



**PAYMENTS *for***  
**ECOSYSTEM SERVICES *and***  
**FOOD SECURITY**





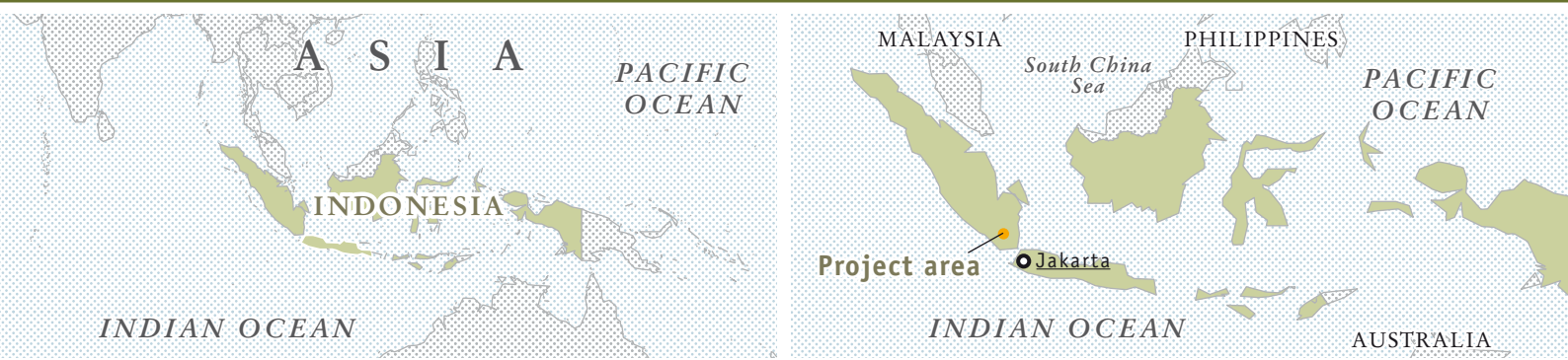
# PES AND MULTI-STRATA COFFEE GARDENS IN SUMBERJAYA, INDONESIA

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Sumberjaya is a sub-district (542 km<sup>2</sup>), in the district of West Lampung, which has historically been the dramatic scene of massive deforestation escalating in social conflicts and poor households. Since the 1970s, Sumberjaya recorded a rapid expansion in smallholder coffee cultivation. Although the government was aware of the consequent high uncontrolled deforestation rate, it was only in 1990, when a hydropower plant was planned in the upper watershed of the Way Besai River, that it took action, concerned about slope erosion and potentially high sediment discharge to the hydropower plant (USAID, 2007). Thus, 40 percent of the land in Sumberjaya was declared as areas of restricted use and forest protection and, between 1991 and 1996, thousands of farmers were evicted from their lands. In 1998, a reconciliatory negotiation promoted by the World Agroforestry Centre (ICRAF), the local NGO Watala, the Ford Foundation and the UK Government's Department for International Development (DFID) was initiated to resolve the huge social conflict and promote sound land-use management.

In 2000, as the farmer eviction was ultimately seen as ineffective, a legal decree established a community forestry programme, called *Hutan Kamasyarakatan* (HKm). The programme, equivalent to a public-led PES scheme, allowed groups of farmers jointly applying as a community to obtain legal permission to use the state-owned land. The permission was issued for a trial period of five years with the possibility of extension for a further 25 years. In return, the farmer community commits to protect native forest trees and convert coffee monocultures into multi-strata coffee gardens (Figure 39). In these coffee gardens, coffee is grown together with some vegetables and medicinal plants under the shade of *Erythrina lithosperma*, *Leucaena glauca*, *Albizia falcata* and various types of fruit trees.



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When a contract is signed an inventory of the existing trees on the contracted land is made and the composition of the agroforestry plots to be maintained is set. In addition, the community agrees to protect the natural forest from logging and forest fires, to adopt soil conservation practices and to plant additional trees — seedlings can be obtained from the local forestry office. Performance is evaluated on the overall land, thus, the whole subscribing community is responsible for compliance of PES requirements.

