**Phase 1 (before March 2021) – Preparatory phase** (data collection and analysis, elaboration of program guidelines and methods, adoption of required regulatory documentation, training personnel to ensure the basic capacity is in place, adjust SIAP functionality to accommodate the AYI program's operational and administrative needs, etc.).

**Phase 2 (April 2021– October 2022) – Pilot run in West Java for 2 consecutive years (3 production seasons)** (review program performance results after each season and on a yearly basis, adjust program's terms and procedures, if applicable).

**Phase 3 (November 2022 – TBD (to be determined))** – Potential program expansion to other pilot provinces, if approved (based on the results of Phase 2).

**Table 9. Suggested modifications for AYI terms**

<b>Crop type:</b>	<b>All rice varieties in Indonesia</b>
<b>Farmers' eligibility:</b>	<p><b>Phase 1: Elaborate a set of program's guidelines and regulatory provisions defining clear farmers' eligibility criteria</b></p> <p><b>Phase 2: Adhere to criteria adopted during Phase 1. Monitor program's performance. Prepare for possible adjustments for Phase 3</b></p> <ul style="list-style-type: none"> <li>• Suggested: Rice producers in West Java province..</li> </ul> <p><b>Phase 3: Adjust eligibility criteria based on Phase 2 performance results</b></p> <ul style="list-style-type: none"> <li>• Consider: Rice producers in other Java provinces (based on Phase 2 results)..</li> </ul>
<b>Insurance period:</b>	<p><b>Phase 1: Enhance SIAP functionality to accommodate the AYI requirements for data management on the basis of the following production seasons:</b></p> <ul style="list-style-type: none"> <li>• WET SEASON: November 1 - March 31 (tentative);</li> <li>• DRY SEASON: April 1 – October 31 (tentative);</li> <li>• INTERMEDIARY SEASON: Dates require clarification and approval from MoA and Jasindo before October 2020.</li> </ul> <p><b>Phase 2 &amp; 3: Differentiate between production seasons. Analyze and adjust if required</b></p>
<b>Premium aid (subsidy):</b>	<p><b>Phase 1: Elaborate necessary regulatory documentation and guidelines defining the subsidy status for AYI program and the level of state support (suggested 100% subsidy)</b></p> <p><b>Phase 2:</b></p> <ul style="list-style-type: none"> <li>• (tentatively) 100% subsidy rate (one pilot province)..</li> </ul> <p><b>Phase 3:</b></p> <ul style="list-style-type: none"> <li>• TBD (to be determined).</li> </ul>

Table 9. Suggested modifications for AYI terms (continued)

<b>Risks covered:</b>	<p>Phase 1: Elaboration of AYI guidelines, including specifying risks covered</p> <p>Phase 2: Cover All naturally occurring risks impacting rice production yield</p> <p>Phase 3: Adjust based on Phase 2 performance</p>
<b>Risks excluded:</b>	<p>Phase 1: Elaboration of AYI guidelines, including specifying risks excluded (if considered)</p> <p>Phase 2 &amp; 3: (tentatively suggested) No exclusions. Basis risk considered. Adjust Phase 3 requirements based on Phase 2 performance</p>
<b>Sum insured basis:</b>	Commercial value of insured yield calculated as the multi-year average yield at the risk area level multiplied by the agreed commodity price and multiplied by the agreed coverage level
<b>Insured Value</b>	(tentatively suggested) 2,400,000 IDR <sup>25</sup> per ton - to be agreed for each insurance season. The agreed value is to be set before the sales season and to be the same for all insureds. Information to be publicly available for farmers' reference
<b>Coverage level</b>	<p>80% of the multi-year average calculated on the basis of 5+ last years</p> <p><i>*Key challenge – amount of years to be acceptable for average yield calculation. The earlier years may need to be de-trended due to technology shift. Last 5 years considered sufficient for this (pending, requires discussion and final agreement with Bappenas and MoA)</i></p>
<b>Yield data for insured yield calculation</b>	<ul style="list-style-type: none"> <li>The latest 15 years of yield data available as supplied by BPS. De-trending methodology must be agreed and approved by Indonesian side;</li> <li>Apply sub-district yield data available with local Dinas offices of the MoA (Data needs to be requested in consistent digital format and validated for the program purposes prior to start in West Java province);</li> <li>Suggest - Average multi-year yield to be calculated as a simple average;</li> <li>e.g.: Can be Olympic average of last 7 years taken, excluding the lowest and the highest yield out of the data set.</li> </ul>
<b>Insurance rate:</b>	<p>Phase 1: Validate the aggregated premium rate of 3.1% for West Java province, based on the available sub-district data from MoA</p> <p>Phase 2: Apply a validated single premium rate (tentatively suggested - 3.10%) calculated for all risk zones defined in a pilot province. Differentiate premium rate by wet/dry season</p> <p>Phase 3: Adjust premium rate to:</p> <ul style="list-style-type: none"> <li>Diversified premium rates by risk zones and by wet/dry season (for provinces approved);</li> <li>To be calculated at later stages according to the methodology agreed.</li> </ul>
<b>Damage Assessment / Loss Adjustment</b>	No loss assessment per individual insured
<b>Claim calculation</b>	<ul style="list-style-type: none"> <li>Calculated using the difference between the insured (trigger) yield and the actual yield (reported by BPS) multiplied by the insured value;</li> <li>Calibration of BPS reported yield with Remote Sensing application.</li> </ul>
<b>Information for underwriting</b>	<ul style="list-style-type: none"> <li>Remote sensing reporting and monitoring;</li> <li>BPS monthly yield statistics (CCE).</li> </ul>

35 Suggested as an example, average farmgate price for 1 ton of rice in 2018. For financial planning, it is recommended that government of Indonesia updates the figure for yield value estimation.

**Table 9. Suggested modifications for AYI terms (continued)**

<b>Other</b>	<ul style="list-style-type: none"> <li>• From the regulation point of view the most important - for the insurer not to insure more area than the farmer actually owns, or under actual rice production;</li> <li>• If farmers want to insure only small portion of land, not all plots, this is possible under index insurance;</li> <li>• Consider opportunities for bundling AYI program with other programs funded by the government (fertilizers, seeds, fuel, pesticides, seasonal loans, etc.).</li> </ul>
<b>Provinces:</b>	<p><b>Phase 1: Analyze sub-district and district data for West Java to define its applicability for product pricing and risk zoning</b></p> <p><b>Phase 2: West Java Province</b></p> <p><b>Phase 3 :</b> (tentatively suggested) Major rice-producing Java provinces - to be agreed based on Phase 2 results – conditional to good quality rice yields dataset and transparent yield reporting.</p>

#### 2.4.4 Actuarial pricing methodology

Because there is no reliable paddy yield data, consultants decided to find out a practical approach which will allow starting the AYI program on a pilot basis. Consultants understand that some yield data may be available in hard copy at the regional agricultural offices and all local offices of BPS. If this data would be available it is recommended to analyze data, even if available for some districts, and work out modification of the rating methodology which may use both production area data, yield records and results of the rice reporting according to the new procedure as introduced by BPS.

Consultants suggest calculating rates for AYI pilot program for West Java using BPS statistical data for paddy area planted and lost for the last 15 years (2003 – 2017). Based on rice production data it is suggested to choose West Java province for piloting AYI program in Indonesia. This selection is based on significant rice production volume in this province (similar to Central and Eastern Java), higher rice average losses per year in West Java comparing to other two Java provinces.

According to BPS data (15 years) the average annual area loss in West Java is 1.67% which is much higher than the average area loss for all Indonesia (1.08%) and higher than for Central and East Java (see data table below). The variability of losses is also higher with the standard deviation being 1.57% comparing to circa 0.5% for other Java provinces. The max area loss in West Java is 4.46% which was recorded for 2008 year. In addition, it should be noted that there's been another 5 years with the area loss higher than 50% above average annual loss (2003, 2006, 2007, 2014, 2015).

We consider West Java to be the best candidate for piloting AYI program due to higher probability of yield movement and potentially higher interest with farmers to insure their crop production. This concept is to be additionally verified based on the actual yield data if provided by West Java district agricultural authorities.

**The suggested base rate calculation for AYI pilot program in West Java is the following:**

- (a) average loss cost (lost rice area per year) - 1.67%;
- (b) target loss ratio - 70% (based on the assumption of lower administrative costs for insurer due to loss adjustment based on official actual yield data provided by BPS);
- (c) 30% loading for higher area loss volatility and insufficient information about rice yields variation between seasons and years;
- (d) the achieved gross rate is 3.10% which is to be re-assessed if the district historical yield data would be available;
- (e) we understand that the gross rate above does not take into account annual and seasonal average yield fluctuations, including yield drops in unfavourable years. From our experience, the AYI rates often are 20-25% lower than indemnity crop product rates. Assuming the AOTP suggested rate of 4.00%, the possible AYI rate based on such an assumption may be 3.10% (approximate 20% discount applied to AOTP 4.00% rate).

**Table 10. Suggested rate calculation for AYI program in Java**

	Rate @ TLR			
	Average	Max	Std Dev	0,7
<b>Jawa Barat</b>	<b>1,67%</b>	<b>4,46%</b>	<b>1,57%</b>	<b>2,39%</b>
<b>Jawa Tengah</b>	1,00%	2,12%	0,50%	1,43%
<b>Jawa Timur</b>	0,62%	2,21%	0,51%	0,88%
<b>Seluruh Indonesia</b>	1,08%	1,79%	0,39%	1,54%

**Final rate for West Java to be 3.1% or net rate 2.39% adjusted for 70% target loss ratio + 30% loading for yield volatility and information ambiguity.**

#### 2.4.5 Study and suggestions on selection for distribution channels

AYI insurance product is based on the calculation for yield estimations for a defined risk zone, potentially based on BPS monthly data validated with remote sensing applications. Due to the issue of farmers' possible low level of trust to the yield data, it is considered that voluntary insurance approach may not generate sufficient uptake to cover costs for program's infrastructure and operation. This is a critical point to consider when choosing the distribution channels for AYI program.

AgroInsurance team considers possible program risks and efforts required to start the program. There are two major channels suggested for further consideration to deliver the program in the pilot province (West Java).

**Channel 1: Bundling AYI with other state-subsidized programs** that is considered due to its scale in Indonesia. Suggested bundle may require adding the insurance coverage to the terms of farmers' participation in this program. As the pilot AYI product is suggested to be 100% subsidized by the state at least during the pilot stage, such a bundled approach will not involve any additional funds from the farmers, while covering their potential exposure to all major risks. It is expected that indemnity payouts may be processes faster than with AOTP and farmers may feel the program's effects better and faster, which addresses the exact needs of the farmers. On the other hand, the subsidy costs provided for fertilizer purchase will be protected by the guaranteed indemnity payout in case the damage trigger in engaged and payout is delivered to the farmer, to restart planting immediately after payout received on farmer's bank account.

**Channel 2: Provide catastrophe coverage to all rice-producing farmers in West Java.** This program requires certain decision to be made on the parts of the central and provincial governments. Program may intend to cover a portion of yield value in case of catastrophe events affect rice producers in certain districts and sub-districts of the province.

Channel 2 is a more complex way to introduce AYI, but at the same time it addresses the issue of ad hoc payouts, making the indemnification process more transparent with a quicker, when compared to ad hoc assistance programs that may have been experienced by farmers in the past.

Both suggested approaches are considered to be valid options for the GoI to review more closely and decide on the way to start delivering AYI in Indonesia.

#### 2.4.6 Utilization of technologies

AYI program is recommended to be supported by the remote sensing applications. Satellite data and imagery based on visual and radar data allow assessing the potential rice yields, specify effect of risk events on certain areas and farmers within the AYI program's portfolio.

However, any remote sensing applications require certain time for data calibration and possible adjustments to the methods of yield data interpretation. It is expected to take up to 2 years before the remote sensing data could be efficiently used for AYI purposes.

Meanwhile, the BPS data collection methods should also consider involving paperless data collection technologies using smart phones or tables by the BPS specialists. Due to expected irregular internet connectivity while at fields, mobile

application for data collection should possess the off-line operation to be able downloading the field assessment results and photos upon reconnecting to stable internet coverage. More details and recommendations on remote sensing and other possible technologies are available in Section 3.3.

#### 2.4.7 Summary of suggested key elements to consider in AYI guideline

Current AYI product concept is based on the data made available for consultants at the time of research. Only gross provincial-level premium rate of 3.1% (West Java province) was possible to estimate due to current data quality and continuity issues. Suggested rating includes a significant level of basis risk. It is recommended to continue product development phase with collection of additional available rice production and yield data on sub-district level to specify risk zones and differentiate the rates between the risk zones.

Data collection and management processes for the needs of AYI program are among the key constraints considered. To address the key needs of local stakeholders AgrolInsurance team provides the draft "Data Collection and Management Guidelines (for use in Indonesia Agricultural Insurance Programs)" in the Annex #1.

The guidelines comprise the following sections:

- Purpose of methodology and data further use;
- Specification of data required to support product design;
- Coding of data for central database;
- "Elements for Success" for collecting the data;
- Data gathering methodology;
- Expected data sampling outcomes.

Data gathering methodology (Annex #1) is expected to result in data that:

1. Links damaged plant counts to estimated yield. Pre-harvest plant counts could be used to estimate a yield of rice for the field. An accurate pre-harvest assessment of yield would be an efficient way to assess field losses.
2. Provides a direct yield outcome from each sample and a comparison to actual harvested field results gathered from the farmer. So, this methodology can be used to assess both plant count and in-field yield sampling accuracy relative to actual harvested production.
3. Creates a standard and consistent method for collecting data on the ground ensuring quality control in all aspects of data management to create a central data base for agriculture insurance for rice in Indonesia.
4. Can be designed to assess and link to remote sensing that could improve efficiency to the data gathering and calibration of assessments results.
5. Includes pro-active interaction with farmers to formulate a real educational experience both in terms of in-field sampling and transparency in outcomes. This is a proven technique to build trust and understanding between farmers, agriculture insurance practitioners and government (central/provincial) who support the program.
6. Can identify specific agriculture management techniques that can either improve rice production or reduce variability (risk) in rice production.
7. All perils will be identified in the in-field sampling exercise. As such, perils that are not currently insured by other programs but appear significant to production might be added to the future insurance cover overtime (may require premium increase).

Policy suggestions that may arise from a variety of sources (e.g. farmers, private sector, universities, political sphere, etc.) can be assessed from an insurance risk perspective but also based on impacts on "potential productivity" outcomes. At times suggestions for change can be accepted while at others they should be rejected. This methodology and subsequent data set can be used to make informed decisions regarding future of agriculture insurance design, operational integrity and beyond.

## III. CONCLUSIONS AND RECOMMENDATIONS

### 3.1. General Conclusion

Consultants recommend bundling both AOTP and AYI products with other government supported programs, like subsidized fertilizers, season credits and the like. This will increase the product uptake and provide additional protection to farmers and the government. Ultimately this approach will increase farmers resilience which must result in more stable rice production, introduction of better technologies and stabilize rural population income from their rice crop production.

Consultants recommend continue running AOTP program according to the current design until October 2020 applying a reviewed portfolio-based rate (recommended 4%) the soonest possible time. The key program enhancements to be developed in the period of November 2019 – October 2020 with the implementation starting tentatively from November 2020. By that time, it is highly recommended to consider adoption of special legislation and regulation for the agricultural insurance program supported by the government. Such legislation must recognize the principle of continuous government support to assure sufficient funding and dedicated resources for the program in the future.

AgroInsurance team recommends piloting AYI program in West Java for at least 2 years. This time is necessary to test program design, communication, marketing activities and to calibrate underwriting, average yield reporting and claims handling procedures. With a stable performance of AYI program and establishment of efficient data infrastructure and procedures at place, further upscale to other provinces may be considered.

The product design is to be based on the traditional AYI concept. The insured yield is recommended to set at 80% of the average annual rice yield. The insured yield must be calculated per each province, district and sub-district based on the data available. The crop value must be set per each season based on the expected rice value (IDR per ton) at harvest time. The insured farmers are to get payout in case the average rice yield in the district will be below the insured yield. According to the product design, all insured farmers must get the same payout sum per hectare. The insurer and government agencies (especially BPS as the owner of rice yield reporting procedure) must assure the yield estimates are done accurately and reported in a timely manner.

### 3.2. Recommended Scale-up Scenarios for RPJMN 2020-2024

#### 3.2.1. Scaling-up Scenario by 2024

Based on the latest consultations with stakeholders in September 2019, no increase of the area planned for insurance in 2020. Further program development is considered with a 10% increase in 2021 and 2022, gaining the 15% increase in 2023 and 20% in 2024.

AYI program is new for Indonesia and it is recommended to initially pilot this program in West Java province. Consultants suggest 10% of paddy area can be insured under AYI program in West Java in 2020. An increase of 5% per year for the area insured looks conservative, but realistic on condition the insurer and respective government agencies conduct reasonable number of educational and informational events in key production areas. Simulated results for such estimations could be found in Annex #9.

It is important to refer to the quality of capacity and availability of respective dedicated personnel at all operational units of the program. For capacity needs see Section 3.4.3 and Annex #5.

#### 3.2.2. Key Recommendations to Realize Scale-up Scenario

##### General recommendation

The key factors for achieving the target of area insured under both AOTP and AYI programs are: (i) communication and socialization campaign, (ii) bundling the programs to other governmental agriculture support programs. The farmers must receive regularly information about programs coverage and government support. It is important that the farmers receive information about application procedures in advance (at least 3 months before the start of application season).

