Background: Climate change and the challenges of irregular weather patterns for the farmers in Imogiri

Hundreds of farmers living in Selopamioro village, Subdistrict of Imogiri, District of Bantul, Indonesia have to confront the negative impact of climate change on their livelihoods. Irregular rain patterns lead to widespread crop failures. Paddy field farmers had traditionally timed the agricultural cycles based on the rainfall from December to January, but in recent years the rain has hardly fallen during this period, leading to dramatic reduction in harvest. For the tobacco farmers, the rain has been arriving unusually early. Planting tobacco in dry season is an established practice for this crop, but in recent years a high volume of precipitation had come soon after planting, causing a drop in the quality and consequently in the price of tobacco.

Local farmers have faced uncertainty as to the appropriate time for starting the planting season. They had been relying on traditional knowledge for weather forecast – called “Pranotomongo” – based on looking for signs from the nature. For example, the appearance of large swarms of fireflies used to be a sign of the onset of the rainy season, and a signal to the farmers to get ready for planting crops. Nowadays, local farmers see that fireflies are no longer the harbingers of the rainfall. The farmers have also tried to rely on the weather forecast provided by the Indonesian Agency for Meteorological, Climatological and Geophysics (BMKG). However, the conventional forecasting methods have also failed to provide a reliable guidance on the weather patterns. In many cases, farmers have planted crops based on the forecast by BMKG which predicted rainfall, only to face shortage of precipitation and harvest failure.

Future Steps towards Sustainability

Field Work Programme
Gadjah Mada University will deploy their students through the University Field Work Programme to continue assisting local community at project sites.

Water and Irrigation
Clean irrigation Movement will continue cleaning water dams and irrigation channel once every two months. In the near future they also plan to develop waste management system.

Improvemen of Food Products
Women farmers are improving the quality of their products to qualify for PIRT certification. After certification has been obtained, their products will be sold to marketing outlets linked to this project.

Agro-tourism
Local government, local community, and Gajah Mada University are continuing planning for the development of agro-tourism in the region.
sites with Gerakan Irigasi Bersih (GIB) or Clean Irrigation Movement. The movement is supported by an association of farmers’ organizations, comprising of 43 farmer groups. The movement promotes exchange of knowledge and improvement of practices in five areas: (1) education, (2) campaign, (3) opening access to participation, (4) waste management, and (5) cleaning and maintenance of irrigation. By linking local farmers at the project sites with an association of farmers groups, it provides a channel for peer-learning and support on the issue of water and irrigation.

4. Post-harvest and food processing activities to support agro-forestry and tourism

Training on food processing and food packaging were given to seven women farmers groups at project sites. These activities were aimed to build the skills of women farmers to give added value to agriculture products in order to be sold at a higher price so they can earn a better income. Some of these women farmers have produced crackers made from cassava or other vegetables for their family consumption, but not for sale. Others have sold their products, but not on regular basis, in limited amounts, without quality standardization, and at a very low price. Therefore, training from Gadjah Mada University enhanced the capacity of the women farmers to produce top quality snacks with attractive packaging. In addition to that, the team from Gadjah Mada University will assist these women farmers groups to obtain home-based food product certification (PIRT) from the District Health Office.

5. Livestock Management

Hygiene and sanitation are important criteria for home-based food production, as well as for tourism. At the outset of the project, hygiene and sanitation standards were lacking at the project sites. Cattle sheds were dirty with manure and left unprocessed. This is not a suitable condition for operating a home-based food production nearby and would not qualify for the PIRT certification. Gadjah Mada University assisted local farmers to introduce a communal shed to be used jointly by the farmers for keeping their cattle. The resulting manure would be processed to compost and biogas, to be used by the farmers themselves for additional cost saving, or to be sold to generate additional income.

6. Agro-tourism

The project sites has great potential for agro-tourism. Many spots in the areas have often used by for film location, pre-wedding photos, and recreation. However, no fees have been charged to the public and thus local community have not received any benefit. Meanwhile, there is an opportunity to generate revenue from the agro-tourism. Therefore Gadjah Mada University has facilitated discussions with key local government agencies and local community on developing an agro-tourism site. Planning phase is ongoing to identify plants/vegetation totaling trekking routes, plants/vegetation based on seasons and climate, rehabilitation and conservation of land, and potential products from the community.

