

# Climate Field Schools in Indonesia: Improv

**Following the successful Farmer Field School approach, experimental Climate Field Schools were set up in Indonesia. These aim to increase farmers' knowledge on the climate and improve their response to it. Climate is another reason for building up resilience in farming systems, and this was built into the CFS curriculum. Farmers are now more aware of how to use climate information in managing their soil, water and crop resources for best effects.**

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**F**armers have always responded to climatic variability, particularly to changes in rainfall, by adapting their practices throughout the season. This involves adapting their choice of crops, crop varieties, planting and other cultural measures, while at the same time managing and manipulating the soil, water and microclimate where possible. Climate change complicates this so-called "response farming", but it does not change the principles of the approach.



Photo: Esti Anantasari

**Farmers in Gunung Kidul look at the changes in crop growth as part of their analysis.**

One way forward is to improve coping strategies to increase farm resilience within the limits set by the environment. Response farming could be improved through better weather forecasting and planning. The best example in the agro-meteorological literature is found in pilot projects set up by the National Meteorological and Hydrological Service in Mali, West Africa. Here, information is regularly received from farmers' fields; forecasts and advisories are then disseminated throughout the growing season. This makes it easier for farmers to respond and adapt. In Indonesia, however, farmers we spoke to in this study generally found official rain forecasts and predictions of little use, because they are not sufficiently downscaled. Farmers were more interested in making their own observations, and acting on them.

## **Using climate information**

The idea of improving extension support to response farming led to the development of Climate Field Schools (CFSs) in Indonesia. In 2005-2006, an experimental CFS was set up in Indramayu, West Java to increase farmers' knowledge on using climate information in their decision making. The collaboration included the Indonesian Ministry of Agriculture, the Asian Disaster Preparedness Center (in Bangkok), the Indonesian Agency for Meteorology and Geophysics, and the University of Agriculture in Bogor.

Indramayu was the site chosen because of its confusing variations in water availability. Farmers live in lowland areas and cultivate rice as their staple crop. They have developed diverse agricultural systems in response to the different water regimes: full technical irrigation, partial technical irrigation, and rainfed agro-ecosystems. Accordingly, rice planting varies from one to three growing seasons per year.

In 2007, a second CFS was established by government extension in a contrasting setting in central Java: Gunung Kidul. An active farmers' group existed there already, some of whom had previously attended a Farmer Field School, which offered promising follow-up possibilities. Farmers in Gunung Kidul live in dry rainfed hilly areas and cultivate multiple cropping systems the whole year round where water allows. But rice can only be planted once a year. The CFS lasted almost five months, with twenty farmers attending twelve meetings in that time. Besides sessions on climate and water regimes, farmers experimented with local practices of dry multiple cropping of rice, corn, cassava, sorghum, tobacco and vegetables. In particular, as rice is a one-season crop here, participants set out to improve water management through establishing ridges in the rice fields.

Since May 2007, the research team of the Academy Professorship Indonesia in Social Sciences & Humanities for Gadjah Mada University's Graduate School (Yogyakarta), carried out ethnographic fieldwork in Gunung Kidul. The team observed the CFS, the participants' local knowledge and practices, their interpretation of the school's teaching, and responses to the climate. The authors participated in discussing alumni farmers' questions over several days in December 2007 and May 2008.

## **Climate change and forecasting problems**

Across the whole of Indonesia, "climate change" is real. Rainy seasons on the islands of Java and Bali, for example, start later and stop earlier, while the amount of rain remains roughly the same, resulting in higher rainfall intensities. An important issue that has emerged is the need to improve farmers' capacity to use climate forecasts and other agrometeorological information in their activities. For instance, farmers in Indramayu are finding it difficult to determine an appropriate planting time for rice under the changing conditions of the rainy seasons.

Many Javanese farmers know about *pranata mangsa*, a world-view based on the Javanese lunar cyclical calendar (the position of stars). The Gunung Kidul farmers depend on this cosmology, as well as observations of the environment, to work out their planting schedule. These farmers are now confused and worried that the guidance they receive from *pranata mangsa* and local observations, built up over time, is no longer of much use. Observations that used to indicate the start of the rainy season are, for example, falling leaves, singing birds or noisy insects.

# ing “response farming” to climate change

However, similar to experiences common now in the African drylands, false starts to the rainy season and unusual dry spells are now being experienced.

In Gunung Kidul, farmers practising rainfed agriculture are interested in understanding the causes of climate change better and hearing about the basic processes behind it. However, the experimental CFS did not delve into this deeply enough. During our follow-up meetings, we tried to explain in simple terms what global warming means and its most likely causes. We then looked at what the consequences are for the atmospheric circulations that determine weather and climate. We emphasised that the trend of climate change is not going away, that larger numbers of more, and more serious, extreme events have already occurred and will occur more frequently in the future. This goes against the farmers’ long built-up cyclical cosmological knowledge.

## Climate change another entry point

If anything became clear to us in our interactions with farmers, it is that climate change is just another reason for building up resilience in farmers livelihoods. Soil and water management, pests and diseases, crop choices and their adaptations, are examples of related issues the farmers in Gunung Kidul wanted to discuss with us. This means that ultimately only the complete livelihood approach counts for Farmer –or Climate– Field Schools.

### *CFSs and soil & water management*

Climate change means that farmers need to adapt to the changes in opportunities for harvesting water, as well as taking measures to prevent water logging and flooding of their fields. In addition to field planning, using responses to forecasts and actual behaviour of the rainy season, a complete understanding of in-field water harvesting principles is highly important. In Indramayu, farmers requested that future CFSs deal more with these latter issues. In Gunung Kidul, farmers’ core issues were to have a better understanding about preventing field water losses, as well as taking on-farm rainfall measurements.