**Table 11. Recommendations for AOTP**

Item	Recommendations
Rice production data	<ul style="list-style-type: none"> <li>• Suggested data gathering methodology (Annex #1) is applicable for both AOTP and AYI. Applying the suggested method will allow having a reliable dataset that could be used for enhancement of product features and development of new designs in the future.</li> </ul>
Insurance data	<ul style="list-style-type: none"> <li>• Improve data entry to avoid typos, incorrect names of insureds, policy inception dates;</li> <li>• Specify policy data by the season (wet and dry);</li> <li>• Specify rice growing technology in SIAP / STAR systems;</li> <li>• Update data set by 2019 data to ensure accurate premium rate adjustments based on program performance;</li> <li>• Recommend adjusting AOTP premium rates on a yearly basis (for dry and wet seasons) using the actual portfolio loss cost and loss ratio info reported by Jasindo;</li> <li>• AOTP data set to be updated with 2019 data when possible. Historical loss data to be used for adjusting AOTP premium rate(s).</li> </ul>
Program status	<ul style="list-style-type: none"> <li>• Continue running program with future performance targets agreed by the government and insurer. Specify the overall objective of the program and make corresponding changes to the guidelines;</li> <li>• Enhance capacity and responsibilities (dedication) of the personnel involved;</li> <li>• Adjust socialization activities to improve farmers' awareness and increase program's take-up;</li> <li>• Conduct major review and update to AOTP guideline: insurance application, policy issuance, policy administration and authorization at different levels, loss assessment and claim handling. Enhance methods and procedures;</li> <li>• Introduce modifications of premium rates per suggested 4 risk zones, with further diversification per wet/dry season, type of technology, per each province;</li> <li>• Maintain damage trigger (75%/75%) with recommended introduction of a lower damage trigger of 50% when AOTP program is stabilized (better address farmers' needs and expectations);</li> <li>• Modify and simplify loss adjustment procedures, streamlining reporting and authorization processes, bringing more transparency and efficiency in further indemnity payouts to the farmers.</li> </ul>
Cover	<ul style="list-style-type: none"> <li>• Continue using the current list of risks covered and excluded;</li> <li>• Apply same damage trigger of 75% of crop damage ratio or 75% of plot area damage;</li> <li>• Review definition of "damage" and "loss" with the purpose of possible moving to yield-based indemnity insurance in the future under AOTP;</li> <li>• Offer unsubsidized cover to commercial farmers with rice area higher than 2 ha;</li> <li>• Enhance cover based on production practice (technical irrigation, rainfed, swampland, hybrid seeds, etc.);</li> <li>• Consider lower damage coverage levels after AOTP is stabilized (e.g. 50%) to increase farmers' interest in the program;</li> <li>• Modify AOTP product in the future by adding several insurance coverage options (6M/8M/10M) to better address various technologies applied by farmers (pending program stabilization). Consider increasing max sum insured (SI) per ha, potentially may apply several options for wet and dry seasons separately;</li> <li>• Discuss introduction of restricted limit for pest/disease claims (e.g. 50% of SI). This change should have positive effect on future program performance while stimulating farmers to better control pest and disease perils;</li> <li>• Review and adjust ways of AOTP coverage socialization among farmers in Indonesia.</li> </ul>



**Table 11. Recommendations for AOTP (continued)**

Item	Recommendations
<b>Actuarial aspects</b>	<ul style="list-style-type: none"> <li>• Consider rate adjustments based on AOTP performance results and suggested new rating structure with proper loadings applied;</li> <li>• Update rating engine based on the updated rate structure and data provided for 2013-2017;</li> <li>• Agree on the rating structure and loadings for AOTP and apply appropriate adjustments in the rating methodolog.</li> </ul>
<b>Rates</b>	<ul style="list-style-type: none"> <li>• Apply the suggested portfolio based premium rate of 4.00% - include 15% CAT loading, 50% loading for adverse selection and disease and pest;</li> <li>• Enhance rating via introducing risk-based rates per risk zones, per season and per production technology type;</li> <li>• If decided to keep the portfolio rate, recalculate rate based on AOTP program performance results and apply additional loadings for CAT events and adverse selection, as suggested in rating structure;</li> <li>• Review seasonal rates on the annual basis based on the adjustments for program performance.</li> </ul>
<b>Underwriting</b>	<ul style="list-style-type: none"> <li>• Differentiate rates per growing season. Specify production seasons (wet, dry, intermediary) and set strict deadlines for each season end (duration);</li> <li>• Capture production technology used by the farmer or farming group;</li> <li>• Assign designated personnel with permanent responsibilities for state-subsidized programs administration and service (central and regional levels);</li> <li>• Apply remote sensing for underwriting and portfolio management;</li> <li>• Advanced underwriting skills training is required to address decision on future AOTP modifications;</li> <li>• Introduce risk accumulation controls within Jasindo and accumulation management procedures.</li> </ul>
<b>Loss assessment</b>	<ul style="list-style-type: none"> <li>• Enhance SIAP to streamline paperless loss adjustment with application of smartphones / tablets. Conduct all records and reporting in online and offline modes. Revise the reporting process for automatic generation of crop assessment forms;</li> <li>• Review and conduct field validation for the loss assessment protocols, procedures and report forms;</li> <li>• Consider reducing the levels of authorization for loss assessment;</li> <li>• Consider loss assessment application to be used via mobile phones;</li> <li>• Required to lower operational cost for personnel involved in LA processes, optimize routing and claim response time</li> </ul>
<b>Subsidy support</b>	<ul style="list-style-type: none"> <li>• Agricultural insurance premium aid (subsidy) is recommended for review to obtain the official status of "subsidy" in a long-term prospective;</li> <li>• Re-calculate budget requirements using the subsidy simulation spreadsheet developed by Agrolnsurance team, based on the final rate applied for AOTP modifications;</li> <li>• Review and specify subsidy portion for AOTP operational costs (per 2019 AOTP Premium Aid Guideline), way of distribution and specific activities covered by these funds;</li> <li>• Continue premium subsidy program with 80% subsidy rate;</li> <li>• Consider splitting of premium subsidy shares between Central and Provincial governments (subject to further discussions with Government entities involved);</li> <li>• Consider bundling AOTP program with other government-funded programs (fertilizers, fuel, seeds, seasonal loans, etc.).</li> </ul>



**Table 11. Recommendations for AOTP (continued)**

Item	Recommendations:
Application of technologies	<ul style="list-style-type: none"> <li>• Start applying remote sensing for AOTP needs in the nearest possible time;</li> <li>• Consider remote sensing application developed by the international service provider (not local). Test available solutions among the suggested, but not limited to: Geosys, GeoVille, EOS, AgriTask, Sarmap for selected portfolio during the 2020 season;</li> <li>• Consider picture-based loss assessment (smartphone-based) procedure to enhance loss assessment process;</li> <li>• Assess the possibility of Involvement of the national operator (LAPAN), as well as keep open the opportunities of international commercial service providers.</li> </ul>

**Table 12. Recommendations for AYI**

Item	Recommendations:
Rice Production Data	<ul style="list-style-type: none"> <li>• Compile and analyze the rice yield data on district/sub-district levels;</li> <li>• Elaborate a master dataset for future program purposes;</li> <li>• Assess the practicality of AYI rating after district/sub-district yield data is made available;</li> <li>• Assess, validate and adjust crop cutting experiments (CCE) methodology with BPS and its practicality for calculation of future indemnity payouts on AYI program;</li> <li>• Address the issue of publicly available yield data for farmers to have access to it, which will facilitate transparency and trust on the farmers' side.</li> </ul>
Insurance data	<ul style="list-style-type: none"> <li>• Apply procedures for data collection, storage, quality control and public access for farmers.</li> </ul>
Program status	<ul style="list-style-type: none"> <li>• Consider participation of West Java farmers (Option 1 – bundled programs, Option 2 – all rice producers in the province);</li> <li>• Total number of participating rice farmers should be considered as an option to address future ad hoc needs for disaster events;</li> <li>• Require farmers participating in AYI program to report production statistics and yields (methods of data collection to be additionally discussed and elaborated).</li> </ul>
Cover	<ul style="list-style-type: none"> <li>• Apply all-risks coverage;</li> <li>• Set coverage periods per season (wet, dry, intermediary);</li> <li>• Establish a deadline for applications at least 30 days prior to insurance season start;</li> <li>• Cover is to be based on the historical production data;</li> <li>• Set end-date for each season. The district average yield to be calculated according to the agreed procedure;</li> <li>• Insured yield is to be calculated as average historical yield for official administrative unit (district, sub-district, or the like) with further application of agreed coverage level (e.g. 80%);</li> <li>• Insured yield to be the same for all participating farmers in the administrative unit;</li> <li>• Consider different insured yields per season and production practice;</li> <li>• Identify the reference source for identification of rice value per ton, for program purposes</li> </ul>
Actuarial aspects	<ul style="list-style-type: none"> <li>• Yield-index rating methodology requires historical crop production data for at least 15-20 years. This data should be available per each administrative unit where insurance is intended to be offered;</li> <li>• Adjustments for technology shift and changes of production practices/technologies must be considered;</li> <li>• Validate existing data and update with any new data available;</li> <li>• Compile a master dataset for ratemaking and program administration.</li> </ul>

**Table 12. Recommendations for AYI (continued)**

Item	Recommendations
<b>Rates</b>	<ul style="list-style-type: none"> <li>• Apply Gross Premium Rate of 3.10% for West Java province (consider significant basis risk) with further diversification on district level (by risk zones). Calibrate rates for defined risk zones with the help of any risk information available in West Java;</li> <li>• Premium rates should be calculated per each administrative unit where program will be offered (sub-district / district). Collect sub-district yield and production statistics;</li> <li>• Premium rates to be set separately per each season if/after yield data is made available.</li> </ul>
<b>Underwriting</b>	<ul style="list-style-type: none"> <li>• Compile underwriting and indemnification guidelines. Final AYI structure requires specific policy wording, administration and underwriting procedures on the side of Jasindo, MoA and other government agencies involved;</li> <li>• Establish standard periods for data reporting and portfolio monitoring (daily/weekly/monthly);</li> <li>• Establish farmers' rice yields and production reporting system and conduct (seasonal/annual) analysis for underwriting purposes;</li> <li>• Conduct trainings on AYI underwriting for Jasindo personnel (technical aspects of program design, revision and portfolio management);</li> <li>• Provide cover for wet and dry seasons;</li> <li>• Set the cut-off dates for farmers to enrol;</li> <li>• Define the yield data to be used for setting the insured yield;</li> <li>• Contract/agree with selected remote sensing provider, calibration period should be considered (up to 2 years);</li> <li>• Establish remote sensing applications for yield validation and program control with involvement of LAPAN and Commercial service provider(s);</li> </ul>
<b>Loss assessment</b>	<ul style="list-style-type: none"> <li>• Elaborate indemnification protocols, procedures and guidelines to streamline the processes and minimize operational and administration costs. If regional offices of the ministry of agriculture involved, the yield estimation procedure must be designed, tested and implemented;</li> <li>• Agree on methodology to calculate yields for loss assessment purposes Apply BPS reported yield data collected according to a validated CCE methodology;</li> <li>• Test reporting timeline by BPS on yield reporting and calculation, including data quality check procedures;</li> <li>• Agree on a process to inform the insurer and farmers on the actual yields to be used for loss indemnification purposes. Develop a yield publication / notification procedure for farmers;</li> <li>• Conduct regular review of procedures;</li> <li>• Validate BPS data with regular adjusters' reports and random calibration samplings.</li> </ul>
<b>Subsidy support</b>	<ul style="list-style-type: none"> <li>• Ensure 100% subsidy for AYI premium sum;</li> <li>• Review the possibility of provincial government participation within a certain share of premium subsidy (50/50; 80/20, consider other possible options);</li> <li>• Consider bundling AYI program with other government-funded programs (fertilizers, fuel, seeds, seasonal loans, etc.).</li> </ul>

### 3.3. Suggestions for Remote Sensing applications in Indonesian agricultural insurance

#### International practice

Indonesia currently applies significant efforts to develop its space-related research programs and apply remote sensing for the needs of the state. LAPAN is the National Space Agency of Indonesia. It's a non-Ministry Indonesian Government Institution that carries out governmental tasks in the field of aerospace research, development and practical application for the needs of the government. The four main areas of LAPAN are remote sensing, aerospace technology, space science, and aerospace policy.

Recent initiatives between MoA, LAPAN and Jasindo for monitoring vegetation stages of rice in all provinces of Indonesia show the necessity for more in-depth development. Moreover, by state regulation LAPAN acts on behalf of the state and may be helpful in acquiring required data that commercial providers may not have access to.

On 28 February 2017 LAPAN has signed a five-year framework agreement with CNES to cooperate with France on space-related activities: sharing of experience, organizing training and hosting Indonesian engineers in order to develop joint research projects<sup>36</sup>. As well, LAPAN cooperated with NASDA (National Space Development Agency of Japan - starting 2003 JAXA) to apply remote sensing satellite from Japan, to map the rice crop field, monitor their growth phase, estimate rice harvest and detect crop diseases<sup>37</sup>.

Remote sensing is becoming an affordable technology for various industries including agriculture. Remote sensing data and images are more affordable now, than 10 years ago. Several companies are already offering different solutions for clients working with the agricultural sector. Agricultural insurance is very data intensive. The insurers require production data (area planted, area established, damaged and lost area, crop yields), farm location information, historical, actual and forecasted weather data, etc. for underwriting and claim handling purposes. While some of this information was available before, the modern platforms and high-tech solutions allow insurers to access various data much faster and easier. The companies Agrolinsurance team assessed provide different solutions but all of them target insurance companies and national governments as key customers of their services.

Many of international remote sensing service providers source the same raw data from ESA, NASA, Airbus, etc., but differ somehow in additional data access (commercial satellites), data processing methods and interpretation of that data for the needs of agriculture insurance clients. It has been mentioned by Jasindo that specific discussions are being held with the local Indonesian remote sensing provider. Consultants had no opportunity to assess the provider's functionality and past experience in providing remote sensing services specifically for agricultural insurance needs. Agrolinsurance team is rather skeptical about deploying local provider with limited exposure and experience in agricultural insurance. **For the reasons of the efficiency and expected quality of the outputs on remote sensing services, it is highly recommended to reconsider current discussions and involve the providers that already have international experience in working with agricultural insurance, that already possess a well-functioning calibrated methods of data interpretations for the specific needs of agricultural insurance. In case of involvement of the local market providers, one should make sure that such providers match the recommended functionality required for the needs of market stakeholders, as suggested in this section below.**

Agrolinsurance team participates in ESA remote sensing initiatives and monitors global market for such services. Based on team's experience, six companies were invited to submit presentations on their capabilities. Five companies submitted materials and expressed their interest in further discussions. One company has not provided the requested presentation (Vito (Belgium)). One company has already held a meeting with the Ministry of Agriculture in July 2019 for possible utilization of their services for rice monitoring (Sarmap). The following five companies have been analyzed:

- Geosys (Canada, Switzerland, France);
- EOS Earth Observation Systems (USA);

<sup>36</sup> <https://presse.cnes.fr>

<sup>37</sup> Small Satellites for Earth Observation: Selected Contributions, 2008

- Geoville (Austria);
- Agritask (Israel);
- Sarmap (Switzerland).

Most of the selected providers utilize the same data sources added by own access to commercial satellites imagery. However, all selected companies provide slightly different functionality for their end users, that has been listed and analyzed below. The available details are summarized in Annex #3 (Remote Sensing Matrix). Table 13. below is visualizing rough estimations on the services available and functions required to produce certain recommendations within current report.

Key remote sensing functionality was identified and categorized with the following attributes for the ease of assessment:

- Confirmed operation, strong functionality: +++
- Declared as available: +
- No specific dedication to particular function, but possible to develop: +/-
- Functionality either non-existent or not mentioned: -
- All fields marked with \* require specific attention and further validation of operational functionality

AgrolInsurance team acknowledges that many of the functions declared by the companies may still be non-existent or in initial pilot stage, but possible to develop and implement within some time (up to 1-year period). For some companies availability of specific functions needs to be reconfirmed with actual show-case demonstration addressing the key functionality, as provided below (on the example of one sub-district, or few villages - same area for all providers reviewed for the ease of further comparison).

**Table 13. Remote sensing providers and their functionality**

Functionality	GEOSYS	EOS	Geoville	Agritask	SARMAP
Data sources	+++	+++	+	+/-	+
Risk occurrence (fact of risk)	+	-	+	-	+
Risk occurrence (cause: flood, drought)	++	-	++	-	++
Field identification	++	++	++	-	-
Crop vegetation monitoring	+++	+++	+++	+	+++
Yield estimation	++++	++++	++	-	++++
Loss Assessment	++++	+/-*	++	++++	++
Comparison functionality (crop, fields, areas, etc.)	+++	-	-	-	-
Reporting	+++	+	+	+++	+
API (application program interface)	+	+	+	+	+
External Data export/import (weather, CSV data table, drone data, etc.)	+	+	+	+	+

Based on the brief analysis conducted by our team, we would like to specify two companies that possess most of the functionality among the selected: Geosys and Geoville. We would urge to continue further discussions with all selected providers, as well as make it possible for other national and international providers to offer their demonstration of capabilities matching the required functions and satisfy to the specific technical needs of agricultural insurance.

**Recommendation: Request practical showcase demonstration on each function listed below**

## Data Sources

There are certain data sources allowing various companies to access raw satellite data that undergoes further manipulation and analysis. Most providers refer to Sentinel-1, -2, MODIS and other satellites, some have access to commercial satellite data. Commercial satellites often have much higher temporal and spatial resolution, but may require higher costs to obtain the necessary data.

**Recommendation: Consider providers with higher number of sources. Access to commercial data is desirable but not obligatory. In case data could be sourced through LAPAN, it should not significantly affect the pricing of images and field data processing on the side of service provider.**

## Risk Occurrence (fact of risk)

It is an available feature with various remote sensing service providers. Usually risk event date is captured when the remote sensing images display significant change of specific indexes which are often visualized as colors. However, it is important to understand the temporal resolution - time required to assess the changes on a certain field. The satellites take an image of the same location once in a certain period of time. Revisiting of the same location and taking images may take place every 3, 4, 5 or more days depending on the satellite orbit, speed and equipment used.

**Recommendation: Advisable temporal resolution is between 3-5 days. However, it is usually offered on a 10-14 days basis, due to free data satellites trajectories. It is also important to consider specifically radar sensor data with the finest spatial (10-50 meters) and temporal (3-5 days) resolution available.**

## Risk Occurrence (cause of risk)

If the confirmation of risk occurrence fact requires comparison of images before and after the risk event, the indication of the risk cause is much more sophisticated. Most providers offer identification of drought effects and floods. However, identification of diseases and pests (rodents) is a much more challenging task. Only one company claimed having such an analysis algorithm (Sarmap), However this should be discussed with other providers and their approach to addressing this particular issue.

**Recommendation: Request identification of the "cause of risk" as one of the functionalities required. Assess various approaches and solutions different providers are able to offer to meet the needs of agricultural insurance programs.**

## Field Identification

This function is very important for developing a national-scale digitized portfolio, that could be put on the google map or analyzed in vector format by mapping software (e.g. QGIS, ArcGIS, etc.). It is currently possible to identify the shape and size of the fields based on the GPS coordinates from the center of the field, that could be provided by the farm group leaders or farmers themselves. It is important to realize that smaller rice fields identification and mapping with their proper shapes may require higher spatial resolution data/imagery. Some companies can identify rice fields using historical images and specialized methodology selecting the fields covered with water at specific periods of time. Some RS companies are currently working on the methodologies to identify fields with specific crop types based on the crop type unique features (eg. High biomass at maize fields).

**Recommendation: Request field identification function to be a part of functionality required for future agricultural insurance programs. Assess and validate solutions offered by service providers.**

## Crop Vegetation Monitoring

NDVI imagery is currently available with almost any provider. It is important to consider not only visualized picture, but the methodology behind interpretation of spectral images and manipulations done to the data that gave such a visualization. It is also important to consider the calibration efforts of each provider and methods for making corrections

to the satellite data and applying machine learning techniques. Vegetation maps are of great assistance to underwriters and loss adjusters. Anomalies revealed on vegetation maps will save time and efforts along the line from claim notification until indemnity payout. In case of large-scale events underwriting decisions may be made very quickly based on farmers' photos and spectral imagery analysis before and after the risk event occurrence.

NDVI<sup>38</sup> (Normalized Difference Vegetation Index) is an index of vegetation greenness or photosynthetic activity. The index is based on color ratios. The data captured by the sensor (reflectance) is stored color by color or spectral band by spectral band. The ratios between each of these different colors in the light reflected by the vegetation provide information on the status of this vegetation. It is calculated as follows:  $(NIR-R)/(NIR+R)$ <sup>39</sup>, where NIR stands for the Near Infra-Red and R for the Red band.

Later, the enhanced vegetation index (EVI) was developed as an alternative vegetation index to address some of the limitations of the NDVI. The EVI was specifically developed to be more sensitive to changes in areas with high biomass (a serious shortcoming of NDVI), reduce the influence of atmospheric conditions on vegetation index values, and correct for canopy background signals.

In areas where vegetative cover is low and the soil surface is exposed, the reflectance of light in the red and near-infrared spectra can influence vegetation index values. This is especially problematic when comparisons are being made across different soil types that may reflect different amounts of light. Thus, the Soil Adjusted Vegetation Index was developed as a modification of the NDVI to correct for the influence of soil brightness when vegetative cover is low.

**Recommendation: Include Crop Vegetation Monitoring as one of the core functionalities required for agricultural insurance needs.**

### Yield Estimation

Estimation of yield is a challenging task as it depends on a significant number of various parameters. However, many companies have gained a considerable success in understanding on how to interpret satellite data and imagery to receive high correlation (over 90%) for yield estimates. It is important to consider provider's calibration activities and methodology for data calibration on the side of service provider.

**Recommendation: Include yield estimation function as one of the key required for the needs of future insurance products for agriculture. Consider a significant time (up to 2 years) to be required to calibrate the satellite data and attain a required level of correlation between the satellite data and actual yields that are sampled according to approved methodology specifically required for AOTP/AYI programs.**

### Loss Assessment

It is important to distinguish between the (i) management information system (MIS) for handling loss assessment records and assure adherence to required procedures (AOTP), and (ii) digital loss adjustment/claim handling (AYI).