Finding Solutions: Stakeholders and their Roles

University

Gadjah Mada University initiated the formal and informal exchanges between the local government, the community and private sector to identify socio-environmental problems that the communities face and to generate ideas on how to address them. The University also engaged in the transfer of knowledge and technology to the community – by contributing to the development of innovative technology for weather forecasting made available to farmers’ organizations, and by offering suitable technology for food processing to the women farmers. The University provided advice to the village governments on the most effective technology solutions to meet the local farmers’ needs.

Local Government

Village governments took part in the trainings, provided venues for community meetings and discussions, as well as agricultural lands for planting crops. The village government also made allocation from the village government budget for purchase of technology to support the food-processing initiative.

Local Community

Local farmers have dedicated their time for capacity building, including exchange of knowledge and skills between farmers groups. They have also contributed their labour in implementing agro-forestry system, building of communal sheds for their cattle, and cleaning the irrigation.

The harvest failures and ensuing economic pressures have pushed people to exploit nearby forests, leading to deforestation, land conversion and loss of biodiversity.

Gadjah Mada University, with support from UNESCO within the framework of Indonesian-Fund-in-Trust project on addressing social implications of climate change in Indonesia, assisted local community in two villages, Selopamioro and Terong, to deal with socio-economic impact of climate change.

The Intervention: Sustainability Science Design

1. Capacity Building to Mitigate Impact of Climate Change

The University organized trainings for the local farmers on climate change and its environmental implications, with a special focus on weather forecasting to determine planting period. In response to the difficulties on predicting the weather, Gadjah Mada University is developing a device to provide weather forecast specifically made for the villages at the project sites. The device will collect various data from the sites to generate the forecast. Local farmers will be able to access the forecast through Android Apps. The idea of connecting the weather forecast to Android Apps was based on consideration that many of the local farmers use Android smartphones.

2. Capacity Building on Agro-forestry

To minimize the risks of harvest failure in the face of climatic virations, the local farmers received training on agroforestry system, including types of crops suited for the area, amount of water needed, planting method, and maintenance. The trainings were carried out in the fields. Implemented changes included the planting of red ginger, which can provide higher income for the farmers as compared with the frequently planted cassava.

3. Water availability to support agro-forestry

Gadjah Mada University facilitated the building of networking between local farmers at project sites with Gerakan Irigasi Bersih (GIB) or Clean Irrigation Movement. The movement is supported by an association of farmers’ organizations, comprising of 43 farmer groups. The movement promotes exchange of knowledge and improvement of practices in five areas: (1) education, (2) campaign, (3) opening access to participation, (4) waste management, and (5) cleaning and maintenance of irrigation. By linking local farmers at the project sites with an association of farmers groups, it provides a channel for peer-learning and support on the issue of water and irrigation.

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Private Sector

Private sectors contributed in the initiative by commitment to provide marketing outlets for food produced by the women farmers groups. The Kompas national daily newspaper offered a training to local farmers on citizen journalism and the use of social media for information dissemination and promotion of local products. Local media also played a role on reporting on the issues confronting the local farmers, or the activities conducted by the farmers.

The Impact

Capacity building processes have increased knowledge and skills of local farmers. Different types of crops that have not been previously considered as suitable for the area have been planted in the fields by local farmers. They also have new hope to have better income from compost, biogas, food products and agro-tourism. Local farmers have prepared the communal shed by cleaning the sheds and holes have been dug for biogas installation. Women farmers are now motivated to produce snacks to be marketed. They have started making snacks from various vegetables and calculating the production costs for a business plan.

Farmers at project sites have participated in activities of the Clean Irrigation Movement. One of the activities was held as a public event called “Mapag Toyo,” which in the local Javanesan language means “welcoming the water” as a symbol to initiate the new planting season of 2017. In this event farmers, local government officials, Gadjah Mada University and private sector took part in cleaning water dams and irrigation channels.