## Improving soil management

Farmers have their own ways of classifying soils according to types, colours, and the combination of both (e.g. light white lime, light red lime, heavy black clay, and light black clay). Related to the increased water runoff problems, they learned in the CFS that this runoff is more severe in light lime than in heavy clay soils. However, farmers perceived that heavy soils are suffering more from water runoff. We reasoned that with such differences in arguments, other factors must be involved. We suggested that slope and soil surface characteristics had a greater influence on soil loss and water runoff, than other soil properties that determine infiltration. Soil surface characteristics include state of tillage, surface cover and other obstacles to water flow.

Building up organic matter was also taught as being an important aspect of soil improvement, for example, not burning fields, nor removing falling leaves or other biomass. We further discussed how contaminated soil gets “cleaner” after applying an organic approach, and whether and how inorganic fertilizer may be combined with organic fertilizer in the long run. We found that it was particularly important to include knowledge on root systems in soil and water management. Crops’ root systems can react to availability of water, availability of fertilizers and competition from intercrops, including trees, depending on the soil horizons they can use.

During the Climate Field School, farmers compared yields in field experiments. Since ridges showed a positive effect in harvesting rainwater, farmers in Gunung Kidul implemented the extensionists’ advice to build in-field ridges to preserve water.

### *CFSs and pests & disease*

Prior to the CFS, farmers did not know the relationship between pest populations and the microclimate. On the basis of their observations and experiences in the school and follow-up, all the farmers were convinced that the less rainfall there is, the more insect pests there are. Under less than normal rainfall, chilli and vegetables are attacked in particular.



Photo: Esti Anantasari

**Climate Field Schools help farmers observe and compare. Farmers in Gunung Kidul recommended ridges in dry-rice fields intercropped with maize.**

In India, a new development for fighting pests and diseases, using warnings from operational agro-meteorological services via the Indian Meteorological Department, will soon begin. This is seen to be very important because changes in rainfall patterns result in shifting pest and disease problems.

### *CFSs and choice of crops*

Farmers adapt more often and faster than is often assumed. Crop choice is a dynamic practice on most soils and has to be even more so under a changing climate. Prior to the CFS, farmers at the two sites were already growing crops suitable to seasonal climatic conditions. However, despite much local knowledge, the farmers are feeling insecure. To increase their farms’ resilience, much better advice is needed on a variety of matters: which crops to grow; in which rotation; on which soils; under which soil conditions with respect to fertilizer history; water use efficiency potential; soil depth and aeration, as well as presently changing rainfall patterns. Farmers need help to do this more efficiently and to disseminate results beyond the local trials. In the CFS, their knowledge was enriched and strengthened by the teachings and observations. Farmers’ presentations in meetings and during our field visits showed the great knowledge they had acquired on suitable crops and the adaptations needed to respond to changing conditions in weather patterns and market developments.

## Farmer observations to respond better to climate change

In terms of climate change anticipation, farmers are good observers and experimenters. They already do adapt but could adapt even more, if they link their own experience to the results of such organised experiments. They are not in the habit, however, of taking notes of their own experiences and observations. In the present unanticipated climate variability, they should regularly write down the particulars of each season to document the changes that are occurring. An argument



Photo: Kees Stigter

**Hedgerow intercropping design on sloping land at the World Agroforestry Centre's experimental fields in Machakos, Kenya.**

frequently used by the farmers of Gunung Kidul themselves was that documentation is an aspect they miss, when compared to better organised societies. We mentioned examples of some traditional societies, where information on changes in plant, tree and crop phenology (cyclic and seasonal natural phenomena

in relation to climate, plant and animal life) had actually been preserved. If documented, these examples could then be more actively gathered and disseminated through Climate (and other) Field Schools.

CFSs go beyond farmers' empirical methods by bringing in experiences from elsewhere, from science and through participatory experiments. Recent discussions in Indonesia looked into how to move away from its dependence on rice. It was proposed that new cropping systems should be tested on-farm in a participatory approach, under the presently changing climatic conditions. As shown by Indramayu and Gunung Kidul, Climate Field Schools can play an important role in such a process. ■

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# Call for articles

## June 2009, Vol. 25.2 Rural Entrepreneurship

Families who farm on small areas of land find it increasingly hard to survive on farming alone. Farming may provide at least part of a family's needs for food, but farmers also need cash: their children are going to school, or they incur medical expenses. The problem they all face is that opportunities for off-farm employment in rural areas are limited. Migration to urban centres in search of work is a very widespread strategy. Whenever possible, people seek work as construction or agricultural labourers closer to home. Those who show motivation and interest, and who have some resources to invest, engage in rural entrepreneurship. They may be running a shop or a small agri-processing business.

In several areas new and different opportunities have emerged. Access to markets (and to market information) has improved, new opportunities have been created for selling organic "regional products", sometimes directly to the consumers. In other cases, initiatives have been taken to pay farmers for their ecosystems services. In mountainous regions and other areas with tourism potential, farmers have moved into (eco)-

tourism. This has meant developing managerial and other skills needed for running home-based enterprises.

This issue of the magazine will focus on how farmers are finding other sources of income, taking opportunities which complement their farming systems, and contributing to an improved quality of rural life. How have traditional and less traditional types of rural entrepreneurship contributed to stronger local economies, and how have they contributed ecologically and socially?

*Articles must be submitted by March 1<sup>st</sup>, 2009, to Jorge Chavez-Tafur, editor, at [j.chavez-tafur@ileia.nl](mailto:j.chavez-tafur@ileia.nl)*

**Vol 25.3**  
**Gender and food sovereignty**  
*Deadline: 1<sup>st</sup> June, 2009.*

**Vol 25.4**  
**Sustaining the gains**  
*Deadline: 1<sup>st</sup> September, 2009.*