



# Quick Scan

Geodata for Agriculture and Water  
In Indonesia



# General Issues



*Land less and small holder farmers located in different geographical location*

Many farmers in rural areas have no land. They usually work for land owners who lives in urban areas under profit-sharing agreement. Related to value chain, this condition has made it difficult to identify the target of the chain. Especially in Java, farmers usually have an average of 0.25 ha. This situation creates challenge in marketing the products to companies who require big amount of products. Not all farmers are members of cooperative or farmer groups. The unorganised farmers living in scattered location creates difficulties in marketing the products and in monitoring the quality of the crops

### *Unavailability of extension workers*

Department of Agriculture has extension workers to assist farmers in improving their productivity and crops quality. However, not all of them have the commitment to reach farmers in most isolated areas.

### *Bad infrastructure – transportation, farming facilities*

The majority agriculture areas in Indonesia are located in isolated areas with limited infrastructure such as road, market and bank. Even when there is road connecting villages to sub-district, the road condition is not good enough. Sometimes it is only certain vehicles that can ride on the road. And certain areas especially outside Java, such public transport can only available on certain days, usually market days which can be only twice a week.







### *Access to finance*

Microfinance institutions are available and they can cover rural areas. However, they are mostly providing credits for small traders and not farmers. This is because farming is considered to be high risk and that there is no guarantee that farmers will get good harvest especially with current unstable climate and weather.

## *Access to insurance*

Similar to access to finance, there is not yet any specific product of insurance for crops and farming products. A pilot on rice crop is however being implemented by Government.



# Specific Issues



Rice is the main staple in Indonesia. Currently Indonesia is still depending on imported rice to meet the needs. Policy for government may be needed to make sure that the land for rice farming will not be converted into other use, especially in Java where rice can grow better. Subsidy for rice seeds and fertilisers needs to be evaluated. There are cases where subsidised fertilisers are kept by the distributors and farmers have difficulty to access it. Organic rice farming is becoming a trend. In the market, mostly modern and supermarket, there have been organic brands but with no certainty whether it is really organic and customers do not know how to be sure. There is still the need to support farmers to access information related to market, finance and insurance to support them improving their productivity. BULOG is needed to support farmers in marketing issue.



# Subsistence to Sustainable Farmers (Community plantation on crops such as coffee, tropical fruits, cashew)



Indonesia is rich with tropical crops such as coffee, tea, cacao, exotic fruits, candle nut, spices, cashews and coconut sugar. The challenges in this community plantation range from land dispute, aging tree/plantation up to the low capacity and skills of farmers. Further, such plantation with limited amount of trees, scattered in different geographical location and not being cultivated in a good way, cannot be the main source of income for farmers because the cash crops can only be harvested once a year. This situation has force them to also do other crops farming resulting in them to have limited time to take care of their cash crops. Further, the small size of land for multi-crops has made it difficult for farmers to obtain crops certification. Government support to facilitate farmers to organise themselves and do better farming system where farmers can have skills in doing better and effective multi-crops agriculture is required. Technology and information to assist farmer families to make them easier to make decision what crops are better for their land and how they can get access to information, market and finance will enable them to be more sustainable famers and not just subsistence farmers. Government policy in land tenure and land use can support farmers in their cultivation. Infrastructure to enable private sectors to connect to farmers (cooperative) will support the market environment





# Aging Farmers



Less and less number of farmers in Indonesia. Young generation in Indonesia do not see farming as a good way to make a living. Further, farming is considered to be low prestige, dirty and living in poverty. There is the need to promote 'modern farming' where people can do farming using technology and 'sophisticated yet user and environment friendly' application. Young people needs to be introduced with agri-preneurship where they can learn how to do agriculture using agri business (land farming as well as aqua farming) and smart climate approach supported by modern technology and mobile application. Examples from successful farming by young people need to be exposed. Media promoting smart-agri-preneurship needs to be increased. Specific activities for schools and curriculum in the higher education may need to be developed to promote smart-agri-preneurship ■



# Water for Agriculture



Agriculture requires lots of water. There is not yet any clear information how farmers in Indonesia has been using water for their farming (land, aqua as well as animal farming). In Indonesia, we are used to see land farmers pumping water from ground to water their crops. And for animal farmers (such as dairy), we used to see farmers use lots of water to clean the cow's pen. There is the need to explore and find methods to make effective use of water



# Aquaculture



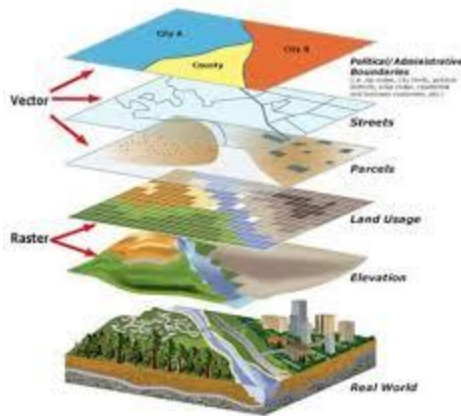
Indonesia is an archipelago country surrounded by water (sea and river). Yet, aquaculture is not an issue where people can easily talk about. Support in the form of introducing smart aquaculture business using modern affordable and user-friendly technology may need to be developed. Partnership between fisherfolks and private sectors to create better and fair business environment should be explored and supported. Aquaculture practices using more environment friendly approach can be developed to help private sectors who have been working with fisherfolks to increase aquaculture productivity