Various providers offer online/offline functionality, downloading images from the fields, generation of the loss adjustment reports and further distribution between the parties involved in claims handling. Various customized solutions are offered by different remote sensing providers. However, it is the observation of AgrolInsurance team such solutions often conflict with existing loss adjustment/claims handling MIS and processes.

**Recommendation: Research on the capabilities of SIAP and possibility to source analyzed remote sensing data into SIAP via API. Intensive technical consultations will be required prior to possible integration of remote sensing provider(s) APIs with SIAP.**

38 Guide To Agriculture Insurance Part II Satellite imagery technology - SCOR

39 Guide To Agriculture Insurance Part II Satellite imagery technology - SCOR

### Comparison Function

Not many providers offer such a function to their clients. Among the 5 selected companies only Geosys has a fully implemented function of fields comparison for the same farmer/group, with other farmers in the same insurance portfolio, etc. This function is of an extreme importance for a good quality underwriting of the growing program's portfolio in the future

**Recommendation: Research and assess functional benefits of the function for fields' comparison with all providers participating in further selections process. This function is not a "must have" but provides significantly enhanced flexibility and better understanding of the portfolio for loss adjusters, underwriters and dedicated specialists in various ministries and agencies involved.**

### Reporting

Being one of the key points of consideration, reporting may differ in types of reports for different system users. Reporting is an adjustable function. However, reporting does very much depend on the system's flexibility and initial dataset architecture. Introduction of immediate changes and further minor modifications of the reporting forms and processes is a considerable benefit for end users.

**Recommendation: Consider reporting functionality, flexibility for modifications, generation of automated reports with automatic forwarding of the reports to assigned users. Online report generation and construction of own report functionality is also recommended for consideration.**

### API (application program interface)

Most of providers are able to provide some API functionality. This particular function allows to integrate the remote sensing provider's solution into the clients MIS. Considering that most of current AOTP processes are administered through SIAP, an API integration should be required and assessed as an available function of the service provider.

**Recommendation: Require API integration functionality and the way it may be integrated with SIAP.**

### External data export/import

This function allows integration of various external data into the system that can benefit agricultural insurance portfolio monitoring and management. This particularly relates to drone images and data, weather data from land-based stations, etc.

**Recommendation: Request data export/import function to enhance remote sensing data with additional datasets and images related to insurance portfolio, that may be available in Indonesia.**

The above-listed functions form a set of suggested functionalities that are recommended by AgroInsurance team for the future rice crop/field monitoring remote sensing application.

As a matter of fact, not all agencies involved in AOTP and future AYI program will require the same functionality. The Table 14. below provides the AgroInsurance team's vision on the functions and their relevancy for various stakeholders in Indonesia.



**Table 14. Remote sensing functions and their relevancy for various stakeholders in Indonesia**

Functionality	Jasindo	Bappenas	MoA POPT/PPL	MoA Data manage- ment	MoA Finan- cial planning	MoF	Farmers
Data sources	+			+			+
Weather forecast	+		+	+			+
Risk occurrence (fact of risk)	+		+	+	+		+
Risk occurrence (cause: flood, drought)	+	+	+	+	+		+
Field identification	+		+	+			+
Crop vegetation monitoring	+	+	+	+			+
Yield estimation	+	+	+	+			+
Loss Assessment	+	+	+	+			+
Comparison functionality (crop, fields, areas, etc.)	+		+	+			+
Reporting	+	+	+	+	+	+	+
API (application program interface)	+			+			
External Data export/import (weather, CSV data table, drone data, etc.)	+		+	+			

Notable that most of the functions will be required for Jasindo (agricultural insurance programs administrator) and various departments and directorates of the MoA.

More dedicated discussions are required to come up with decisions on further steps in applying remote sensing and integration of the required functionality into the SIAP system. Considering possible limitation of access to SIAP databases via API, another relevant alternative may be to apply a web-based solution offered by provider. However, API integration with SIAP may offer more usability and faster case processing in SIAP, so should be considered as a primary option.

## 3.4. Recommended Actions and Financial Envelope to Realize both Scenarios

### 3.4.1. Recommendations for premium subsidy

#### AUTP Subsidy support considerations

Consultants recommends assessing the need for funding AUTP premium aid program based on the historical performance of AUTP in the recent years (2017 and 2018). The highest volume of insurance for AUTP program was achieved in 2017 season with the total sum insured (according to data from Jasindo) being **5,987,763,240,000 IDR**. The total premium for this year was **179,632,897,200 IDR** with the subsidy required of **143,706,317,760 IDR**. The area insured in 2017 was very close to the target being **997,961 ha vs planned 1,000,000 ha**. In 2018 Jasindo insured 806,200 ha of rice crop with the total premium of **145,115,935,200 IDR** and subsidy required from the government at **116,092,748,160 IDR**.

From our experience, based on the international agricultural insurance practice, we would expect program to increase insured volumes by 20% per year until the area insured will reach 50% of the total rice crop area. Currently we understand



the insured rice area constitutes circa 9% of the total rice production area in the country. The assumed insurance volume growth rate for AOTP at 20% per year is reasonable, but subject to the government's future plans and possible changes to AOTP cover structure. The simulation of the budget requirements was based on the assumption of 80% subsidy rate or 80% premium financed by the government. More accurate estimate of the funds required for premium subsidy will be done after discussing AOTP plans with MoA, BAPPENAS and Jasindo.

**Table 15. Interim premium subsidy estimations for AOTP program\***

Year	Total premium	Subsidy (80% rate), IDR	Subsidy requirements in USD**
2020	Rp 239.510.529.600	Rp 191.608.423.680	\$ 13.603.538
2021	Rp 263.461.582.560	Rp 210.769.266.048	\$ 14.963.892
2022	Rp 289.807.740.816	Rp 231.846.192.653	\$ 16.460.282
2023	Rp 333.278.901.938	Rp 266.623.121.551	\$ 18.929.324
2024	Rp 399.934.682.326	Rp 319.947.745.861	\$ 22.715.188
<b>Subsidy for 2020-2024</b>	<b>Rp 1.525.993.437.240</b>	<b>Rp 1.220.794.749.792</b>	<b>\$ 86.672.224</b>

\*For subsidy simulations tables see Annex #9

\*\*Exchange rate: IDR 14,085 = 1 USD

Consultants provide subsidy simulation spreadsheet (Annex #9) to be used to estimate budget requirements for different scenarios in case the government will decide to change the current design of the program. The estimates of budget finance required for AOTP are based on the current 4% portfolio base rate for all provinces, 6 million insured sum per hectare of rice and 80% of subsidy rate.

According to the estimates after September 2019 meetings, with no insurance volumes growth in 2020 year, the Indonesian government will need to allocate approximately 13.6 million USD for subsidizing AOTP premium in 2020 based on 4% portfolio-based premium rate for AOTP. This is based on the assumption that approximately 1 million hectares of rice will be insured in 2020 under AOTP program. For the years 2021-2024 our assumptions are based on insured area increase at 10% per each year 2021-2022, with the expected 15% growth in 2023, and 20% growth in 2024. The budget requirements to subsidize AOTP premiums in 2024 constitute circa 22.7 million USD. This funding should be sufficient to insure premium to insure about 2.5 million hectares of rice. In case of changes to the cover parameters (premium rate, subsidy rate, sum insured per hectare) the subsidy requirements must be recalculated. Total AOTP premium budget for 2020-2024 is estimated indicatively at the total of 86.7 million USD.

**Notably, our major recommendation for AOTP program would be to either introduce differentiated rates per risk zone or to increase portfolio-based rate to at least 4.00% based on the program performance during 2015-2018. If any of these recommendations accepted, the subsidy funding requirements will need to be re-estimated. Recalculation of subsidy requirement can be done with the help of the subsidy simulation spreadsheet tool developed by Agroinsurance team.**

**Additional recommendations: Assure allocation of government funds for premium support for the next 5 calendar years. It is recommended to keep the subsidy rate stable at 80%. AOTP program is still new for Indonesia and high level of government support is required to achieve the targeted program results as discussed in the report. The subsidy rate can be reconsidered after 2024. The future level of subsidy of (tentatively) 60% may be sufficient to achieve two objectives: (1) reduce the demand for government funds to finance premium support, and (2) AOTP program to remain attractive to paddy producers. It is important to avoid ad hoc payouts for paddy losses because such actions may undermine AOTP program and send wrong signals to farmers. Although in some years with severe crop losses some ad hoc payments may still be required. It is recommended to differentiate payments to farmers insured and not insured. The farmers having AOTP policy must receive more benefits from the government to incentivise further insurance uptake. The non-insured farmers receiving lower ad hoc payments should also get a strong message that they have to insure their crop in the future to be eligible for higher level of support from the government.**

### AYI Subsidy support considerations

AgrolInsurance team did not get the requested granularity (district / sub-district) for the yield data from the Indonesian counterparts which makes program design, rate calculation and subsidy estimates highly conditional at time of current report elaboration. This task is to be further addressed when the data is made available for analysis and assessment of its applicability. Further discussions with Indonesian counterparts are required to elaborate more specific figures on subsidy support

Following the July 2019 visit to Indonesia, it has been decided to provide very rough estimates of the budgetary requirements for subsidizing AYI insurance premiums during 2020-2024. These estimates are based on some assumptions which will need to be supported by the data and additional analytical information.

The following assumptions have been used to estimate budgetary requirements to support AYI premium subsidy:

- **AgrolInsurance team suggests piloting AYI program in West Java.** This is the riskier province in Java with the 1.65% of the rice area lost during the period of 2003-2017 (BPS data). This is higher than for Indonesia in general (1.06%) and higher than the same ratio for Central and East Java (1% and 0.6% respectively). According to AOTP program results West Java has the historical loss ratio of 73% which is higher than for other Java provinces (27%). However, West Java's results are close to the current AOTP program performance loss ratio (73% vs program 67%). We would expect AYI program to make payouts to farmers sooner than in other Java provinces which should have positive effect on the new program acceptance with farmers;
- The basis risk in West Java is assumed to be lower than in other Java provinces. We assume a higher probability of payouts under the AYI pilot program in West Java. This should positively result in program acceptance with farmers;
- We would assume premium rate of 3.10% to be reasonable for piloting AYI program in West Java province. This is based on the area lost ratio of 1.65% and target loss ratio of 70% and 30% loading for yield volatility and data ambiguity. Usually the target loss ratio for index programs is higher than for indemnity ones due to lower administration and loss assessment costs;
- The simulation is based on an assumption of growing AYI insurance volume growth is 5% per year based on 2 million ha of planted area (BPS data for 2016-2018). We also used 80% coverage level to the multi-year average rice yield of 5,942 t/ha. The insurance value per ton of rice of 2.4 million per ton was used to calculate the sum insured per hectare and to be used to payouts;
- Participation rate is assumed to be 10% of the planted area per year. This is based on the information available from the countries piloting index programs. Usually the start of the program is slow with circa 10% of the area insured. Later about 5% to 10% growth rate is experienced with the critical participation level of 50% achieved. However, should the program be imposed as an obligatory participation requirement for all beneficiaries of other governmental programs, portfolio risk exposure and proper CAT loading should be considered, additional simulations will be required to finalize product rating exercise.

**Table 16. AYI premium rate simulation model for West Java**

Province West Java			
<b>S</b>	Area planted per year	2.052.798	BPS 2016-2018 data
<b>Y</b>	Average yield (t/ha)	5,942	BPS 2016-2018 data
<b>C</b>	Coverage level	80%	Assumed based on data available
<b>IY</b>	Insured yield (t/ha)	4,753	
<b>IV</b>	Insured value (IDR/t)	Rp 2.400.000,00	
	Participation year 2020	10%	
<b>R</b>	Assumed premium rate	3,10%	based on Loss Cost for West Java of 1.65% and 70% target loss ratio plus 30% loading

Based on our assumptions and simulation model for West Java province only, consultants would expect 5.15 million USD required for subsidizing AYI pilot in 2020. By 2024, applying the suggested growth below, the subsidy required would be

approx. 18.04 million USD based on the product cover parameters<sup>40</sup>. Total budget for 2020-2024 is indicatively estimated at total of 54.11 million USD. When better data is available AYI rates can be updated, the recalculation of premium support is required.<sup>41</sup>

**Table 17. AYI penetration for the period 2020-2024**

Year	AYI Penetration (%)	AYI Penetration, ha
2020	10%	205.280
2021	15%	307.920
2022	20%	410.560
2023	25%	513.199
2024	35%	718.479

**Table 18. Assumptions for AYI subsidy requirements simulation**

Year	Total premium	Subsidy (100% rate), IDR	Subsidy in USD
2020	Rp 72.598.851.494	Rp 72.598.851.494	\$ 5.154.269
2021	Rp 108.898.277.242	Rp 108.898.277.242	\$ 7.731.403
2022	Rp 145.197.702.989	Rp 145.197.702.989	\$ 10.308.537
2023	Rp 181.497.128.736	Rp 181.497.128.736	\$ 12.885.671
2024	Rp 254.095.980.231	Rp 254.095.980.231	\$ 18.039.940
<b>Subsidy for 2020-2024</b>	<b>Rp 762.287.940.692</b>	<b>Rp 762.287.940.692</b>	<b>\$ 54.119.820</b>

**Recommendation:** Similar to AOTP, the government must budget sufficient amount of funds for supporting premiums under AYI program. This task may be easier for AYI as this program is recommended to be piloted in West Java only for the first years with possible expansion to other provinces to be agreed later, based on program results. The estimates of funds required are provided in Section 3.4.1. The estimates are provided based on assumption of 100% subsidy rate applied.

#### Considerations on other investments needs

AgroInsurance team did not get the requested figures on actual annual investments into AOTP infrastructure and remuneration for the PPL and POPT field staff, MoA authorizing administrators at all levels (as required by current AOTP Premium Aid Guideline). Consultants have neither received and specific figures on ad hoc support for the last years to benchmark the potential disaster response costs with possible investments at time of compilation of this report.

Considering the limited financial data available to consultants, it is currently suggested to consider the suggested premium distribution model agreed with Jasindo. Specifically, part of operational and administrative costs could be covered from the respectful lines of the premium portion dedicated to these specific activities. Alongside, it is advised to pursue conduction of an assessment (during the following phases of the project) on the additional costs incurred by the central and provincial governments to support the AOTP activities, as well as define better the ad hoc disaster sums for the last 5 years, that were distributed by central and local governments to the farmers, specifically distributed to sustain farmers' rice production practice.

It would be beneficial for the MoA and MoF to assess actual costs of the central and provincial governments to understand better the actual investments and plan costs for future periods. Cost-benefit analysis would be required upon collection of data for earlier period (2017 performance is recommended). The recommended timeline for analysis of the AOTP performance and actual costs incurred by the MoA and local governments before and after the adjustment of the rating structure and switching to fully paperless administration and loss adjustment via SIAP.

<sup>40</sup> The assumptions provided for West Java only. If other provinces added for AYI piloting, subsidy requirements need to be recalculated based on the new data.

<sup>41</sup> Suggested estimations are based on the discussed figures during September 12-20, 2019 meetings in Jakarta. Current figures are provided as indicative values for premium subsidy planning. The figures can be recalculated by changing the penetration rate (%) value in tables of Annex 9.

Table 19. Simulated distribution of premium portions<sup>42</sup>

		2020	2021	2022	2023	2024	Total 2020-2024
I	<b>RISK PREMIUM</b>	\$ 13,810,641.80	\$ 16,634,901.17	\$ 19,561,187.08	\$ 23,216,962.73	\$ 29,664,349.26	\$ 102,888,042.04
A	<b>Target Loss Ratio</b>	AUTP = 60%; AYI = 70%					
II	<b>LOADING FOR COSTS &amp; MARGIN</b>						
B	<b>Operational Expenses</b>	\$ 3,194,947.02	\$ 3,772,155.15	\$ 4,374,869.92	\$ 5,159,957.12	\$ 6,514,090.32	\$ 23,016,019.53
	Acquisition Expenses	\$ 2,862,566.65	\$ 3,375,611.13	\$ 3,911,611.58	\$ 4,611,747.23	\$ 5,817,581.44	\$ 20,579,118.03
	Socialization Expenses	\$ 221,586.92	\$ 264,362.68	\$ 308,838.89	\$ 365,473.26	\$ 464,339.25	\$ 1,624,601.00
	Publication Expenses	\$ 110,793.46	\$ 132,181.34	\$ 154,419.44	\$ 182,736.63	\$ 232,169.63	\$ 812,300.50
C	<b>General (Administration)</b>	\$ 2,087,012.45	\$ 2,450,341.75	\$ 2,830,675.47	\$ 3,332,590.82	\$ 4,192,394.05	\$ 14,893,014.53
	Policy Administration	\$ 144,031.50	\$ 171,835.74	\$ 200,745.28	\$ 237,557.62	\$ 301,820.52	\$ 1,055,990.65
	Officers (direct)	\$ 638,989.40	\$ 754,431.03	\$ 874,973.98	\$ 1,031,991.42	\$ 1,302,818.06	\$ 4,603,203.91
	Management expenses	\$ 783,262.29	\$ 902,822.67	\$ 1,029,184.82	\$ 1,204,179.61	\$ 1,496,558.22	\$ 5,416,007.62
	IT facilities	\$ 443,173.83	\$ 528,725.36	\$ 617,677.78	\$ 730,946.52	\$ 928,678.51	\$ 3,249,202.00
	Research and Development	\$ 77,555.42	\$ 92,526.94	\$ 108,093.61	\$ 127,915.64	\$ 162,518.74	\$ 568,610.35
D	<b>Loss Adjuster Expense</b>	\$ 850,221.15	\$ 935,243.27	\$ 1,028,767.59	\$ 1,183,082.73	\$ 1,419,699.28	\$ 5,417,014.03
E	<b>Reinsurance</b>	\$ 1,107,934.58	\$ 1,321,813.41	\$ 1,544,194.45	\$ 1,827,366.30	\$ 2,321,696.27	\$ 8,123,005.01
F	<b>Profit Margin</b>	\$ 1,107,934.58	\$ 1,321,813.41	\$ 1,544,194.45	\$ 1,827,366.30	\$ 2,321,696.27	\$ 8,123,005.01
	<b>Total</b>	\$ 22,158,691.58	\$ 26,436,268.15	\$ 30,883,888.95	\$ 36,547,326.00	\$ 46,433,925.46	\$ 162,460,100.14

**Recommendation:** Define and apply clear personnel remuneration strategy for PPL and POPT staff involved in future AUTP and AYI programs. The interim source of finance required to cover the dedicated personnel costs could be defined within a portion of AUTP/AYI programs' premium sums, received by Jasindo. Conduct a cost-benefit analysis at least one year after modification of AUTP premium rate and introduction of paperless administration and loss adjustment via SIAP.

### 3.4.2. Recommendations for Guidelines and Underwriting

Guidelines for operations and administration of both programs in consideration create agricultural insurance program's implementation framework. Such technical documents specify on exactly who does what, at what time, in what sequence, and what data is reported, or what authorization is required within what deadlines.

Any specialist involved in program operations or administration should have a clear understanding of what exactly is expected from this specialist, and what is the responsibility for reported data accuracy.

So, the guidelines must include:

- technical specifications of the program;
- methodologies on program-related processes;
- sequence of activities, reporting, authorization and subordination.

ToR requires the consultants to provide draft technical guidelines for both AUTP and intended AYI programs. AgroInsurance team has reviewed the documents received from Jasindo, MoA and BPS.

Paragraphs below provide more details and consultants' considerations with recommended further steps and necessary activities on specific guidelines and methods.

#### Premium Aid Guideline for AUTP (2019)

Based on experts' considerations, existing AUTP guidelines cannot be modified, but rather require a significant review and production of a new set of guidelines and methodologies that are required for any sustainable agricultural insurance program.

A detailed review of the document conducted by several experts showed that current guideline formulates the structure for program's operation and administration. However, current guideline does not put any requirements for responsibility attributed to any personnel mentioned in the document. Notable, that many of the current personnel involved are making everyday decisions on a program annually worth USD 20 mln to Indonesian government.

