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Exploring the utility of a community seed bank in Sarawak

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Background

The vast majority of the world's small farms (those less than 2ha) are located in Asia, where rice grown on hillsides (padi bukit) is an important staple. In particular, the livelihoods of indigenous Iban and Bidayuh farmers in Sarawak, Malaysia, are centred on hill padi. These farmers practise shifting cultivation, where forest is cleared to grow rice and later left fallow for many years to regain fertility. In recent years, increased allocation of arable land to cash crops, such as oil palm and pepper, has led communities to grow hill padi on steeper slopes at higher altitudes, where the land is more fragile and the climate more unpredictable. Population pressure and limitations on land procurement have led to a reduction in the fallow period, which reduces soil fertility and crop yields. These trends, which may be exacerbated by the effects of climate change, threaten the preservation of traditional agricultural biodiversity in these communities and the cultural identity that it embodies. Although, in many cases, the rice harvest does not meet family subsistence requirements, Iban and Bidayuh farmers continue to cultivate hill padi because of their strong cultural and religious connection with rice.

Historically, government and outreach agency approaches, which have aimed at increasing rice yields and replacing the shifting cultivation practice with more productive methods, have met with limited success. However, from 2010 to 2012, the Sarawak Institute of Agriculture Scientists, the Sarawak Department of Agriculture and the Platform for Agrobiodiversity Research worked together with indigenous communities in Sarawak to support the maintenance of agro-biodiversity and the adaptation of their traditional farming systems to climate change. The objective of the project was to increase local diversity of crops and access to genetic resources by increasing awareness of the value of diversity in adapting to climate change. It also aimed to explore how community gene banks could respond to farmers' needs by promoting dialogue between farmers and research scientists at the participating institutes. The community participants were the inhabitants of the Bidayuh village of Gahat Mawang (Serian District) located 125km south of Kuching and Iban people living in the longhouses of Mujan, Murat, Mejong and Nanga Tebat in Skrang

(Sri Aman Division), 250km southeast of Kuching. The project involved 204 households.

Raising awareness of agricultural biodiversity

To increase awareness among community members about climate change and the value of agricultural biodiversity, several participatory methods were used:

- *Four-cell analysis*: In April 2010, farmers from Gahat and Skrang carried out an experiment to assess how crop biodiversity is managed in each community by measuring the extent and distribution of rice varieties. In this technique, farmers place slips of paper representing different varieties in one of four quadrants indicating how many households grow them (many or few) and over how large an area (large or small). Some crops, e.g. those grown in large quantities by many households, are considered stable, while others, those grown by few households in small quantities or over small areas, can be considered at risk, because if one family stops growing them or one disease or bad year wipes out the strain, the variety could disappear.
- *Crop catalogue*: A booklet in the local language and English describing and picturing the plants cultivated in Skrang is in preparation. It is based on information gathered in surveys and community discussions with Iban farmers. This document is intended to illustrate the rich diversity of crops the communities manage and to serve as a public awareness instrument.
- *Community biodiversity register*: A record is kept by community members of the local genetic resources, including information on the custodians, passport data, agro-ecology, cultural and use values. Farmers were introduced to this practice in February 2012. The biodiversity register allows careful documentation of crops planted and their performance from year to year. It helps the farmers recognize trends in crop yield in relation to variety, weather patterns, pests and other factors.
- *Participatory varietal selection workshop*: In January 2012, a farmer/plant breeder from Nepal gave a workshop on participatory varietal selection in Sarawak communities. Through this method, farmers learned to identify valued characteristics of traditional varieties and were very enthusiastic about trying it out (Plate 10).
- *Community seed fair*: In July 2010, a seed fair was held during the state-level Farmers, Fishermen and Breeders Day celebration at Betong. The fair encouraged lively discussion and the exchange of germplasm in and between communities.

Promoting dialogue

To address the second objective of promoting dialogue among farmers and scientists, a workshop was held at the rice gene bank in the Agriculture

Research Centre in Semongok in August 2010. This gene bank is a small, simple facility set up by the research centre's rice section under the Sarawak State Government to keep traditional seeds from being lost because of crop failure or when farmers switch to modern varieties. Conservation work began in 1963, when 305 accessions were collected; it continued over six Department of Agriculture explorations from 1991 to 1999 and now includes over 2,000 accessions of rice.