# Possibilities of Solutions - General

- Landscape-based value change. Having a spatial map in a landscape or one geographical area, it will be easier to identify the area for farming and/or plantation, to identify the border of the customary land or forest, to identify water resources, etc. Having a clear map, it is easier to identify what sustainable value chain or supply chain that can be developed.
- Preventing land conflict and dispute due to unclear border.
- Disaster risk preparedness and mitigation. Having a good spatial map, we can also identify the potential natural disasters existing in the specific area such as eruption, flooding, earthquake. And based on the data/information, we can develop better strategy to reduce and mitigate the risk. Further, the community including farmers can develop strategy for adaptation of the changing spatial condition including strategy for evacuation and security.
- Spatial based information services can help farmers to get updated information on the forecast weather and climate change so they can decide crops that are more suitable with the weather and climate. Further, using the same information, bank and insurance companies can use them in calculating risks for crops damaged due to disasters and/or climate change

## Rice Farming



- G4AW: Profit sharing Agreement could be monitored using (radar & optical) remote sensing as indicator (be aware 100% legal prove classification of land is NOT feasible)
- G4AW: With the actual mapping of the location of rice using (radar) RS also local production and with that the effect on local market prices can be anticipated by within season rice (production) statistics from satellites during the growing season
- G4AW: a potential side spinoff of agricultural monitoring and acreage mapping of various crops by using satellite RS is that the extension service (Dept of Agriculture) can use the recent (within season) crop statistics indicators as a base for optimization of logistics to send more extension workers to areas with expected higher yields and acreage of crops



- G4AW: a potential side spin off of agriculture statistics retrieved from RS is that (certainly over the years average) indications of structural high or low yield regions of crops give indication where policy should invest in improving infrastructure onto the right places to benefit more from this in the future. RS helps in policy support and priority decision making.
- G4AW: The insurance model can benefit from risk indicators derived from RS: Crop Statistics produced can lead to structural (over the years) problem areas indication, which help in premium differentiation strategies or investment priorities to improve the situation in certain areas. E.g. due to structural water shortage or flooding or distribution of water in general in certain areas one could adapt insurance strategies and investment strategies on the long term to improve the situation

# Rice production increase for improved self sufficiency



G4AW: The potential crops statistics derived from (radar and optical) RS have been technically proven in the past in several projects (SARI project, and others). The operational applicability is depending on the acceptance of introducing this new information besides/on top/integrated with the traditional Indonesian census system.

G4AW: Irrigation and water availability is difficult to map in Indonesia using RS derived evapotranspiration products/services (due to cloud and thermal/optical RS), however radar can map the flooded rice area during the growing season and possibly indicate in temporal analysis the absence of water (leading to lack of inundation). This could lead to decisions to improve/change the water distribution to local areas.



# Subsistence to Sustainable Farmers (Community plantation on crops such as coffee, tropical fruits, cashew)



G4AW: RS derived crops statistics together with the census statistics could be input to landevaluation processes. Which areas are traditional low and high yielding areas for the various cash crops. In case of low yielding areas probably replacement with other (less vulnerable crops could be realised. This requires also collaboration with agricultural research institutes advising and testing on crops resillience to drought, diseases, poor soil conditions, etc.



G4AW: a specific example can be given on Oil Palm in South Kalimantan (peat areas), where RS could monitor the growth performance and map the location. Also the good and poor performance lead to indications of quality in soils and with that the suitability of growing other crops. It could lead to optimization of landuse when the right governance procedures are in place ■



# Aging Farmers and attracting (interest ) of young people



G4AW: The education and awareness of RS applications and the combination with modern technology like communication (app development, telecom and mobile solution, location based services) and ICT in general (like googlemaps, facebook, open data, etc) should be stimulated. In G4AW an educational component by involving entities active in education and research and development can be introduced. It requires a long term vision and should be especially stimulated by the government and the involved ministeries.

# Aquaculture



G4AW: the use of RS especially on water quality (optical RS) could help in monitoring waters with algae or waterplants (e.g. waterhyacinth or other plants). The monitoring could help in assessing problems on fishing cultures (preventing monocultures like the Nile Baars in Lake Victoria in Africa) or fish production problems due to shortage of oxygen or acidity due to organic waste for example.

## **Water for agriculture:**

G4AW: See earlier remarks with rice.



# Additional Information collected from Workshop



- Fisheries: LAPAN has developed a map of potential fish catching zone and the map can be accessed through the dept of fisheries at district level for free.
- Irrigation is still a big issue in Indonesia and it is worsened by climate change. Many farmers have turned to be water-catch rice farmers because the water is getting scarce. The irrigation scheme for agriculture that has been developed by national government is now about 65% that are not functioning. This is partly due to decentralization.
- This year (2014) the cattle insurance will be started.
- The infrastructure is not just about road but also the condition of farming facility such as quality of storage.
- GIZ with their program called ForClime has supported government at district level to use geodata to map their area. Such as in Kapuas Hulu. The map is used to link and upscale the agropolitan program.
- The extension worker is more focusing on monoculture

# Thank You

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