<sup>42</sup> Figures in the table are based on the simulations conducted in Annex 9 and should be used as indicative values for policy decisions, but not for actual financial planning needs. Any changes in the Annex 9 parameters will affect the values in this table, based on the simulation formulae. Bappenas and MoA are recommended to adjust the parameters to their latest objectives and commitments.

Current AOTP guideline lacks specific technical methods for loss estimation, way and manner of calculation of plants at time of loss assessment, etc. Its current version will have to be reviewed to implement the suggested changes to AOTP program. This also provides an opportunity to make the general review of program's guidelines in the nearest future, based on decisions for introduction of modifications suggested by October 2020, as provided in Section 2.3.4.

To facilitate the review by Indonesian counterparts, AgroInsurance team compiled a set of recommendations with suggested stages: (i) Immediate changes, (ii) Changes until October 2020, and (iii) Strategic changes required based on further decisions on program's strategic objectives. See details in Annex #8.

For the ease of reviewing parties, AgroInsurance team includes the English version of this document with specific comments and suggestions on initial changes in wording for certain parts of the guidelines. Our team believes it will help the key local stakeholders to understand the complexity of a properly designed AOTP guideline and guide them in further modifications required in the nearest future.

### **Jasindo claim manual**

The document shared with AgroInsurance team (translated into English) revealed that specific AOTP-attributed processes and procedures are more simplified than procedures provided for other Jasindo's programs (non-subsidized). Modification of Jasindo's internal operational guidelines is not within the scope of current assignment. The parts attributed to AOTP are loose and too basic for any specific modification to be suggested at the moment. Current AOTP-related guidelines cannot be used for training regional staff and establishing quality control verification procedures.

A totally new set of procedures and guidelines for AOTP program is required. The new guidelines could further be used to train and further guide Jasindo's dedicated personnel in the future. Development of the set of guidelines and methods requires more time for research, validation of methods, undergo field tests and validation. All the required cannot be performed as a part of current assignment, as requires significantly larger timeframes and resources. According to consultants' practical experience this exercise will require approx. 4-6 months of time for elaboration of a proper set of documentation required.

Same package of new guidelines and methodologies will be required for future AYI program.

### **Yield data gathering methodology**

Our team has reviewed parts of BPS yield data collection guideline specifically related to parts for assessment of rice. Guidelines' sections recommended to our team did not contain specific numeric methodology on proper plant count or yield estimation method, that could be usable for insurance purpose at the moment. This has been addressed by suggesting the alternative Data Gathering Methodology (See Annex #1).

### **Underwriting**

It is advisable that Jasindo applies the same underwriting procedures for both government-supported and commercial programs. The underwriting process must capture key risk factors which may be either used for current season underwriting or for program enhancement in the future. This includes production practice used by the specific farmer, source of seeds, type of irrigation, pest and disease management plant, harvesting method, etc. We would expect some specific underwriting adjustments to be applied to certain provinces (based on historical performance) and seasons (micro-climate differences). The adjustment factors can be based on the available weather and production data. It is advisable for Jasindo to gather such information for further use for underwriting purposes.

The key improvements required: (a) more stringent risk acceptance criteria and better risk profile data capturing by the insurer; (b) elimination of unnecessary paper work and simplification of AOTP reporting via e-authorization in SIAP; (c) enhancement of loss assessment procedures to capture all important features of each claim in electronic format via smartphones/tablets; (d) develop methods on proper identification of crop damage, yield loss estimation and required reporting; (e) seasonal reporting principles for insurance and agricultural policy analysis purposes.

Additionally, program underwriting should consider to:

- Differentiate rates per growing season. Specify production seasons (wet, dry, intermediary) and set strict deadlines for each season end (duration);
- Capture production technology used by the farmer or farming group;
- Assign designated personnel with permanent responsibilities for state-subsidized programs administration and service (central and regional levels);
- Apply remote sensing for underwriting and portfolio management;
- Advanced underwriting skills training is required to address decision on future AOTP modifications;
- Introduce risk accumulation controls within Jasindo and accumulation management procedures.

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### 3.4.3. Recommendations for Capacity needs

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Capacity is a collective term that includes (not limited to): agricultural insurance competences and practical skills (underwriting, loss adjustment), management and operation, duties and responsibilities (program administration and supervision).

To establish the required capacity for sustainable national agricultural insurance programs takes years. Extensive timeline is always among the considerations for any agricultural insurance scheme. Capacity issue is among the key reasons for starting the program in pilot areas for testing the product and understand better the operational (specialists in the provinces), managerial (insurer's operation) and administrative roles (functions between the ministries and directorates).

Capacity building is a complex task that is fully determined by the level of dedication to the program. Our team's observation shows that there is no dedicated personnel to AOTP at all levels of operation and administration (Jasindo, MoA). Dedication, in its turn, is much dependent on the regulatory environment for state-supported agricultural insurance program(s).

Agriculture insurance dedicated personnel at all levels should attain proper theoretical knowledge and establish competences through workshops, trainings and daily practice on skills required. In most cases "learning by doing" approach provides the fastest result with an acceptable quality at the start. However, to benefit from such an approach, establishment of proper mentorship and quality assurance procedures is required. This approach will ensure proper quality of exact capacity required.

Indonesian experience with AOTP program has provided a good opportunity for specialists in various organizations to understand the technical and operational details attributed to agricultural insurance processes. It is notable that after almost 5 years of program operation on the market, there are only few specialists on the market who are can continuously discuss and understand technical aspects related to AOTP program. This requires a change.

Suggestions provided in the Annex #7 on the capacity needs for different organizations in Indonesia should be considered. Due to a variety of levels within various agencies currently involved in AOTP program, our team provides tentative recommendations and the expected list of trainings per each agency involved.

The general summary of recommended:

- Assign responsible personnel at all levels;
- Adjust duties and responsibilities;
- Establish transparent remuneration for duties on agricultural insurance program(s);
- Request timely reporting and transparent subordination;
- Train on theoretical and practical skills for data collection and loss calculation methods applied in AOTP (and future AYI).



Capacity investments require time and significant financial resources. Proper regulation ensuring a long-term status for agricultural insurance premium subsidy will form a solid basis to support the coherent financing for capacity building activities.

#### 3.4.4. Recommendations for regulatory changes and PPP

Recommendations provided in this report include a number of items that require attention. Some items may require to be created anew; some may require various level of modifications to meet the future goals and objectives of Indonesian government for farmers' insurance protection.

##### **Agricultural insurance programs' management and administration**

Defined goals and purposes of the program need to be reflected in proper legislation, regulatory acts and guidelines. Current AOTP program is implemented by Jasindo based on the letter of the MoA and AOTP Premium Aid Guideline. Existing AOTP guidelines set the basis for administrative and reporting framework, while the operational methods are vague. Those require review and elaboration of new set of technical documentation for the program (See Section 3.4.2). Modification of existing guidelines and elaboration of methodologies for program operation is recommended.

Proper modification in legal framework may be required in case more insurers would be required to join the program in the future. Consultants provide examples of the Agricultural Insurance Law (Turkey, Annex #12) and operation procedures (Turkey, Annex #13) for future reference of a well-operating PPP model. Government of Indonesia will face future need of creating the center of agricultural insurance competence that would require proper legal and regulatory framework. Further discussions and research would be required to define the proper legal and regulatory frameworks adjustments.

**Recommendation: Consider an adoption of a law/by-law in the future, that would regulate existence and operation of all agricultural insurance programs with state support. Modify existing AOTP guidelines (see Annex #6) and elaborate a new set of guidelines for AYI. Elaborate a new set of methods for underwriting, remote sensing application, loss adjustment and other manuals to ensure smooth programs operation for the next 3-5 years.**

##### **Premium subsidy status**

Current status of agricultural insurance is the "insurance premium aid". It is financed from the budget of the MoA. Current setup puts substantial limitations on future program development and planning. It has also been a consideration of the MoF representative expressed at the workshop in Jakarta (July 2019) that program requires a status change to properly account it within the framework of the overall state budget for agricultural support.

Potential change of the status from an "aid" to the "subsidy" will enhance the performance of future agricultural insurance programs due to better planned resources and their specific responsibilities on each program.

**Recommendation: Consider adoption of a law/by-law regulating the "subsidy status, providing assignments and ensuring the overall existence of agricultural insurance programs with state support for the next 3-5 years.**

##### **PPP (Public Private Partnership)**

A significant number of suggestions provided in Part III of this report require an integrated approach. Most of the items reviewed require either significant modifications or creation of new set of guidelines and methods from scratch. The following development approach should include the mid- and long-term strategy of the government towards the farmers protection.

It is notable, within the government of Indonesia there were comments and suggestions to consider inclusion of more than one insurer into realization of the future premium subsidy programs. This is possible in the future, but not recommended within current AOTP structural setup, which is due to its current immaturity.

There are two key steps suggested for development. This approach should be discussed and agreed between the different ministries and respective directorates within the government of Indonesia:

**Step 1** – Continue development of AOTP and AYI programs on the basis of infrastructure of Jasindo and the MoA;

**Step 2** – Establish a dedicated agency managing all agricultural insurance programs on behalf of the Government of Indonesia.

The Step 1 may be independent from Step 2. It is recommended to decide on a clear strategy before implementing significant capacity and infrastructural changes. Should the PPP development be the decision of the Government, the newly created agency should become a center of competence for all agricultural insurance issues in the country. It will also require specific regulation and proper legislation assuring its level of authority, status within the governmental structure, subordination and line of reporting. AgroInsurance team provides an example of an effective legislation and operation setup for program-managing agency applied in Turkey, that regulates their current agricultural insurance subsidy program and operation of the PPP scheme currently worth approx. USD 500 mln of annual premium income (Annexes #12 and #13).

Creation of the PPP scheme will allow within some time to address major infrastructural and capacity issues and enable solid grounds for sustainable development of agricultural insurance programs and overall farmers protection in Indonesia

**Recommendation: Conduct separate discussions on the issue, decide on the tentative timeline and workplan for the development strategy agreed. PPP approach is recommended. Consider adoption of a law/by-law regulating PPP scheme operation, subsidy assignments and overall existence of agricultural insurance programs with state support.**



## ANNEXES

### ANNEX #1: Data Gathering Methodology (for Use in Indonesia Agriculture Insurance Programs)

#### Summary

This paper outlines a methodology to gather data to support the agriculture insurance designs that could improve the existing AOTP insurance in Indonesia and form the basis of an area-yield program design in future. While this methodology is formulated as a "research exercise" to gather data to assess a number of design and operational parameters it should be viewed as an ongoing sampling process embedded into a functioning agriculture insurance program for success.

#### Background

The Indonesia government currently operates a multi-peril insurance program for rice paddy production – AOTP. Indonesia, with funding from the Japan International Development Agency (JICA) wants to increase participation by farmers in agriculture insurance to enhance farmer resilience to impacts of climate change and promote Indonesian self-reliance in food production.

Agroinsurance International, consultants to the project, was provided an extensive set of documents and data to serve as background and primary source information for review. The consultants appreciate the obvious effort expended by their Indonesian counterparts to provide information/data and respond to inquiry in a forthright manner.

The information review indicates that the data provided serves as a good general indication of rice paddy production in Indonesia but is not of high value to specifically support the design of an agriculture insurance program. Nonetheless, the consultant believes there are ways to gather appropriate data to support multiple agriculture insurance designs and be valuable for broader societal policy development.

#### Purpose

The purpose of this document is to lay the groundwork for a method to gather rice production data with a specific focus to support agriculture insurance designs. Some methodology details are outside the scope of the current project, but definition could be included in a subsequent project.

In many countries where agriculture insurance is new or under consideration various data is available. However, it is not uncommon for these data sets, gathered for non-agriculture insurance purposes, to be of little value when supporting an insurance design. On the other hand, data that is gathered with a focus on agriculture insurance can often be used for other societal initiatives (e.g. policy development, risk management, etc.). As such, the method proposed in this paper to gather data envisages several practical outcomes; namely, to :

1. Develop a data set that could support the continued improvement of the current AOTP program.
2. Develop a data set that could support introduction of an area-yield program design.
3. Develop mechanisms to ensure in-field operational efficiency of data gathering.
4. Develop strategies to ensure consistency in data gathering and the creation of a national data base that can support agriculture insurance designs and broader applications.
5. Test the value of new technologies to improve operational efficiency and data management (i.e. gathering, quality control, securitization and data use/query access)
6. Develop a capacity to offer options to farmers to improve participation through valued insurance designs.
7. Provide mechanisms to educate farmers and through engagement and input develop their trust in the agriculture insurance system and enhance food securitization via improved rice production in the field.

## Data Required to Support Product Design

### a) AOTP Design

The current AOTP design provides farmers with insurance claim payments based on a pre-defined value of input costs (6,000,000 mrps/hectare) when a significant number of plants are damaged within a rice paddy (75% plants damaged on 75% of planted area) due to specified natural perils (drought, flood and limited pests/diseases).

Data to support this type of agriculture insurance design would include historical indications of number of plants damaged in rice paddies gathered throughout Indonesia using consistent measurements at selected sample sites. If rice yield data was collected in a similar fashion and links established between plant damage and yield shortfall the AOTP insurance design could be altered to provide claim payments to farmers that reflect yield shortfall directly rather than a pre-defined value of inputs.

With these types of data, an agriculture insurance design could be based on deviations from a "normal expected amount of plant damage". For example, let's say in a certain area of Indonesia the normal expected amount of plant damage in a rice paddy is 15% (based on an average of annual historical plant damage gathered consistently overtime). With a good historical data set, variations in plant shortfall (and subsequent expected insurance losses) below the "15% normal" could be determined. An insurance design could offer farmers different levels of plant damage to insure against – for example, below 30% of normal, below 40% of normal, etc. - each layer of insurance coverage with a specific premium rate based on the likelihood (frequency and extent) of yield shortfall estimated by plant damage. Governments can subsidize premium rates at different levels and if desired a catastrophic fully subsidized coverage level could also be offered to increase participation and subvert the need for ad hoc intervention. Subsidy costs to government can be calculated for any coverage level with assumptions for farmer participation.

### b) AYI (Area Yield Index) Design

Area yield designs are identical to individual field/farm insurance designs in the type of data required. The difference is simply "the focus area" of the insurance. In both instances, designs require an indication of "normal yield for the area insured" and a measurement of the current insured years' production. The current years yield is compared to a percentage of "normal" – (e.g. 60%, 70% 80%) to determine if a production shortfall warrants an insurance claim. As with the AOTP design, historical losses and subsequent premium rates can be calculated for each coverage level offered to farmers at the area focus. Governments can subsidize premium rates at different levels and a catastrophic fully subsidized coverage level could be offered. Subsidy costs can be calculated for any coverage level with assumptions for farmer participation.

The difference between these two designs is simply that in the AOTP approach plant damage is being used as a proxy for yield. An estimate of area-yield could be used to establish coverage, but premium would be based on the frequency and extent of plant damages below a reference "expected normal". Whereas in an area-average approach an actual yield is determined through samples taken in the field and harvested as the basis for setting coverage, premium and claim settlement.

## Gathering Useful Data – Elements for Success

A suggested method to gather valuable data for rice production insurance in Indonesia rice contains the following elements:

- Sub-divide Indonesian provinces by distinct "homogeneous" rice producing areas
  - » In many countries offering agriculture insurance areas are defined by political boundaries. While these may be easier to define and readily available, average yields and/or plant damage across "homogeneous risk areas" will more accurately reflect impacts at a farm/field level throughout the area.
- Identify rice production land in each area
  - » Area yield data has to reflect crops grown in the area not simply fields "insured" in the area especially when insurance participation is low. In Canada, provinces such as Alberta offer an area yield "proxy" design for some minor crops based on the average yields of predominant crops insured fields/farms in an area. This can work

since Alberta insures roughly 75% of the entire crop land in the province which makes an “average” estimate of individual farms indicative of area results.

- Select sampling locations throughout each homogeneous area in sufficient numbers to provide statistical accuracy within financial capacity of Indonesia
  - » A random selection of fields/farms in an area is the appropriate technique to gather valuable data to construct an area average yield. India has developed a good methodology to select Crop Cutting Experiments (CCE's) locations. A secondary consideration is to make sure that all parts of an area are represented in the sampling.
  - » Specific management characteristics important to design should be reflected in the sampling process. For example, if there are known management techniques that impact yield (e.g. seed bed preparation, hybrid seed, irrigation practice, pest control, etc.) field sampling should be structured to identify paddies using these management practices so that yields can be monitored and management impacts documented for future design options.
- Develop sampling manual and train dedicated personnel conducting in-field sampling
  - » Consistent methodology and dedicated personnel to gather field samples is paramount to success. In India, each State is responsible for conducting CCE's as the basis of area yields. However, the CCE's are gathered to assess crop inventory is not primarily focused on agriculture insurance. Consequently, timing of CCE completion and yield data extraction is late relative to insurance settlements and data management lacks quality control by insurance practitioners. Farmers can wait up to two seasons to receive insurance compensation and often disagree with CCE results for insurance payments. It is recommended for Indonesia to develop a sampling method for insurance purposes specifically.
  - » Provide consistent, adequate and, when appropriate, calibrated sampling equipment for in-field personnel with training to maintain equipment as well as timely access to replacement equipment if needed.
- Develop and test technology for field samplers to enter data collected directly to a national agriculture insurance data base controlled/managed by insurance administration
  - » India conducts many thousands of CCE's each year to assess crop productivity. This effort requires extensive human resources. Since each State is responsible for their own CCE process, data gathered across States is not consistent. Agriculture insurance administration is not in control of this process and receives area-yield data when the process is complete. They cannot identify issues as they arise and have no real influence on suggested changes to the process.
  - » In Canada, field assessors use computers in-field with electronic forms to aid data entry. Loss assessors enter raw data in designated fields and mathematical calculations are completed to automatically fill other required data fields to maintain quality assurance. Data is uploaded daily to a central data base for claim payment, to query data results collectively in real-time to address concerns and to verify data for entry into the central data base for future use.
- Include farmers in the in-field sampling process as part of an education focus to garner interest and trust in the agriculture insurance process. If farmers participate in gathering data and understand that it is being done properly, they will have more faith in outcomes. Also, after the data gathering process is complete report results to the farmers to get their feedback and to instill transparency in the process.
  - » Indonesia sees value in agriculture insurance design that encourages farmers to use better technology to improve productivity, reduce risk and improve their financial viability. Showing farmers the results of improved yield and reduced risk for specific management practices demonstrates a broader value in the data gathered from the agriculture insurance process.
  - » Offering insurance design options to farmers (in future) based on data gathering results is a way to show how the data gathering exercise is achieving demonstrable results. For example, if using hybrid seed shows an increase in yields of 10% over non-hybrid seed then farmers who use hybrid seed could be offered a threshold

area-yield that is 10% higher than a non-hybrid seed threshold area-yield. As farmers see benefits, they are more apt to adopt changes to improve their productivity and incomes - a desired goal in Indonesia.

- » In Canada, while insurance is offered on individual farms, area yield results are compiled from the data base and reports offered free of charge to farmers. The reports compare the farmers personal results to an average of other farmers in the area using different management techniques. This offers each farmer a way to compare actual in-field results of different management practices to make future management decisions. Similarly, many provincial insurance agencies in Canada hold annual or semi-annual input advisory sessions with farmers to solicit direct feedback to design and operations. Input is analyzed using the central data base and, when warranted, changes are actually made to the program design. Those changes are made known to farmers to show that their input has been used in decision making. This exercise builds trust in the process and value in the insurance program for farmers.