During the four-cell analysis conducted as part of the Platform for Agrobiodiversity Research project in Sarawak, an additional 95 varieties were identified, with priority given to traditional varieties identified as grown by few families over a small area. During the workshop, farmers provided about 100g of seeds of each variety to the gene bank managers. These samples were processed, cleaned, placed in glass jars sealed with wax and stored at a temperature of 16°C.

The workshop gave community members an opportunity to learn about conservation efforts undertaken by the government and fostered discussion about the potential roles that gene banks can play in meeting community needs. Farmers toured the facility and were shown how their seeds had been processed and stored. The farmers were fascinated by the simple air-conditioned storage facilities. Some remarked that, although they may not have money in the bank in Kuching, it was a consolation to know that they now owned something even more precious than money in the Agriculture Research Centre's rice gene bank.

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As a result of seeing the seed-storage facilities, many workshop participants expressed a desire for larger seed-storage facilities at the farm level to counter problems with weather. The success of hill padi cultivation depends on timing of the burning step in relation to the onset of the rainy season, and the farmers had experienced failed germination when the rains were late. Currently, they stored their seeds in containers made of natural material covered with plastic to protect them from moisture and pests. Workshop participants asked the Department of Agriculture to expand the gene bank facility to accommodate larger quantities of their seeds with the possibility of retrieving them for future cultivation. Alternatively, they suggested that the project set up a seed-storage facility in their villages. They suggested that many people would deposit their seeds in the bank, as many have experienced irretrievable loss of their heirloom varieties (see Box 20.1).

In response to the farmers' interest in better seed storage, focus group discussions were held in Gahat and Skrang in August 2012 to explore the potential for establishing a community-managed seed bank. Twelve community members attended these meetings; in Gahat, most participants were men. Farmers in Skrang welcomed the idea of a community seed bank, although their interest depended on the quality of the facility and the provision of a salary for its management. As in other aspects of the project, community members in Gahat were hesitant to engage in this activity at a community

scale. A third of these farmers felt that such a facility was not required, as each family had its own varieties and ensured that they remained viable. However, another third were receptive to the idea because it could ensure that their children would one day have a chance to see their traditional varieties. One of these farmers suggested putting all their seeds in the gene bank facility at Semongok so as not to increase the workload of the farmers. In general, labour is an issue in these communities, as young people are leaving and those who remain have an increased workload.

Unfortunately, the modest gene bank at Semongok lacks the space to accommodate the needs of the communities. The potential for expanding the

Box 20.1 Provision of seeds for adaption to climate change

During the gene bank workshop, farmers expressed a desire to have access to rice varieties (particularly traditional varieties) that have better tolerance to pests and diseases, which they saw as major problems associated with climate change. The characteristics of rice most valued by the farmers were organoleptic and agronomic qualities, followed by postharvest features. There was also a request for high-yielding rice varieties that are able to grow well with minimal pesticide and fertilizer inputs. Gene banks may be able to provide varieties that will satisfy farmer demands.

During an earlier gene bank workshop, farmers were provided with seeds capable of growing in marginal, drought- and flood-prone environments, according to available records; the varieties were Buntal B, Serasan Puteh and Serendah Kuning. Several farmers who had grown these varieties were interviewed during the community discussion in January 2010 regarding their performance and reported that they ripened early but all three varieties were too short. According to one farmer, one variety was good but its panicles were too long. There were several reports of birds and monkeys eating the seeds. None of the three varieties performed well according to the farmers and, as such, they did not intend to plant them again. During the discussion, it was noted that some farmers had mixed the seed and planted it together with other varieties. The farmers had also rebranded the seed as 'padi Kuching' or named it after their own family.

This qualitative evaluation suggests that the seeds did not meet the expectations of the farmers. The passport data associated with the rice seeds at the seed bank lacked information on the environmental tolerances of the plants. Including more details on the environmental preferences of accessions in the gene bank would make it easier to select varieties more adapted to climate change.

facility to store more farmers' seeds as a 'hotel service' might be explored further. The cultural taboos related to padi seeds place constraints on seed exchange and sales. Although, in a way, this is a form of protection of farmers' rights over local varieties, it does not create the conditions needed for an effective and dynamic community seed bank.

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