### Coding Data for Central Data Base

A central data base is a crucial element in the ongoing success of an agriculture insurance program and can't be over-emphasized. Considerable time and effort can be expended to collect and compile data that, while meaningful to agriculture in general, is of no value to agriculture insurance. Similarly, if data is gathered without consistency or with a focus on quality control even if it is "appropriate type of data for agriculture insurance" is will not be useable. The definition and structure of a central data base is beyond the scope of this project but the use of digitized codes rather than "written" (name values) within a data set is important with a key to reference the code to a specific known value. A central data base code structure with defined data management processes and expected uses clearly outlined should be a component in a data gathering methodology. For example, in-field sampling should include numerical coding of sampling sites by location and management practice by:

- » Province, district, sub-district, village, farm group, farmer and land parcel
- » Management – seed -bed preparation, hybrid seed use, irrigation practice, pest control, etc.
- » Perils – flood, drought, type of pest and disease

### Data Gathering Methodology (Suggested)

An appropriate number of sample locations to estimate rice paddy production in Indonesia will be based on the size of each "homogeneous risk area" and is outside the scope of this project. However, for each field selected for sampling 5 -6 samples per hectare (randomly selected and dispersed throughout the field in an approximate X-pattern - no sample should be within 10 m of the edge of the paddy) should be adequate to estimate a yield for the field. In India each crop cutting experiment is roughly 5 m X 5 m. For practical purposes a 1m X 1m sampling plot (or area containing at least 100 rice plants) should be adequate for Indonesia rice production.

At each sampling area within a field the following technique could be employed to garner a broad range of data outputs.

- Plant damage (with farmer participating) – count out 100 plants and identify and mark (e.g. with coloured elastic band or coloured stick marker beside plant) each as:
  - » I) no damage; ii) up to 25% damaged; lii) 26% to 50% damaged; Iv) 51% to 75% damaged or V) over 75% is 100% damaged
  - » Identify the cause(s) of plant damage (regardless of whether it is currently an insurable peril)
  - » Enter the plant damage results in the appropriate fields in electronic form or other data sheets – consistent to all in-field samplers
  - » **Note:** A single plant damage value should be determined for each sample site and an assessment of damage will be subjective to some extent. Presumably, personnel training with Indonesian agriculture specialists can narrow damage estimates into the categories suggested. If so, a value of plant damage for each site could be calculated in "full damage equivalents" following the hypothetical example in Table 1. **In this example there is 28% plant damage.**

**Table 1: Example of Full Equivalent Plant Damage (100 plants)**

Plant Damage Category	Number of Plants Damaged	Full Equivalents of Plant Damage	
i) No damage	51	(51 X 0)	0
ii) Up to 25% damage	5	(5 x 0,25)	1,25
iii) 26 to 50% damage	14	(14 x 0,50)	7
iv) 51 to 75% damage	20	20 x 0,75)	15
v) 76 to 100% damage	5	(5 x 1)	5
<b>Total Plants</b>	<b>100</b>	<b>28,25 (28%)</b>	

- Photograph the sample area with appropriate equipment (e.g. hand-held cellular phone to show plant damage and colour coded markers)
  - » A photograph will help to determine if there are any differences in the way in-field sampling personnel assess the percent of damage in a sample site. This is simply to identify/clarify training enhancements. Training and in-field issue identification needs to be practical and use input from rice experts in Indonesia as well as direct input from in-field sampling personnel. .
- With appropriate equipment (e.g. cellular phone) take a vegetative index reading for the sample area and an average height measurement of the rice plants
  - » The exact equipment used in this component of the field sampling process is beyond the scope of this project. Various vegetative indices and equipment could be reviewed (literature, experience in private firms, other agriculture insurance jurisdictions, etc.) for validity in Indonesian context with rice production. Radar satellite data, less encumbered by cloud cover than vegetative indices from light, should be explored. In addition, data from local weather stations could also be compared to in-field sampling visits (perhaps throughout the growing season rather than just at the harvest period) may be useful).<sup>1</sup>
- Cut the rice plants in the sample area and secure in appropriate container for weighing and harvest of grain; storage container should be marked to identify sample site AND not impact the quality of the sample (see Section - Coding Data for Central Data Base)
  - » In India, CCE in-field sampling includes drying and threshing crop by the sampling team which appears to add considerable time to data gathering outcomes. In Canada, in-field grass samples and/or in-field grain samples are identified in the field, stored and transported to a special facility for analysis or grading. A form of "function specialization" in the data gathering process may help to build efficiency in the in-field sampling process in Indonesia.
- Track each field from which samples are taken to get a final field level yield of rice from the farmer (rice grain and grass production) after harvest to compare with estimates of yield from the average of the in-field sampling site<sup>2</sup> .

### Expected Data Sampling Outcomes

This methodology (with many samples) should result in data that:

- First, links damaged plant counts to estimated yield. This means that pre-harvest plant counts could be used to estimate a yield of rice for the field. An accurate pre-harvest assessment of yield would be an efficient way to assess field losses either for an enhanced AOTP program that pays based on shortfalls in production rather than input cost.

<sup>1</sup> The methodology presented in this paper is primarily focused on end of crop year or just pre-harvest/harvest in-field sampling. However, periodic in field visits to sample fields may be beneficial to monitor plant development and compare (calibrate) remote sensing data (e.g. satellite, weather, drone, hand-held photographs/vegetative indices). In Alberta, Canada, in-field research demonstrates that a vegetative index linked to monthly grass samples can be used to construct a field-level production curve as a basis of insurance design.

<sup>2</sup> An estimate of harvested production would require a "known and accurate" measurement of the size of the rice paddy field harvested. An in-field GPS or satellite-based measurement of the field area harvested (and field area planted) would be valuable in the data gathering process.

- » Recall, that in India it takes many months to gather CCE data that required threshing of the crop to get a yield result. A pre-harvest technique that is accurate and consistently applied throughout Indonesia would be an efficiently way to offer a “yield shortfall” insurance design using pre-harvest plant counts.
- » Also, recall that an area-yield and an individual farm/field design is simply a distinction in area. As such, a pre-harvest plant count method (if accurate) could be used to assess individual field yields that with results garnered from an appropriate number of representative fields could form the basis of an area-yield calculation in an area yield design.
- Second, this methodology provides a direct yield outcome from each sample and a comparison to actual harvested field results gathered from the farmer. So, this methodology can be used to assess both plant count and in-field yield sampling accuracy relative to actual harvested production. If a plant count methodology proves to not be a good estimate of in-field yield, then this approach still provides a harvested yield sample outcome that can be directly compared to harvested field level yields. An average of the yield estimates taken in each field can be compared to the actual harvested yield outcomes to assess the accuracy of the sampling results. If sampling results are seen to consistently under or over-estimate actual yield harvested than an adjustment factor can be established to alter in-field sampling results to an actual harvest field result for the future.
- Third, this methodology creates a standard and consistent method for collecting data and tests technological applications to ensure quality control in all aspects of data management to create a central data base for agriculture insurance for rice in Indonesia. This quality data set would be valuable in all aspects of policy development – agriculture insurance and broader applications.
- Fourth, the methodology can be designed to assess and link to other technology (e.g. satellite imagery – radar, vegetative index, drone applications, etc.) that could improve efficiency to the data gathering (plant damage or actual yield measurement). Building various techniques into the in-field sampling process, which have to be undertaken regardless, is an effective way to research new technologies.
- Fifth, this method includes pro-active interaction with farmers to formulate a real educational experience both in terms of in-field sampling and transparency in outcomes. This is a proven technique to build trust and understanding between farmers, agriculture insurance practitioners and governments who support the program.
- Finally, results of this methodology can identify specific agriculture management techniques that can either improve rice production or reduce variability (risk) in rice production. These identifiable practices can be supported through options built into the actual design of an AOTP or area-yield insurance design. This adds value to farmers in the actual insurance design but also is a direct built-in educational tool for farmers as they see direct financial benefits for management techniques in either enhanced coverage or reduced premium.
- Two secondary outcomes can also be derived from this methodology.
  - » All perils regardless of whether they are currently insured or not will be identified in the in-field sampling exercise. As such, perils that are not currently insured but appear significant to production might be added to the insurance cover overtime (perhaps requiring increased premium).
  - » Policy suggestions that may arise from a variety of sources (e.g. farmers, private sector, academia, political sphere, etc.) can be assessed from an insurance risk perspective but also based on impacts on “potential productivity” outcomes. At times suggestions for change can be accepted while at others they should be rejected. This methodology and subsequent dataset can be used to make informed decisions regarding agriculture insurance design and operational integrity and beyond.

## ANNEX #2 : Review of India Agriculture Insurance with Particular Reference to Issues in Indonesia

### 1.0 Purpose

The purpose of this paper is to review the Agriculture Insurance scheme in India relative to provide:

- A summary of the India National Agriculture Insurance Scheme (NAIS) conducted in 2006 for the World Bank that might pertain to work underway in Indonesia by this papers team;
- A Review of the current India RADHAN MANTRI FASAL BIMA YOJANA (PMFBY) based on internet-accessible information;
- Notations of similarities between the agricultural insurance schemes in India and the current state of agriculture insurance programs in Indonesia.

### 2.0 Summary of Issues

Many issues facing India and their 2006 NAIS program are similar to those currently observed in Indonesia with AUP. India faces a number of challenges because of the vast numbers of farmers, the size of farms and infrastructure hurdles that impede effective insurance services delivery. Comparisons to agriculture insurance existing elsewhere and methods to improve the NAIS, program design should focus on :

- Reduction of the size of an area used for the NAIS area-yield design so outputs would better reflect local crop production
- Enhancement of NAIS operating structure
- Enhancement of the area-yield program to increase producer enrollment
- Review and adjustments to reflect on proper premium rating methodology

The data received by consultants for this project contained in a multitude (over 70) of Excel spreadsheets in varying formats and degrees of quality. An initial correlation among Excel data sets revealed over half the data was either suspect or could not be integrated in its current form into a suitable data format for research. After a significant effort the data was cleaned and organized to an extent that it could be useful for the project. This exercise demonstrated to the consultants that **the dataset within India used to support NAIS was of little value for an effective ongoing research and program monitoring effort.**

The process for selecting and collecting data from the CCE is good in India but it is being conducted by government (State) personnel with no ties to AICI (Agricultural Insurance Company of India). All CCE are completed before sending any data to AICI for review. Any data gathering concerns (loss adjusting) observed by the AICI network can't be corrected in the CCE process. Data coming from many different State samplers was not quality controlled or integrated into a national data set.

India wanted to decrease the size of the area used for the area-yield program design. This is largely due to pressure that area yields don't accurately reflect what happens on farms within the area. But decreasing the area size meant an increase in the number of CCE's required to provide yield data unique for the smaller areas. That impeded with the cost of increasing the number of CCE locations – additional resources and impacts on premium.

Among the key recommendations was the **utilization of remote sensing technology to estimate relative growth and production of crops.** For example, research could be conducted with satellite imagery to predict the health of crop growth during the growing season, with the predictions calibrated using the results of the "in-field" CCEs. Depending on the reliability of the satellite yield model, both the sample size and the number of samples could then be reduced to a smaller level and used solely for calibration.



NAIS Program Design was *plagued to two major impediments*:

1. Premium rates were not set to reflect actual risk and governments did not pay their share of premium up-front.
2. CCE process took a long time to complete so data to determine losses was very late relative to losses in the field.

India was recommended (i) to develop a national database and introduce actuarially-based premium rates on which to base reinsurance access for the future; (ii) consider using a longer time series for analysis (at least ten years) where data was available, with the incorporation of a yield trending mechanism to more accurately reflect the normal production for an insurance area. This was serving to reduce yearly coverage fluctuations, reduce the potential for adverse selection and avoid declines in client satisfaction and/or participation relating to inadequate coverage.

### **3.0 The Current India RADHAN MANTRI FASAL BIMA YOJANA (PMFBY)**

Several changes were made to the India NAIS program to create the current PMFBY scheme and appear to have originated from the 2006 review process, but still not specifically reflecting on the earlier recommendations given, namely :

- Threshold yield extended to 7-year average with up to two calamity years excluded from the threshold average.
  - » Consultants recommended a longer time series for a threshold yield – up to 10 years and even more (with more than 10 years a trend adjustment for technology advancements in production)
- Claims can be paid for: prevented planting, mid-season losses and post-harvest
  - » The down-side here is that the entire area (IU) has to have a loss before any individual farmer receives a payment
  - » Post-harvest claims are for crops that are “in storage” after harvested (left out to dry/cure)
- Advance claims can be made if estimated losses in an area seem likely
  - » Up to 25% of an expected claim can be paid out early to farmers in the area
- Some individual farm/field losses can be paid in certain situations
  - » Individual field/farm coverage is available for specific perils – hail, landslide, flood
  - » Post-harvest losses due to cyclone or cyclone induced rain
- Farmer premium is reduced to:
  - » 2% for all Kharif Food & Oilseeds crops,
  - » 1.5% for Rabi Food & Oilseeds crops and 5% for Annual Commercial/Horticultural Crops.
- Federal and State governments share premium beyond what the farmer pays on a 50%/50% equal basis
- Coverage (sum insured) is based on 70%, 80% and 90% of the threshold yield
- Private companies bid for agriculture insurance contract for an area – lowest premium rate gets the contract. However, AICI also offers insurance and has most of the insurance participation so not sure if they have to “compete with insurance rates ”
  - » This is not a recommendation from the 2006 World Bank report..

### **4.0 Outstanding Issues in India PMFBY Scheme**

According to issues outlined in the Report of the Comptroller and Auditor General of India it appears the operational integrity of PMFBY is suspect. There are still no “dedicated resources” to the agriculture insurance scheme. Even though there is an overall Agriculture Insurance Company (AIC) in India, effective operations are divided among several players. There does not seem to be a pro-active monitoring/internal auditing process within the structure (responsibility of AIC) to verify the integrity of the entire system.

In recent years, India has altered the agriculture insurance program quite often and substantially. If a major proportion of farmers are small and not well educated changing the program design often without improving operations and communications does nothing to improve the overall scheme. In fact, it may only confuse farmers.

AIC is a government-mandated insurance company managing the bulk of the premium subsidized agriculture insurance products in India. Other private insurance agencies (IA) are also involved. AIC applies for government share of premium for AIC AND FOR THE PRIVATE IA'S. They disburse the premium subsidy to themselves and to the IA based on application data and premium collected by farmers. However, according to the Auditor there is often little data to support verification of premium subsidy given to private IA's by AIC.

A statement in the Auditor's report suggests "they are moving toward actuarial premium rating". This also suggests India is not yet using actuarial sound rating that truly reflects risk. However, if the premium rates are not actuarially based and do not include loads for reinsurance and catastrophic loss then they won't be the correct amount to sustain the program.

While the federal government contributes their share to the program's premium on a timely basis, the State governments do not. This means that when there are losses to pay there are insufficient funds and payment is delayed. In one case, (2017) the auditor noted farmers receiving a payment **two full seasons after it was due**. This along with a protracted Crop Cutting Experiment field sampling process (co-ordinated by the States) means that payments to farmers for legitimate claims under the area-yield system are delayed, often significantly. This was a major problem under the NAIS scheme and has not been solved yet.

In addition, States often do not follow the actual required CCE process for acquiring area-yield data for their purposes. However, it still forms the basis of the claims and threshold yield history for PMFBY. This represent another source of poor data management in the current program. AIC receives the CCE data when it is available and has no way to scrutinize results of the data going into the area-yield.

An article by Observed Research Foundation (ORF)<sup>3</sup> suggests several problems with PMFBY – primarily operational, namely:

- **State Commitment** - States in India can voluntarily participate in agriculture insurance on an annual basis. They can also cap the amount of land to be insured and the sum insured for policies. Farmers may find it pointless to go through the insurance application process not knowing if they would be eligible for insurance. Some States have simply defaulted on their premium contributions and paid out direct transfers (ad hoc) and loan waivers since it was a cheaper alternative to premium subsidy.
- **Bank Operations** - Farmers, especially with loans, operate through banks who are only interested in "selling insurance to cover their loans" and don't educate farmers on all that is available. Bank employees aren't agriculture insurance specialists and often miss deadlines such that farmers are not insured. Banks are paid 4% of premium to administer agriculture insurance and likely want to do as little as possible to get that fee. **Banks can deduct premium from a farmers account without advising the farmer**. In addition, according to the Auditor, AIC releases payment of claims to IA's and to Bank's without verification that those entities actually paid the farmers.
- **Mandatory Loan Insurance** - Insurance is mandatory for a loan and few farmers without loans do insure. However, in one State where the mandatory "insurance for a loan" not condition was removed many farmers without a loan did buy insurance. One of our project recommendations was to remove the mandatory requirement to have agriculture insurance with a loan. Banks can require insurance for a loan, but it would not be mandatory.
- **Sampling Resources** - There is a lack of qualified state personnel to conduct CCE sampling in-the-field and questions of accuracy in results. There is a current lawsuit underway in which farmers claim that the CCE process was not accurately done and area-yield data is inaccurate.
- **Revenue Insurance** - The yield-based programs currently offered by India provide no "commodity price" or revenue protection so are lacking in value to farmers.
- **Communications** - According to the Auditor's report roughly 65% of farmers have no knowledge of agriculture insurance in India – likely infrastructure and communication impacts.

<sup>3</sup> <https://www.orfonline.org/research/pradhan-mantri-fasal-bima-yojana-an-assessment-of-indias-crop-insurance-scheme-51370/>

- **Area-yield Insurance Design** – The area-based approach to insurance cover, which makes insurance viable for India in the first place, was found to leave many farmers dissatisfied with the results as they were not compensated for the losses they faced.
- **Premiums** – premiums charged by private insurance firms are continually rising while acreage insured is declining. Farmers feel that private firms are making large profits at the expense of farmers and government.

## 5.0 Summary Related to Indonesia

There are several similar issues in both the India and Indonesia agriculture insurance schemes that may continue to cause problems regardless of product design:

- a. Dedicated Resources** – in both India and Indonesia there is no central agency with real control over the primary aspects of the program. In India, data from the CCE process that drives the entire area-yield program design is neither under the direct control or responsibility/authority of AIC – the government agency. In Indonesia, a variety of government departments are involved in data gathering but none is fully responsible for it with proper authority.
- b. Transparency** - There is real lack of transparency in the India program and agriculture insurance has changed many times. The yield results of the CCE process and weather-index data is not well documented and results are not trusted by farmers. At current stage in Indonesia, it is difficult for us to get a clear picture of the design of the program (plant transplant versus yield) and how past years of data have been gathered. The program is very new in Indonesia but without dedicated resources, good training and a concerted effort to ensure transparency (especially with index or area-yield product designs where discrepancies to individual farm/field results will exist) Indonesia could face the same “trust problem” in the future as is evident in India. **This is one of the key reasons Indonesia is suggested to pilot their data gathering and operational/transparency processes first before actually “piloting a product”.**
- c. Operational Timeliness** - The CCE process in India is cumbersome and results in very late payments to farmers and in many cases no payment even when there are individual field/farm losses. If there is an area-yield approach adopted in Indonesia there will have to be significant planning and testing to ensure that in-field sampling is done most efficiently and that all data is captured in a central data management system. This is something is lacking in India and it shows.

One example of potential operational efficiency in the field sampling process might be to separate distinct functions in the sampling process to gain efficiency such as:

- standardized field sampling (with manuals/training/auditing for all in-field staff) with sample identification by location;
  - central drying facility (possibly with threshing together);
  - designated State facility for threshing;
  - sample movement and tracking with data quality control throughout with automatic data entry and upload to central data bank.
- d. Administration (Operational Timeliness)** - Cumbersome administration structures and processes are confusing to farmers and likely to personnel running the programs. In India there are many partners involved in the process including banks (nodal and local branches), private insurance firms, federal and state governments, politicians with differing objectives, human resources that are not dedicated and likely not very knowledgeable in agriculture insurance. Indonesia also has a cumbersome administrative process that should be significantly streamlined with central oversight/audit/monitoring but with regional implementation (loss adjustment, CCE, etc.).
  - e. Partners with Limited Training / Understanding** (part of dedicated resources) – the more partners involved in the operational process that are removed from the actual agriculture insurance focus (i.e. using private sector firms with a secondary interest in agriculture insurance OR government personnel (federal or State) that are not fully dedicated to agriculture insurance (i.e. have other responsibilities as well) the less likely there will be fixed operational standards applied. A profit motive can be advantageous but can without central oversight and control

be detrimental to success. Many partners with different objectives and dissimilar messaging may simply cause confusion and mistrust among farmers – this is a part of the transparency issue in India.

- f. Lack of Central Data and Consistency** – India had a central data issue in 2006 and that is still the case now. This is one of the major impediments to their success. With no central data management system AIC doesn't have the responsibility/authority to oversee the CCE sampling process. They can't accurately assess "private sector bidding or premium rates" which shouldn't be happening anyway. AIC should be stating the "actuarial premium rates to be charged for the government subsidized program" that private firms should be using. Private firms could compete on administration loads and even reinsurance pricing for stated layers of reinsurance for private sector risk".

Also, with no central "quality controlled" data base the design of new program features is impeded. In addition, there is no good data to make sound agriculture policy in general (a key benefit of agriculture insurance data for society at large). When government rank value from agriculture insurance relative to budget expenditure good data for policy decision-making is taken into account in addition to participation in the agriculture insurance program.

- g. Actuarial Premium Rates** – India is "moving toward actuarial premium rates" but based on the indicators analyzed by AgrolInsurance team, they are not there yet. Given that State governments have demonstrated a real propensity to counter premium rate costs (limit sum insured or land insured, limit crops to be insured, outright cancel insurance and pay "limited" ad hoc) there must be a real reluctance to state the real cost of agriculture risk through premium. Poor data management (f) doesn't help to define the true nature of agriculture risk. Not knowing the true risk nature impedes good policy and will impact ability to acquire cost effective reinsurance or at least to negotiate effectively for reinsurance. Indonesia is currently not reflecting sound actuarial premium rating in their program and as a consequence government is likely not setting aside the proper premium in a "reinsurance fund" to backstop poor production years with excess premium earned in good production years.

**The two main concepts of risk transfer in insurance are :** (i) "pooling of risk among widespread participants and (ii) time.

Both India and Indonesia may miss the time aspect without consistent application of actuarially sound premium rates and the building of an in-house "reinsurance fund" that can be linked to private reinsurance, while being built on good quality data.

- h. Social versus "Business Focus"** – a main focus in India is "helping incomes of rural poor" so that they aren't pressured to move to urban areas where there is overcrowding. Food productivity for the country is also a major concern as it is in Indonesia. However, these "societal issues" can override the "business focus" required for a stable agriculture insurance program. Agriculture insurance can be structured to provide data/policy basis to aid societal goals but should as a priority be structured with a business approach first (note: Business focus does not necessarily mean "profit-oriented").
- i. Use of Technology** – India and Indonesia are both thinking about integrating technology into their respective agriculture insurance process. "Technology" now usually means remote sensing technology (e.g. satellite, drones) to streamline field assessment. These are good ideas but given the state of operational processes in India (and Indonesia) the notion of technological improvements should encompass any "new process relative to the existing process" that can improve program design, operational efficiency (including resource training)m and communications to ensure a consistent messaging to partners and farmers.

For example, improvements could be made in India (and Indonesia) to streamline the field sampling process for an area-yield design. The use of satellite/drones or cell phones with vegetative index capability or simply building streamlined functions into the current sampling process. All of these should be considered with a practical means of adaptation given the state of resources and understanding in country. Often concentrating on a "specific" technology especially "high--tech" technology can draw focus away from basic improvements (e.g. data management) that is needed regardless of technology use.

- j. Communications and Direct Link to Farmers** – neither India nor Indonesia appear to have farmers directly linked into policy development/planning issues surrounding the development of agriculture insurance. Farmers' education, trust, infrastructure can impact communications built to start with the main audience and expands outward with program's further penetration from there. It appears that government personnel and/or insurance practitioners in both countries are "the originators" of communications material, possibly designing their efforts with themselves as the focus. Farmers should be involved in all program elements as a means to foster their understanding and trust in the system. Adding their input into design and operations so that they can see they are having an impact (within boundaries of insurance) is one of the ways to promote farmer's participation in agricultural insurance programs in the future.
- k. Time of the Essence** – practical timing is crucial to effectiveness and perceived value of agriculture insurance. Insurance has to be available before the crop is seeded so the farmer knows what they are buying and not buying – this protects both farmer and the insurance program. Insurance proceeds (claim payments) should be available to farmers around the same time as they expect to receive payment for the crop harvested. Farmers (and banks) with loans expect to be paid to cover loans made for the crop that was lost or in shortfall NOT to help secure a loan for the next crop season. This is not the case in India and may not be in Indonesia if proper actions for necessary changes are not taken as early as possible.



## ANNEX #3 : Remote Sensing Matrix

Functionality	GEOSYS	EOS	
<b>Data types</b>	<p><b>2 Weather Models</b></p> <ul style="list-style-type: none"> <li>• ECMWF*–ERA-5 / Global / 20km</li> <li>• Météo France – AROME / France / 1km</li> </ul> <p><b>WEATHER DATA</b></p> <ul style="list-style-type: none"> <li>• (MODIS images of the entire globe, 250m resolution, daily synthesis)</li> <li>• Photosynthetic biomass activity measured with the NDVI*</li> <li>• 15 Years of daily global satellite data</li> <li>• Daily vegetation updates (NDVI)</li> <li>• Distinction between cropland pixels and natural vegetation pixels</li> <li>• 30 years of daily global weather data</li> <li>• Major available parameters: <ul style="list-style-type: none"> <li>» Precipitation</li> <li>» Snow Depth</li> <li>» Evapotranspiration</li> <li>» Temperatures</li> <li>» Soil Moisture</li> <li>» Surface Temperature</li> <li>» Wind Speed</li> <li>» Relative Humidity</li> <li>» Solar Radiation</li> </ul> </li> <li>• Semi-automated integration of historical and yearly statistics of production, area, yield at sub-country level, on the main geographies (main EU countries, USA, Brazil+ continuous integration of new geographies: Russia, Argentina, Canada)</li> <li>• Data cross-referencing and comparison to analogy year</li> </ul>	<p><b>DATA TYPES</b></p> <p>Free imagery (Sentinel 1, Sentinel 2)</p> <p>Free optical data:</p> <ul style="list-style-type: none"> <li>• Modis (resolution 250m, daily)</li> <li>• Landsat 8 (resolution 30m, ~ 16-20 days)</li> <li>• Sentinel 2 (resolution 10m, ~ 3-6 days)</li> </ul> <p><b>WEATHER DATA (HISTORICAL, FORECAST, RISK)</b></p> <ul style="list-style-type: none"> <li>• Access to archive of historical meteorological data to analyze the impact of weather conditions on the health and yield of the field Indicators: precipitation, air temperature, air humidity, wind speed</li> <li>• Daily updated meteorological data</li> <li>• A five-day weather forecast</li> <li>• Soil Moisture Monitoring (Resolution: 200m, Depth: Surface layer (0-7cm), Root zone (up to 70 cm))</li> <li>• Precipitation</li> <li>• Flood risk identification (incl. flash flood)</li> </ul>	
<b>Weather forecast</b>	<ul style="list-style-type: none"> <li>• 14 days weather forecast</li> <li>• Weather forecast models: ENS (ECMWF), 20km resolution, GFS (NOAA-NCEP**), 25km resolution</li> <li>• Automated integration of crop progress on USA, and more geographies to come</li> <li>• Evaluate the impact of any weather phenomena on the production («% of the production is impacted by this given event»)</li> </ul>	N/A	
<b>Risk identification</b>	<ul style="list-style-type: none"> <li>• Crossing several parameters (weather, vegetation) to qualify the occurrence of a risk, using thresholds</li> <li>• Alerts for forecast changes that may impact results and developing situations in the condition of the crop that need to be monitored closely</li> </ul>	N/A	



Geoville	Agritask	SARMAP
<ul style="list-style-type: none"> <li>• Sentinel-1 (radar, VH-polarization), 10m spatial resolution</li> <li>• Sentinel-2 (multispectral), 10m spatial resolution</li> </ul>	<ul style="list-style-type: none"> <li>• <b>NO own satellite data processing facility – able to import external data into own platform</b></li> <li>• Collection of Primary Customer information</li> <li>• Geographical localisation of farm</li> <li>• Geographical Risk Exposure Analysis (Climatic Conditions, Elevation, Slope, Contour lines, Land Use classification, Planting suitability, Soil class, Compliance (Natural Reserves, etc.))</li> <li>• Initial Risk assessment (Go/No- Go)</li> <li>• Integration of primary customer Information</li> </ul>	<ul style="list-style-type: none"> <li>• Key sensors - Sentinel-1 and -2</li> </ul>
<ul style="list-style-type: none"> <li>• Weather forecast is available</li> </ul>	<ul style="list-style-type: none"> <li>• Weather alerts available (details on functionality to be requested from the provider)</li> </ul>	<p>N/A</p>
<ul style="list-style-type: none"> <li>• FLOOD RISK forecast with hot spot mapping – intensiveness, duration, etc.</li> </ul>	<p>N/A</p>	<ul style="list-style-type: none"> <li>• Insect pest injury incidence</li> <li>• Incidence of diseases</li> <li>• Weed infestation</li> </ul>

Functionality	GEOSYS	EOS	
<b>Field identification</b>	<ul style="list-style-type: none"> <li>Functionality is available, but requires additional clarification from the provider</li> </ul>	<ul style="list-style-type: none"> <li>Land cover classification</li> <li>Arable/non-arable land identification</li> <li>Crop type classification</li> <li>Fields boundaries delineation</li> <li>Actual acreage estimation for each crop type</li> <li>Crop rotation historical data</li> </ul>	
<b>Crop vegetation monitoring</b>	<ul style="list-style-type: none"> <li>Monitor and analyse crops development throughout the world</li> <li>Compare current and historical performance data using NDIV, EVI and other indexes</li> <li>Access accurate and unbiased data in real-time</li> </ul>	<ul style="list-style-type: none"> <li>NDVI (assessment of the intensity of the growing season of plants)</li> <li>LAI (assessment of crop condition in yield forecasting)</li> <li>EVI (assessment of plant health in conditions of dense / rarefied vegetation cover)</li> <li>MSI (moisture stress assessment)</li> <li>GNDVI (assessment of nitrogen content in the leaves of plants)</li> <li>SAVI (soil vegetation index)</li> </ul>	
<b>Yield estimation</b>	<ul style="list-style-type: none"> <li>Readily available yield estimation models for various crops, including rice</li> </ul>	<ul style="list-style-type: none"> <li>Crop yield forecast accuracy two months before harvest - 70 %</li> <li>Crop yield forecast accuracy two weeks before harvest - 90 %</li> <li>Different levels: Country, Region, County, Municipality</li> </ul>	
<b>Loss Assessment</b>	<ul style="list-style-type: none"> <li>Available wide functionality for loss adjustment and crop data calibration with offline data / images upload functionality. Previous 2 seasons NDVI images available. Vegetation curves available for last 15 years</li> </ul>	<ul style="list-style-type: none"> <li>A classification map with damages of each crop due to disaster, for example cyclone/hurricane. The map allows to identify specific types of affected crops, not just their territorial location</li> </ul>	
<b>Comparison functionality (crop, fields, areas, etc.)</b>	<ul style="list-style-type: none"> <li>Compare the crop potential to the field history</li> <li>Assess yield variability</li> <li>Anticipate crop potential</li> <li>Observe advance or delay of the cycle</li> <li>Anticipate harvest time</li> </ul>	N/A	
<b>Reporting</b>	<ul style="list-style-type: none"> <li>Flexible and extensive reporting functionality is available, adjustable by level of authorization and access for various seats in the system</li> </ul>	<ul style="list-style-type: none"> <li>Own cloud-based application</li> <li>API</li> <li>Raster and vector maps</li> </ul>	

	Geoville	Agritask	SARMAP
	<ul style="list-style-type: none"> <li>• Location and acreage of arable land available for the production of rice in Indonesia</li> <li>• Identify areas where rice could start to be grown</li> <li>• An accurate updated map of the areas effectively used for rice production</li> <li>• Un-utilised areas: no rice produced throughout the year</li> </ul>	N/A	N/A
	<ul style="list-style-type: none"> <li>• Monitoring of crop vegetation stages</li> <li>• Identify areas where rice production could be increased from one to two or three rice crops per year</li> <li>• Areas where alternative crops could be grown between rice growing seasons</li> </ul>	<ul style="list-style-type: none"> <li>• Growth Monitoring (RGVI: Rice growth vegetation index, Using available data. Ex: Sentinel or Landsat)</li> </ul>	<ul style="list-style-type: none"> <li>• Start of Season</li> <li>• Seasonal Area</li> <li>• Leaf Area Index</li> <li>• Smart Sampling Map</li> <li>• Flood Map</li> <li>• Drought Map</li> </ul>
	<ul style="list-style-type: none"> <li>• Acreage under rice production estimation (ha) per production season</li> <li>• Allow for the calculation of annual production estimates</li> </ul>	N/A	<ul style="list-style-type: none"> <li>• Mapping and yield estimation (Rice area maps, Planting dates, Yield estimates)</li> </ul>
	<ul style="list-style-type: none"> <li>• Capturing crop damage after risk event</li> </ul>	<ul style="list-style-type: none"> <li>• Claims Notification Weather Services (Control)</li> <li>• Assigning inspection tasks</li> <li>• Loss &amp; Indemnification Inspection on the field</li> <li>• Claim settlement</li> <li>• Cross check claims from customers with multiples data sources</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of effects on flood and drought events</li> </ul>
	N/A	N/A	N/A
	<ul style="list-style-type: none"> <li>• Wide reporting functionality is available, adjustable by level of authorization and access for various seats in the system</li> </ul>	<ul style="list-style-type: none"> <li>• Wide reporting functionality is available, adjustable by level of authorization and access for various seats in the system</li> </ul>	<ul style="list-style-type: none"> <li>• Reporting functionality is available</li> </ul>

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## **ANNEX #4: List of Meetings**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia

## ANNEX #5 : Suggestions on Capacity Needs

The following agencies and organizations will be required to conduct a significant transformation of duties and responsibilities to achieve the best outcomes out of the state-subsidized agricultural insurance program. Most capacity-building activities should be started the soonest for preparations for possible transition to a modified AOTP and tentative start of AYI pilot from November 2020.

The following capacity building activities need to be initiated in November 2019 and continued with phased approach (suggested for both AOTP and AYI) at least until October 2022:

### (i) Jasindo

#### Central Office:

- Assign a dedicated board member responsible for state-subsidized program(s) in agriculture
- Assign a dedicated Program Manager (chief underwriter) for agricultural insurance program(s). This specialist reports to board member(s) and communicates with external public and private agencies/companies on behalf of the program(s).
- Assign deputy managers (underwriters) responsible for different products or services (crop insurance, livestock/fisheries insurance, loss adjustment). Deputies report to Program Manager.
- Assign several trainers who will deliver and monitor theoretical and practical training schedule. Trainers report to Program Manager.

Central office managerial personnel may require following trainings/workshops:

- Basics of agricultural production insurance and crop production specifics
- Basics of crop underwriting
- Advanced underwriting and portfolio management skills
- AOTP / AYI coverage structure, guidelines and procedures
- Loss adjustment and claims management procedures (field measurements, reporting, indemnification procedures)
- Remote sensing for agricultural underwriting and loss adjustment
- SIAP – reporting and authorization, portfolio management
- Communication with farmers / Socialization principles

#### Regional offices:

Assign at least one dedicated Regional Manager for agricultural insurance programs. This specialist is responsible for agricultural insurance operations on the territory covered by the regional office. This specialist maintains contacts with local MoA Dinas offices specialists, extension service officers and POPT/PPL specialists in the same region. Reports to a program-dedicated underwriter in the central office.

- Assign at least one Deputy Regional Managers (may be part-time position) assisting or substituting Regional Manager when one is not available. Reports to Regional Manager.
- Assign at least one dedicated regional loss adjusted (may be part time position) to monitor loss adjustment processes and coordinate with POPT/PPL specialists. Reports to Regional Manager (or Deputy).

Regional office personnel may require following trainings/workshops:

- Basics of agricultural production insurance and crop production specifics
- Basics of crop underwriting
- AOTP / AYI coverage structure, guidelines and procedures
- Loss adjustment and claims management procedures (field measurements, reporting, indemnification procedures)
- Remote sensing for agricultural underwriting and loss adjustment

- SIAP – reporting and authorization, regional portfolio management
- Communication with farmers / Socialization principles / Steps for upscaling insurance participation

## **(ii) Ministry of Agriculture**

### **Extension service**

Assign service area for each extension officer. Define a substitute position (e.g. Officer from neighboring district). Establish transparent compensation plan for the time spent on agricultural insurance programs. Possible officer's schedule of duties. Assure that agricultural insurance program activities are clearly defined with reference to exact tasks, reporting procedures and deadlines.

Extension service personnel may require following trainings/workshops:

- Basics of agricultural production insurance and crop production specifics
- AOTP / AYI coverage structure, guidelines and procedures (basic)
- Loss adjustment and claims management procedures (field measurements, reporting, indemnification procedures) (basic)
- Remote sensing for agricultural underwriting and loss adjustment (if considered for extension officers)
- SIAP – reporting, authorization procedures and deadlines
- Communication with farmers / Socialization principles / Steps for upscaling insurance coverage in officer's area

### **POPT/PPL**

Assign service area for each POPT/PPL. Define a substitute/exchange position (e.g. POPT/PPL from neighboring district). Establish transparent compensation plan for the time spent on agricultural insurance programs. Define clear schedule of duties, procedures and guidelines. Assure that agricultural insurance program activities are clearly defined with reference to exact tasks, reporting procedures and deadlines.

Extension service personnel requires following trainings/workshops:

- Specifics of rice production and crop's susceptibility to effects of various risks
- AOTP / AYI coverage structure, guidelines and procedures (basic)
- Loss adjustment and claims management procedures (field measurements, reporting, indemnification procedures) (theory and field training)
- Remote sensing for agricultural loss adjustment
- SIAP – specifics of loss adjustment reporting, authorization procedures and deadlines
- Communication with farmers / Socialization principles / Non-insurance risk management instruments for farmers

### **Ministry's dedicated staff (data management, financial planning, research and development)**

Simplification and streamlining of AOTP / AYI programs' administration, reporting and authorization via SIAP is recommended. Following the procedural changes the agricultural insurance program dedicated personnel (exact positions) should be defined at all levels. Adjust (if required) schedule of duties, procedures and guidelines for authorization to reflect on actual responsibility for activities and timely reporting.

Different levels of administration personnel will require different combination of trainings and workshops. Among the suggested are:

- Basics of agricultural production insurance and specifics of rice production
- AOTP / AYI coverage structure, guidelines and procedures
- Loss adjustment and claims management procedures (field measurements, reporting, indemnification procedures) (basic)

- Remote sensing for agricultural portfolio monitoring, reporting. Providing remote sensing user services for farmers
- SIAP – reporting and authorization, portfolio monitoring, reporting and deadlines
- Data collection / validation / storage.
- Communication with farmers / Socialization principles

### **(iii) BPS**

Establish transparent procedures for yield data gathering and reporting. Based on procedural changes the agricultural insurance program dedicated personnel (exact positions) should be defined (sub-district level). Adjust (if required) schedule of duties, procedures and guidelines for reporting to reflect on actual responsibility for activities and timely reports submission.

BPS personnel will require a number of initial and further recurring trainings and workshops. Among the suggested are:

- Basics of agricultural production insurance and specifics of rice production
- AOTP / AYI coverage structure, guidelines and procedures
- Data gathering and reporting guidelines
- Data collection / validation / storage / accessibility
- Communication with farmers / Socialization principles

### **(iv) LAPAN**

- Establish a clear role for LAPAN in state insurance programs development
- Assign dedicated personnel (exact positions, part-time) to agricultural insurance programs
- Adjust (if required) schedule of duties to reflect on actual responsibilities, level of authority and decision-making
- Assure access to data with required temporal/spatial resolution for AOTP/AYI programs

LAPAN personnel will be recommended to participate in workshops and conferences involving discussions related to agricultural insurance and remote sensing applications. No specific trainings are considered at the moment. Specific topics could be defined at later stages. Recommended participation in all workshops and key meetings on agricultural insurance and monitoring of rice crop/yield vegetation monitoring.

### **(v) Bundled programs partners (Fertilizer companies, Banks, MFIs, etc.)**

- Assign dedicated personnel (exact positions, part-time) responsible for agricultural insurance programs
- Adjust (if required) schedule of duties to reflect on actual responsibilities, level of authority, decision-making and reporting

These specialists should possess a clear understanding of the bundled program structure, administration of the program between Jasindo and partner organization, internal procedures of the partner on the program. Knowledge of the basics of insurance coverage and procedures required in case of loss experienced by the farmer (client).

Suggested trainings:

- Basics of agricultural production insurance and specifics of rice production (basic)
- AOTP / AYI coverage structure, guidelines and procedures (basic)
- Loss adjustment and claims management procedures (field measurements, reporting, indemnification procedures) (basic)
- Remote sensing for agricultural portfolio monitoring, reporting. Providing remote sensing user services for farmers (basic)
- SIAP – reporting and authorization, portfolio monitoring, reporting and deadlines
- Communication with farmers / Bundled program's socialization and communication principles



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## **ANNEX #6 : AUTP Guideline**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia

## ANNEX #7 : Suggestions for AUPG Guideline

### Suggested immediate changes to be implemented before end-December 2019 (for the period – November 2019 – October 2020)

- **Eliminate hard-copy paperwork for claims notification and loss adjustment process – move to pure e-authorization via SIAP.** Adjust SIAP's functionality and authorization functions.
- **Introduce updated AUPG (portfolio-based) rate of 4%**, as suggested in Final Report.
- **Review and update insurance premium aid portions** (central government, provincial governments) and farmers' portion – move from current actual sums in IRD to per cent shares of each party's portion (considering the premium rates diversification the sums will be different for different provinces per risk zones defined).

### Suggested changes for review in the period of November 2019 – October 2020 (preparations for rice production seasons starting from November 2020)

- **Introduce definition of a growing season to clearly separate wet, dry and intermediary seasons.** It is recommended to set fixed dates for a start and finish of each growing season. The coverage period (period of insurance) must coincide with the growing season (section 1.4 and 3.1.7).
- **Introduce a definition of an "application for insurance" and set the minimum requirements for information to be provided to the insurer.** Set fixed rules for application period per growing season and set the deadline when the applications are no longer accepted (section 1.4).
- **Revise definition of "Damage" for AUPG program purposes** (1.4, provision v) (key issue: what damage actually is? What should be the minimum number of rice plants not alive? What should be the number of plants with tassel missing or when certain percentage of grain missing in a tassel? Is it rice plants with a specific type of damage when it is believed the plants won't be able to produce harvestable paddy? Etc.)
- **Enhance definition of "compensation"** (section 3.1.4).
- **Review and adjust Claims Settlement Procedure** (section 3.7). The process described in this section is confusing and inefficient. It is vitally important to improve claims settlement procedure as soon as possible. This is a vitally important for successful operation of AUPG. Area yield index product will use different claim settlement procedure which will need to be developed and tested in the pilot province.
- **The Claim Approval section (3.7.2) looks to be unnecessary and can be removed from the Guidelines.** Usually this is provided in the insurance agreement subject to consumer rights protection legislation and insurance regulations.
- **Reconsider claim related forms, as well as the whole loss adjustment process, need to be reviewed.** Forms 6 and 7 do not provide all information about each claim that must be collected and put into a centralised database. This should be part of the general loss adjustment process revision.

### Strategic, longer term – based on modifications on the strategic objectives of AUPG

- **Revision of the program intention, purpose and target (section 1.2) to align with the actual objectives of AUPG program**, i.e. production cost recovery after severe crop losses.
- **Define clear responsibilities and levels of authority of each government agency involved in implementation of AUPG at all levels.** The current wording of section 2.1 is very loose and non-committal.
- **Reconsider AUPG terms and definitions** (section 1.4) to make them more specific and in line with AUPG program operational basics.
- **Specify functions and responsibilities for Loss Assessors, POPT-PHP officers (observers and controllers), and POPT-PHP coordinators (section 1.4).** Clearly separate their functions.
- **Further review of the functionality of SIAP.** At the present time Jasindo has a separate internal system while SIAP is used for registering farmers for AUPG insurance coverage, calculation of premium support volume and some claims services. (section 1.4, provision w).

- **Revise eligibility criteria for AOTP program** (3.1.1 and 3.1.2). These have to be more specific.
- **Reconsider insurance amount** (section 3.1.5) to either introduce higher sum insured limits or sum insured options. This forms the basis of insurance payment. An updated sum may be required, as well as possible introduction of various coverage options is expected and proposed.
- **Clarify funding rules for AOTP program** (section 3.2). It may be possible to introduce a provision that support of AOTP (premium financing) will be defined by the government in a separate document. However, it would be best if the subsidy funding to be approved at least 6 months before the next planting season/period of insurance. This time will be necessary to deliver program change information to the regional governments and farmers for them to know exactly what is changing and how.
- **Simplify implementation mechanism** (section 3.3). The current graph is very confusing. With updated SIAP's functionality certain steps (as set at the graph) may be eliminated. For example, according to these guidelines the insurance contract is an agreement between the insurer and farmer. However, the graph in section 3.3 provides that the insurance policy is issued by the insurer to DINAS. DINAS is not a party of the insurance agreement and, from the legal point of view, they have no role in the agreement implementation.
- **Simplify registration process for farmers** (section 3.5). With SIAP operating, the system can generate the required documents to several authorised parties (action required, information only, premium subsidy allocation, etc.) simultaneously. The process describes in section 3.5 looks overly bureaucratic and complex, requires optimization.
- **Simplify premium aid/subsidy distribution framework** (section 3.6). The government must set up the clear rules for the insurance provider (Jasindo) with control mechanisms to be in place. The insurer can be audited on an annual basis by the administrator of AOTP and in case issues established, the government may impose certain sanctions. Though the efficient process will help to eliminate a number of unnecessary approvals/authorisations and reduce the amount of paperwork.
- **The whole section 4 Monitoring, evaluation and reporting must be reviewed.** The authority and responsibilities must be clearly allocated to specific government agencies. Otherwise, the inefficient system overall will be established as a result.
- **Forms 2,3, 4 and 5 are very similar in type of information. They can be combined into one form only.** At the same time, with SIAP's updated functionality, these forms may be not necessary at all. SIAP can generate numerous reports as required by different authorised government agencies. Ultimately, the government needs to get a summary report of farmers covered by insurance in each season/period of insurance and the summary of claims.

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**ANNEX #8 : Suggested Project Work Plan 2019-2022**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia

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## **ANNEX #9 : Subsidy Simulation Tables**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia

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**ANNEX #10 : AYI Rating Suggested**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia

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## **ANNEX #11 : AOTP Rating Structure**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia



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## ANNEX #12 : The Agricultural Insurance Law in Turkey

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**Law Number** : 5363  
**Law Admission Date** : 14.06.2005  
**Official Gazette Issue Date**: 21.06.2005  
**Official Gazette Number** : 25852

## PART ONE

### The Purpose, Scope and Definitions

#### The Purpose

**ARTICLE 1.** - The purpose of this Law is; to compensate the losses, producers suffered due to the risks specified in this Law and in order to determine the procedures and principles regarding the implementation of the agricultural insurance.

#### The Scope

**ARTICLE 2.** - This Law, covers the establishment of the Pool, the risks to be insured by the Pool, the Pool's income and expenses, the premium subsidy and the excess of loss support, insurance contracts, providing reinsurance and covers the principles and procedures of the insurance companies duties, authority and responsibilities and the contribution and participation.

#### The Definitions

**ARTICLE 3.** - In this Act; The followings shall refer to,

- a. The Ministry: The Ministry of Agriculture and the Rural Affairs,
- b. The Undersecretariat: The Undersecretariat of the Treasury,
- c. The Insurance companies: Referring to the insurance companies of which were formed within the framework of the "The Insurance Supervision Law No. 7397" and had license on agricultural insurance.
- d. The Producer: The real and legal persons, who are dealing with the crop and animal productions.
- e. The Agricultural Insurance: Insurances specified in the articles of 1316 to 1319 of the 6762 numbered Turkish Commercial Codes and the insurances covered by this Law.
- f. The Pool: The Agricultural Insurance Pool,
- g. The Company: The company undertaking the operations of the Pool,
- h. The Board: The Board of Directors of the Agricultural Insurance Pool,
- i. The Livestock: The cattle, sheep and goats, poultry and aquaculture products

## PART TWO

### The Establishment, Duties, Authority and Responsibilities

#### The Pool

**ARTICLE 4.** –In order to cover the risks under this law and to determine the standard insurance policies, the loss organizations, actuarial studies, indemnity payments and to provide the reinsurance cover, ensuring the development, dissemination and monitoring of the agricultural insurances and other technical services, a legal entity had been established as the Pool.

The Pool; is authorized to make insurance, reinsurance and retrocession for the risks taken under cover. The Insurance companies are obliged to transfer the premiums to the Pool of which were obtained from agricultural insurance under this Act. Commission will be paid to the insurance companies for the premiums which have been transferred to the Pool on the portion charged by the Pool. The premiums which are not transferred to the Pool on time by the insurance companies will be charged subject to the provisions of Law No. 6183 on the Procedure of Collection of the Public Receivables.

The Pool is managed by the Company according to the conditions specified in Article 9 and as the regulations issued jointly by the Ministry and the Undersecretariat of the Treasury.

Istanbul is the center of the Pool. The Pool is in terms of the activities under this Act is not subject to the Public Financial Management and Control Law No. 5018 and the Public Procurement Act No. 4734.

### **The Committee**

**ARTICLE 5.** - The Board, totally is consist of seven members, those are two from the Ministry and two from the Undersecretariat and one member from each, the Insurance and Reinsurance Companies of Turkey, the Union of Chambers of Agriculture of Turkey, and from the Company.

The board members who are selected among the public officials by the Ministry and the Undersecretariat found to be at least ten years in public service and the representatives from the Ministry in the field of agriculture and the representatives from the Undersecretariat must have knowledge and experience in the field of insurance. The other members must at least ten years of professional experience in the relevant field in which they should have and they should have the satisfying requirements of the A) sections (1), (4), (5), (6) and (7) numbered sub-sections of the article 48 of the Civil Servants Law No. 657. One of the Ministry representative to be the natural president of the Board.

The committee may gather with participation of five members and takes decisions by majority. If voting is even, the presidents vote to be considered as two.

The Board members shall serve for a period of three years. The ended tasks may be designated as new. If the appointed members of the board may leave the institutions they represent or if the institutions are taking them back, thus the membership expires. The appointed new members complete the remaining term.

The Board members who are in the public office service and as the participating sessions are not more than four meetings in a month and for each meeting day to be paid 2000, and for the people without public office service, the 3000 index figure to be paid for each meeting, the fee will be calculated by multiplying the amount of the monthly coefficient of government officials meeting and will be paid.

The application of the committee decisions and the secretarial services are executable by the Company.

### **The duties and responsibilities of the Board**

**ARTICLE 6.** – The duties of the Board is included in the following

- a. To determine the implementation of the principles of the functioning of the Pool.
- b. May not exceed the total amount of the State premium subsidy for the budget year the product, risk, and making studies on the business scale on the basis of the region to determine the rate and to provide the premium support and submit to the Ministry.
- c. To identify problems encountered in practice, to work towards solving these problems.
- d. To decide on the reception of the service within the field of task
- e. To identify the loss adjustment principles and procedures of loss adjustment
- f. To build up insurance contracts with the insurance companies within the scope of this Regulation of which willing to operate in the field of agricultural insurance.
- g. To build up the contract with the management company of the Pool determining on working procedures and principles.

### The Pool resources

**ARTICLE 7.** – The Pool resources include in followings:

- a. The transferred premiums from the insurance companies.
- b. The premium subsidy that provided by the State.
- c. The investment income of the collected resources.
- d. The Borrowings.
- e. The contribution obtained from the general budget
- f. The other incomes.

The pool revenues are exempt from all the taxes, duties and charges.

### The usage places of the Pool resources

**ARTICLE 8.** – The expenses of the Pool are;

- a. The indemnity payments for the agricultural insurance.
- b. The expenses necessary for the management and functioning of the Pool.
- c. The payments for the protection provided from the reinsurance, capital and similar markets,
- d. The commissions paid to the insurance companies.
- e. The payments related to the information and publicity campaigns.
- f. The payments related to loss adjustment.
- g. The principal and interest repayments of borrowings.
- h. The other payments to be made along the purpose of this Law
- i. The operating cost to be paid to the Pool management company.

### The Company

**ARTICLE 9.** – The procedures for the operation of the Pool, will be carried out by the management company which is a joint stock company established with equal shares of the insurance companies participated into the Pool.

The Company's duty within the principles and procedures decisive of the Board is;

- a. To make all kind of work and organization in relation with the loss adjustment forming the basis of indemnity payments to ensure the indemnity payments to be made as soon as possible.

The loss adjustment in Crop insurance to be handled by an agricultural engineer, agricultural technician; in livestock risk inspection to be handled by veterinarians and zootechnist agricultural engineers; loss adjustment is to be handled by veterinarians. The priority on the loss adjustment is on the agricultural engineers and the veterinarians.

The risk inspection in aquaculture insurance to be handled by the aquaculture engineers, agricultural engineers that had been graduated from aquaculture department, fishing technology, engineers and veterinarians; and the loss adjustments to be handled by the veterinarians together with the aquaculture engineers, agricultural engineers that graduated from aquaculture department, fishing technology, to be made by one of those engineers.

- b. By the risk sharing and transfer of, to carry out the plan of the work on the implementation of reinsurance and also to submit the risk sharing and reinsurance program in order to provide the approval of the Board.
- c. The implementation of the decisions taken by the Board and providing the secretarial services of the Board.
- d. The collection of the premiums and the indemnity payments and other similar tasks to carry out.
- e. To inform the producers on the agricultural insurance and to conduct the public relations and promotional campaigns.

- f. To produce statistics on the agricultural insurance under the general provisions and to prepare a report to the Board on this issue.
- g. To forward the Pool resources to the investment within the framework of the principles and rules.
- h. To make recommendations to the Board of Directors on the matters of the Pool in terms of the execution of a healthy work as it deems necessary,
- i. To perform all the tasks related to the operation of the Pool and all other types.

The company is responsible to the Ministry, Undersecretariat and to the Board to carry out the works of the Pool and from the execution of the Pool and the best way for the benefit of. The company accounts and transactions of the Pool and all the income and expenses, to be followed by special and separate records.

The Company cannot disclose the acquired information to the third parties for any reason of which been acknowledged by their duties under this Act. The correspondence and documents of the Pool must be kept with safety. Under the cases of the Company's termination of its activities, such as liquidation or bankruptcy and until a new contract is made by the Board, the company will continue to carry out its duties. In this case and while is under this law, all information and documents must be returned to the Board.

The Company, cannot involve with a business other than those specified in this law.

### **The duties and the authorities of the Ministry**

**ARTICLE 10.** – The duties and the authorities of the Ministry under this Act are as follows:

- a. To take the necessary measures for the development and dissemination of the agricultural insurance.
- b. To present proposals to the Council of Ministers for the approval of the products, risks, and premium support that will be provided by the regions.
- c. To watch the indemnity payments to be made accurately and in an orderly manner.
- d. To carry out other duties that been assigned by this law.

### **The auditing**

**ARTICLE 11.** – The supervision of the Pool's and the Company's insurance applications are carried out by the Undersecretariat and all the other operations are supervised by the Ministry.

## **PART THREE**

### **The Risks, Insurance Contracts, the participation to the Pool, Reinsurance, the Aid and Subsidy**

#### **The Risks to be insured by the Pool**

**ARTICLE 12.** – The crops, greenhouses, agricultural structures, agricultural tools and the machinery to be covered and for farm animals; drought, hail, frost, flood, ground water flood, storm whirlwind, earthquake, landslide, fire, accident and pests all damages arising from animal diseases and/or for the other risks that will be important for the agricultural sector to be determined by the Council of Ministers upon the request of the Board.

#### **The premium subsidy**

**ARTICLE 13.** – The premium support that will be provided by the State as each year, shall be determined by the Council of Ministers upon the proposal of the related Ministry on the products, risks, regions and the scales of operations of the company.

The amount of appropriations for the premium subsidy will be located within by the budget by the budget law each year. The premium amounts that will be transferred to the Pool by insurance companies after being calculated by the Ministry after comparing the premium subsidy of the farmers' records and without any delay.

#### **The Insurance contracts and participation to the Pool**

**ARTICLE 14.** – The agricultural insurance cover determined under this law is provided predominantly by the Pool. These covers may be provided by the cooperation of the insurance companies too, if the conditions are available by the risk management and after the approval of the Board.

The insurance contracts to be made over the standard policies specified by the Pool.

If the protection is not sufficient for the loss ratio previously calculated by the Pool, the remaining part to be covered by the Government.

#### **Reinsurance**

**ARTICLE 15.** – The Pool, in order to transfer the risks, can provide protection from the national and international insurance markets for the risks undertaken from the capital market and other markets.

#### **Excess of loss Support**

**ARTICLE 16** – If the protection provided from the national and international markets in respect of the transfer of the risks undertaken by the Pool is not sufficient the amount determined by the Council of Ministers is guaranteed by the State.

#### **The aid and debt suspension**

**ARTICLE 17** – The agricultural producers who do not take insurance for the risks, within the scope of this Regulation, during the application year, cannot benefit from the 20.06.1977 dated and 2090 numbered Law.

## **PART FOUR**

### **The Temporary and Final Provisions**

#### **Regulation**

**ARTICLE 18** – Within two months from the date of entry into force of this law; The Pool's working principles and procedures will be formed by obtaining the opinion of the Undersecretariat and the regulation to be issued by the Ministry, and the principles of the insurance contracts will be subject to the regulation which will be issued by the Undersecretariat.

**THE TEMPORARY ARTICLE 1** – The members of whom will take place within the Board will be informed to the Ministry by the relevant institutes and the assignment of those members to be completed in 3 months time the latest from the date of entry into force of this law.

The Company to be formed in 3 months time the latest, from the date of publication of this law.

#### **The Effect**

**ARTICLE 19** – The article 4 of this law shall enter into force 3 months after the date of publication; the other articles shall enter into force within the publication date.

#### **The Execution**

**ARTICLE 20** – Provisions of this Law shall be executed by the Council of Ministers.

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## **ANNEX #13 : Turkish National Agricultural Insurance Pool (TARSIM) Operating Procedures and the Principles**

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### **PART ONE**

## **The Purpose, Scope, Basis and Definitions**

### **The Purpose**

#### **ARTICLE 1**

1. The purpose of this Regulation, is to determine the working procedures and principles of the Agricultural Insurance Pool established in accordance with the provisions of the Agriculture Insurance Law No. 5363, dated 14.06.2005.

### **The Scope**

#### **ARTICLE 2**

1. This regulation covers the principles and the procedures of; the establishment of the Pool, the risks to be insured by the Pool, the income and expenses of the Pool, the premium and excess of loss subsidy, the loss adjustment and risk assessment organizations, the data collection, risk analysis, the premiums collected by insurance companies, studies on premium subsidy, conducting the related indemnity payments, providing reinsurance cover, developing the agricultural insurance, dissemination, monitoring and other technical services related to the execution of agricultural insurance and the activity and the supervision of the operating Company of the Pool.

### **Basis**

#### **ARTICLE 3**

1. This regulation has been prepared on the basis of Article 4 and 18 of the Laws on the Agricultural Insurance Law No. 5363.

### **Definitions**

#### **ARTICLE 4**

1. In this Regulation as means;
  - a. Ministry: The Ministry of Agriculture and Rural Affairs,
  - b. Livestock: The cattle, sheep and goats, poultry and the aquaculture products,
  - c. The farmer registration system: The database which is kept within the Ministry for the agricultural information to farmers,
  - d. The Pool: The Agricultural Insurance Pool,
  - e. The Pool loss adjuster: Persons, having the certificate of Agricultural Insurance Pool Loss Adjusters Education and registered in the Agricultural Insurance Pool Registry by the Undersecretariat, who can make risk analysis and loss adjustment in agricultural insurance,
  - f. Law: The Agricultural Insurance Law No. 5363, dated 04.06.2005,
  - g. The Board: The Board of Directors of the Agricultural Insurance Pool,
  - h. The Undersecretariat: The Undersecretariat of Treasury,
  - i. The Insurance company: Insurance companies operating in the agriculture branch within the frame work of The Insurance Supervision Law No. 7397 and shareholder of the operating company
  - j. The Company: The Company is undertaking the operations of the Pool,
  - k. The Agricultural insurance: The insurances covered in the Agriculture Insurance Law No. 5363,
  - l. The Producer: natural or legal persons except public legal entity, to benefit from the Premium subsidy, registered within the Ministry's farmer's registration system.

## PART TWO

# The Establishment of the Pool and the Board, Duties, Authority and Responsibilities

### The Pool

#### ARTICLE 5

1. In respect of the risks to be covered, the determination of the standard insurance policies, the organization of losses, actuarial studies, the payment of indemnities, to provide reinsurance coverage, to develop, disseminate and to monitor the agricultural insurance and in order to ensure the other technical services, the Pool was established as the legal entity.
2. The Pool centre is in Istanbul.
3. The pool is operated by the company specified in Article 13th of this Regulation. As it needs the Board may open office in Ankara.

### The pool resources

#### Article 6

1. The Pool resources include the followings:
  - a. The transferred premiums of the insurance companies.
  - b. The premium subsidy provided by the Government.
  - c. The investment income of the collected resources.
  - d. The Borrowings.
  - e. The contribution obtained from the general budget
  - f. Other incomes.
2. The pool revenues are exempt from all the taxes, duties and charges.

### The usage places of the Pool resources

#### ARTICLE 7

1. The expenses of the pool;
  - a. The payments of indemnities for the agricultural insurance.
  - b. The expenses necessary for the functioning of the Pool management.
  - c. The protection payments will be provided for the reinsurance, capital markets and similar payments that is related to,
  - d. The commissions paid to the insurance companies.
  - e. The payments related to the information and publicity campaigns.
  - f. The Risk assessment and loss adjustment payments transactions.
  - g. The principal and interest repayments of borrowings.
  - h. The operating cost to be paid to the management company.
  - i. The other charges for the purpose of this regulation and the Law

## **The Board**

### **ARTICLE 8**

1. The representative and management organ of the pool is the Board. The Board is assembled by two members from the Ministry and two members from the Undersecretariat, one member from the Insurance and Reinsurance Companies of Turkey, one member from the Turkey's Union of Chambers of Agriculture and one member from the Management Company and thus consists of seven members.
2. The Chairman of the Board is selected among the representatives of the Ministry and shall be appointed by the Minister of Agriculture and Rural Affairs. The Board nominees from the Undersecretariat and the Ministry should have at least ten years in the public service and the Ministerial nominees must have knowledge and experience in the fields of the agricultural risks and natural disasters and the Undersecretariat representatives must have knowledge and experience in the field of insurance. The other members must at least ten years of professional experience in the relevant field in which they should have. In addition, the Board members shall satisfy the requirements of the article 48 of the Civil Servants Law No. 657 of subparagraph (A).
3. The people who take part in the institutions representing the relevant institutions shall be notified in writing to the Ministry.
4. The appointment of members of the Board are made by the Minister of Agriculture and Rural Affairs. The next assignment as followed by departure from the office would be done in accordance with the same procedure in a month time.

## **The duties and responsibilities of the Board**

### **ARTICLE 9**

1. The duties and responsibilities of the Board is included in the following:
  - a. To determine the implementation of the principles of the functioning of the Pool.
  - b. May not exceed the total amount of the State premium subsidy for the budget year the product, risk, and making studies on the business scale on the basis of the region to determine the rate and to provide the premium subsidy and submit to the Ministry.
  - c. To prepare tariffs for the risk in respect of the support, for the products and the regions, to determine the dates and deadlines for sales closing dates, to identify problems encountered in practice, to work towards solving these problems,
  - d. To decide on the reception of the service within the field of task
  - e. To determine the principles and procedures for the Loss adjustment and loss adjustment payments process.
  - f. To build up insurance contracts with the insurance companies within the scope of this Regulation of which wants to operate in the field of agricultural.
  - g. To determine on working procedures and principles with the Management Company of the Pool.
  - h. To determine on the amount of operating costs that to be given to the Management Company.
  - i. To determine on the amount of commission to be paid to the insurance companies.
2. To implement the decisions taken by the Board and secretariat services for the Board, to be carried out by the company.

## **The Convention of the Board**

### **ARTICLE 10**

1. The Board convene with the participation of at least five members, and decisions are taken by majority vote. The Board convene at least once a month by the call of the Chairman of the Board, or meet with an outstanding offer at least three board members. The Board members cannot abstain from voting. In case of equality in voting, provided the majority of votes cast by the Chairman to be counted.



2. If a member do not participate in three consecutive meetings within a year time without a legitimate excuse like travel or illness or even though having this legitimate excuse but not noticing it, or if not attending in three meetings annually and by the offer of the Chairman of the Board the membership shall be terminated by The Ministry and replaced by a new one as shall be appointed according to the procedure established by Article 8.

#### **The Terms of office of the members of the Board**

##### **ARTICLE 11**

1. The Board members shall serve for a period of three years. The term of office may be designated as new. If the appointed members of the board, may leave the institutions they represent or if the institutions are taking them back, thus the membership expires. The remaining term to be completed by the new members appointed instead.

#### **The fees payable to the members of the Board**

##### **ARTICLE 12**

1. If the responsible members of the Board are in the public office service and as the participating sessions are not more than four meetings in a month and for each meeting day to be paid 2000, and for the people under the responsibility but without public office service, the 3000 index figure to be paid for each meeting, the fee will be calculated by multiplying the amount of the monthly coefficient of government officials meeting and will be paid from the Pool sources.

## **PART THREE**

# **The Company and Insurance Companies Duties, Authority and Responsibilities**

#### **The Company**

##### **ARTICLE 13**

1. The procedures for the operation of the Pool, will be carried out by the Management Company established by the insurance companies with equal shares which participated in the pool.
2. The agricultural insurance companies, which has licence or will have after the date of the publication of this regulation and of those who want to operate under the law, must be the shareholder of the Management Company, equally with the other insurance companies. In order to ensure the shareholdings, the existing insurance companies that has shares, is obliged to pay the specified shares to the new company which will participate in the Pool that will be formed as an incorporated company.

#### **The Articles of Association**

##### **ARTICLE 14**

1. The Company's Articles of Association, must be arranged in accordance with the provisions of the Act. The main contract will be prepared and submitted to the approval of the Undersecretariat.
2. In changing the incorporation's Articles of Association, the approval of the Undersecretariat is necessary. If deemed unacceptable by the Undersecretariat of Treasury, the amendment cannot be in the agenda of the general meeting of the Company and shall not be discussed proposals. The Registrar, cannot register the change in the main contract without approval of the Undersecretariat record in the Commercial Register.

## **The Organization**

### **ARTICLE 15**

1. The Company's board members, auditors, general managers, assistant general managers and the people who have the authority to sign and execute in the company of the Insurance Law No. 739, dated 21.12.1959 and of the second paragraph of the Article 2 of the paragraph (b) that the qualifications specified in is required to bear.
2. The Company's board members, auditors, deputy general managers and the general manager, in addition to the matters mentioned in the first paragraph of Article 4 of Law No. 7397 on the third, fourth and fifth paragraphs shall be required to have the qualifications.
3. The people who had been assigned to the Company as a member of the board of directors, and the auditors shows that they have the qualifications specified in the first paragraph, together with the documents and should notify it to the Undersecretariat within one month from the starting date of the employment. The approval of the Undersecretariat is searched prior to the assignments to be approved as the deputy general manager and the general manager of the company. In the opinion of the Ministry is necessary in order to be appointed as the Assistant General Manager.
4. The Board, may apply to the state-supported agricultural insurance system in order to ensure the effective operation of the Company's organizational structure and human resources and also to provide the necessary changes and arrangements.

## **The acquisition of shares, merger and transfer**

### **ARTICLE 16**

1. To acquire shares of the company by a natural or legal person, or the company merger with another legal person or the transaction of the assets and liabilities to another legal entity is subject to the approval of the Undersecretariat.

## **The operating cost**

### **ARTICLE 17**

1. A certain extent of a monthly operating cost is paid to the company by the Pool, out of the total annual premium, including the state premium subsidy, after the deduction of the termination and cancellations and transferred to the Pool.
2. The operating cost to be determined by the Board, cannot be more than
  - a. 6% for YTL 0-50 million,
  - b. 5% for YTL 50-100 million,
  - c. 4% for YTL 100-200 million,
  - d. 3% for YTL 200-300 million,
  - e. 1% for more than YTL 300 million
3. For the first year of the operation of the Pool, and is without being subject to the procedure laid down in the second paragraph, a fixed operating cost will be determined by the Board to be paid.
4. It is essential to observe savings in the company's expenditures and employment policies. The company offers a detailed expense report in every six months, to the Board. Which of the expenditures made by the Company and is the issue of the Pool is determined by agreement between the Company and the Pool under the provisions of the Law and the relevant legislations.

## **The Annual report and financial statements**

### **ARTICLE 18**

1. The company activities are carried out under the act will be reported to the Ministry and the Undersecretariat, on the following financial year in the form of an annual report by the end of April.

2. The Company shall transmit a copy of balance sheet and profit and loss statements, together with the example of a company's board of directors and the approved auditors' reports, to the Ministry and to the Undersecretariat.

### **The Acquisitions and investments**

#### **ARTICLE 19**

1. The Pool resources are evaluated within the framework of the principles and procedures set by the Board.
2. The Pool resources and the acquired ownership of real estate is owned by the pool.
3. The company will take the necessary measures to protect and preserve cash assets which belongs to the Pool real estate, securities, software and hardware.
4. The Company in purchases and investments on behalf of the Pool is responsible for protecting the rights and interests of the Pool.

### **The duties and responsibilities of the company**

#### **ARTICLE 20**

1. The duties and responsibilities of the company, within the framework of the principles and procedures, to be determined by the Board are as follows:
  - a. On the payment of compensations, which to be a base on the damage assessments will be within the organization of work and carry out all types of transactions and to ensure of compensation payments as soon as possible.
  - b. Sharing the risk and transfer and to carry out activities related to the implementation of the reinsurance plan and, and provide submitting the risk sharing and reinsurance plan to the approval of the Board.
  - c. To execute the implementation of the decisions which are taken by the Board and provide the secretariat services of the Board on their tasks.
  - d. To collect the premiums from the insurance companies on behalf of the Pool and to make the necessary procedures for the premiums that are not transferred on time and to inform to the Board accordingly.
  - e. To inform the producers about the agricultural insurance and public relations and conduct the promotional campaigns.
  - f. To prepare reports on the general provisions within the framework of the statistical data on the agricultural insurances and submit it to the Board.
  - g. To direct the Pool resources, within the specified framework of the principles and rules, to the investment
  - h. In order to run the Pool works in terms of necessary health deems, to make recommendations to the Board, on the matters.
  - i. To keep the track of all accounts and transactions and the income and expenses of the Pool in separate private records.
  - j. Handling all the operations and any other business activities are related to the Pool.
2. The Company, is responsible to the Board and the Ministry and to the Undersecretariat on the execution of the Pool works and the best way handlings for the benefit of the Pool.
3. The Company cannot disclose these information to third parties for any reason that has been acquired in accordance with the law and duties under this Regulation.
4. The correspondence and documents of the Pool must be maintained and kept in safety. In accordance with decommissioning of the Company and entering into the event of liquidation or bankruptcy process; the company shall continue to perform its duties until the contract is made by the Board with a new company. In this case, shall return all information and documents to the Board, within the scope of this Regulation and the laws.

5. The Company cannot be engaged with a business other than those specified in this Regulation and the Laws. The company can spend within the scope of the authority specified in the contract which will do with the Pool and the monthly expenditures made by the company on behalf of the Pool to be presented to the Board in the following month.

## **Reinsurance**

### **ARTICLE 21**

1. The pool, in order to transfer the risks, can provide protection from the national and international insurance markets for the risks undertaken from the capital market and other markets.

## **Rights and obligations of the insurance companies**

### **ARTICLE 22**

1. The rights and obligations of the insurance companies are as follows:
  - a. To comply the decisions which is taken by the Board and fulfil them.
  - b. The premium debts for the pool is YTL 100.000. - (YTL one hundred thousand) hard cover, for the first year to be determined by the Board according to the type of guarantee and in the following years the assigned premium is 15% over on the previous year's payment to give additional collateral to the Pool.
  - c. The premiums to be charged monthly and that to be collected in the related month and in accordance with decisions of the Board and within the principles and procedures to be transferred to the Pool at least until the evening of the 20th day of the following month.
2. The premiums that are not transferred to the Pool on time by the insurance companies, primarily will be charged by the Company through convertible into cash collateral unvested portion of premiums in excess of collateral, according to the provisions of Law No. 6183 on the Procedure of Collection of Public Receivables.
3. The Insurance companies, makes the agricultural insurance contracts and the insurance policies on behalf of the Pool and on set by the standard form of the Pool and transfer all the risk and the premium to the Poo.
4. The agricultural insurance covers are given exclusively by the Pool within the scope of the laws. These covers, in terms of risk management, can be given jointly with the insurance companies if the conditions make it necessary and if it deemed appropriate by the Board.

## **The Termination of the contract of the insurance companies with the Pool**

### **ARTICLE 23**

1. The insurance company's contract, which do not comply with the legislation and the decisions of the Board, is terminated and removed from the Pool in this way, the insurance company issued out of the Pool, may not transfer business to the Pool. The removed insurance company, is bound with its commitment and obligations arising from the contract with the Company during the time period of the contract validity and until the end.

## **PART FOUR**

## **Risks and Expertise**

### **The Risks will be insured by the Pool**

#### **ARTICLE 24**

1. The Coverage for the plants, crops and greenhouses, agricultural structures, agricultural tools and machines, drought for livestock, hail, frost, floods, ground water floods, storms, cyclones, earthquakes, landslides, fires, accidents and pests losses caused by the animal diseases and / or other risks landmarks are important for the agricultural sector, to be determined by the Council of Ministers upon the proposal of the Board.

## The Pool Loss adjuster and their education

### ARTICLE 25

1. The training of the Pools loss adjusters, under the Act and in relation to the loss adjustment procedures in accordance with the principles and procedures to be determined by The Council of Ministers, and will be involved in the organization of risk analysis and loss adjustment the company is in collaboration with the coordination of the Ministry.

Those who are successful after training will have the Agricultural Insurance Pool Loss Adjusters Training Certificate that issued by the Ministry and together with the following documents, to apply to the Undersecretariat, in order to be assigned in the register;

- a. An identity card sample.
  - b. An education certificate's notarized copy
  - c. A certificate of residence and the date of issue
  - d. The date of issue should not be older than six months and including the archive registration with non-criminal record certificate.
  - e. The documents relating to bankruptcy or composition have not been announced.
  - f. Five pieces of passport size photograph taken within the last six months.
2. By completing the required documents specified in the first paragraph of the track records, a loss adjuster certificate document of the Agricultural Insurance Pool shall be issued by the Undersecretariat.
  3. Those who had the Pool expertising registry by the Article 38 of Laws No. 7397 in accordance with paragraphs 3 and 4 of the article's may function as risk analysis and loss adjustment within the scope of the agricultural insurance operations.
  4. Prior to acceptance into the insurance, the risk analysis procedures of the livestock should be done by the zootechnist veterinarians and the agricultural engineers and the loss adjustment procedures of the insured livestock to be performed by a veterinarian.
  5. The loss adjustment procedures of the plants and the crops to be primarily handled by an agricultural engineer and in the absence of an agricultural engineer that can be done by an agricultural technician.
  6. In case of doubts on the risk analysis and loss adjustment, this hesitation to be eliminated by the Board.
  7. The insurance risk assessments of aquaculture to be handled by the aquaculture engineers, that had been graduated from the fisheries, fishing technology, engineers and veterinarians; and the loss adjustment to be concluded by the veterinarians with the findings of fisheries engineers, agricultural engineers that graduated from department of aquaculture, fishing technology, to be made by one of those engineers.

## PART FIVE

### Duties of the Ministry and the Government Subsidy

#### The duties and authorities of the Ministry

### ARTICLE 26

1. The duties and authorities of the Ministry are as follows:
  - a. To take the necessary measures for the development and dissemination of the agricultural insurance, publishing and organizing education and seminars on these issues and to cooperate with the Pool and the Company.
  - b. To organize education and trainings in collaboration with the Company on the relevant documents about the Pool expertise.
  - c. To perform correctly on the operation of the business and regularly monitoring the work on the indemnity payments, incomes and expenditures of the Pool.

- d. To transfer the State's premium support for the Pool, to the bank account.
- e. To present to the Council of Ministers as proposals of the products, risks, premium support that will be provided at scales of regions and business plans for approval.
- f. To carry out other duties assigned by the Laws and this Regulation.

#### **Premium subsidy**

##### **ARTICLE 27**

1. The amount of premium subsidy will be provided by the State each year and shall be determined by the Council of Ministers upon the proposal of the Ministry, due to the crops, risks, regions and the scales of operations.
2. The payment of premium subsidy, takes place every year in the budget of the Ministry, by the budget law.
3. The Ministry, according to the farmer's registration system and the other records of the Ministry, as taking into account the data base of the Pool, which is guaranteed by the Decision of Council of Ministers will be held by the insurance companies for the risks in accordance with the standard policies and the State will transfer the subsidy of the total premium to the Pool's account.
4. The other matters related to premium subsidy is determined by the Board.

#### **Support for Excess of Loss**

##### **ARTICLE 28**

1. In order to transfer of risks undertaken by the pool and if the protection provided from the national and international markets is in shortage for this purpose and in the case of absence of the sufficient amount, then the difference to be determined by the Council of Ministers and is guaranteed by the State.
2. The excess of loss to be committed by the State for the support of the principles and procedures determined by the Board's decision. Sent to the Council of Ministers upon the proposal of the Board by the Minister.

#### **Assistance and debt suspension**

##### **ARTICLE 29**

1. The agricultural producers who do not take insurance, within the scope of this Regulation, during the application year for the risks thereof, the 20.06.1977 dated and 2090 numbered Law on the Natural Disaster Assistance will not be implemented for the benefit of the farmers who suffered.
2. Merely, for the risks identified by the Council of Ministers, due to the regions and products as outside of the risk, product and can receive helps in the areas within the scope of Law No. 2090.

## **PART SIX**

### **Miscellaneous and the Final Provisions**

#### **The Auditing**

##### **ARTICLE 30**

1. By the aspect of the insurance applications of the Pool's management is implied by the Undersecretariat and all the other operations to be made by the Ministry.

#### **The authority to regulate**

##### **ARTICLE 31**

1. The Ministry and the Undersecretariat, shall be authorized to ensure the implementation of this Regulation and to make any kind of sub-arrangements.
2. For the issues not included in this regulation, the applicable legislations will be, the provisions of the contract to be applied to decisions of the Council and the Board.

#### **Repealed Regulations**

##### **ARTICLE 32**

1. The 22.09.2005 dated and published in Official Journal No. 25944 as named the Operating Procedures and Principles of the Agricultural Insurance Pool is repealed.

#### **Effect**

##### **ARTICLE 33**

1. This Regulation shall enter into force on the date of its publication.

#### **Execution**

##### **ARTICLE 34**

1. The provisions of this Regulation shall be executed by the Minister responsible for the Undersecretariat of Treasury with the Minister of Agriculture and Rural Affairs

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**ANNEX #14 : Crop Yield Statistics: AYI Data Collection Table**

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File can be requested to Directorate of Food and Agriculture,  
Badan Perencanaan Pembangunan Nasional/BAPPENAS (National Development Planning Agency)  
Government of Indonesia





**Japan International Cooperation Agency (JICA)**

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