## ESTABLISHMENT OF A PES SCHEME

The IFAD-funded RUPES (Rewarding Upland Poor for Environmental Services) initiative has been acting as a facilitating intermediary began in 2004 and this has helped to scale up the success of the *Hutan Kamasyarakatan* initiative. To date nearly 6 500 farmers have received conditional land tenure; this has doubled the local land value, reduced corruption, decreased bribing and consequently increased household income by about 30 percent. Above all, land tenure has motivated farmers to protect the remnants of native forests.

RUPES has also being involved in facilitating a privately-funded PES scheme by launching a pilot study, RiverCare, between the hydroelectric power plant set on the Way Besay River and a community of 70 households, living on 160 ha in the Way Lirikan subcatchment, which is the contributing to major sediment discharge in the Way Besay River (Figure 40). The Way Besay hydroelectric plant, operational since 2001, presently provides 60 percent of the electricity to the province of Lampung. The sediment load can be as high as 3 kg/m<sup>3</sup>/second and this creates a reduction in turbine efficiency, damages the plant filter and increases cleaning costs. Under the RiverCare initiative the community received a full payment of USD 1 000 in the first year to cover the implementation costs of digging sediment/litter pits, dead-end trenches, drainage ditches to reduce soil erosion in their coffee plantation, check dams in some rough



**Current pages**

**(from left to right):**

- Multi-strata coffee gardens consist of different vegetation layers constituted by timber-, fruit- and shade-based systems.
- Sediment pits improve the infiltration capacity of the soil and provide better conditions for coffee plant growth.
- Litter pit to facilitate accumulation of the litter layer and increase of soil protection and fertility.

sections of the river of slow its flow and sediment traps on public foot path and in gullies. In the subsequent years, the community has received payments according to the percentage of sediment reduction obtained (Table 16).

Table 16  
**Conditional payment scheme based on the reduction percentage of the river sedimentation load**

Percentage of sediment reduction	Annual payment received by the community (USD)
≥ 30	1 000
20-29	700
10-19	500
≤ 10	250

RUPES carried out an auction process in the villages of Mulya Indah and Wanasari to estimate the costs that farmers will face planting trees (a minimum of 400 trees/ha, which includes 70 percent fruit trees and 30 percent timber trees) to reduce soil erosion. Particular attention was given to ensure that farmers understood the auction mechanism. Thus, the auction was held in two sessions, one in each village. Participants bid seven consecutive times to allow them to become familiar with the auction process. The bids submitted in the last round were considered as the real auction output. During previous rounds participants developed familiarity with the process and adjusted their estimated opportunity costs on the basis of the previous bidding outcomes. Although there was an expected certain variability in the estimate of the opportunity costs given by participants, there were 19 auction winners in Mulya Indah and 15 winners in Wasanari. In both cases, the contract price per hectare of land under the PES scheme was set close to the average opportunity value estimated by the auction (Table 17).



Table 17  
**Results of the auction promoted by RUPES/IFAD to estimate opportunity costs of farmers planting trees to reduce soil erosion**

		Mulya Indah	Wanasari
Number of participants		48	34
Number of auction winners		19	15
Contract price per hectare of land (USD)		178	167
Opportunity costs estimated by the participants (USD)	Minimum	100	67
	Average	311	269
	Maximum	2 778	778

Recently, the RUPES RiverCare pilot project has been extended to 25 households in Buluh Kapur village. In this case, the first year payment was conditional on a 30 percent sediment reduction. Although the community did not meet this threshold, only being able to reach a 20 percent reduction, the Way Besay hydroelectric power plant delivered the first year’s payment as a token of goodwill and effort made by the villagers (van Noordwijk and Beria, 2010).

PES implementation in the Sumberjaya region gives an example on the critical role of the intermediary in facilitating and upscaling publically- and privately-funded PES initiatives. The key task was to re-establish people’s basic levels of trust in the government’s policy and programmes, which had been disrupted by a history of conflicts on land use and allocation. The intermediary was subsequently able to establish dialogue and mediate between the interests of a major hydroelectric power company in Sumatra and very poor local farmer communities.



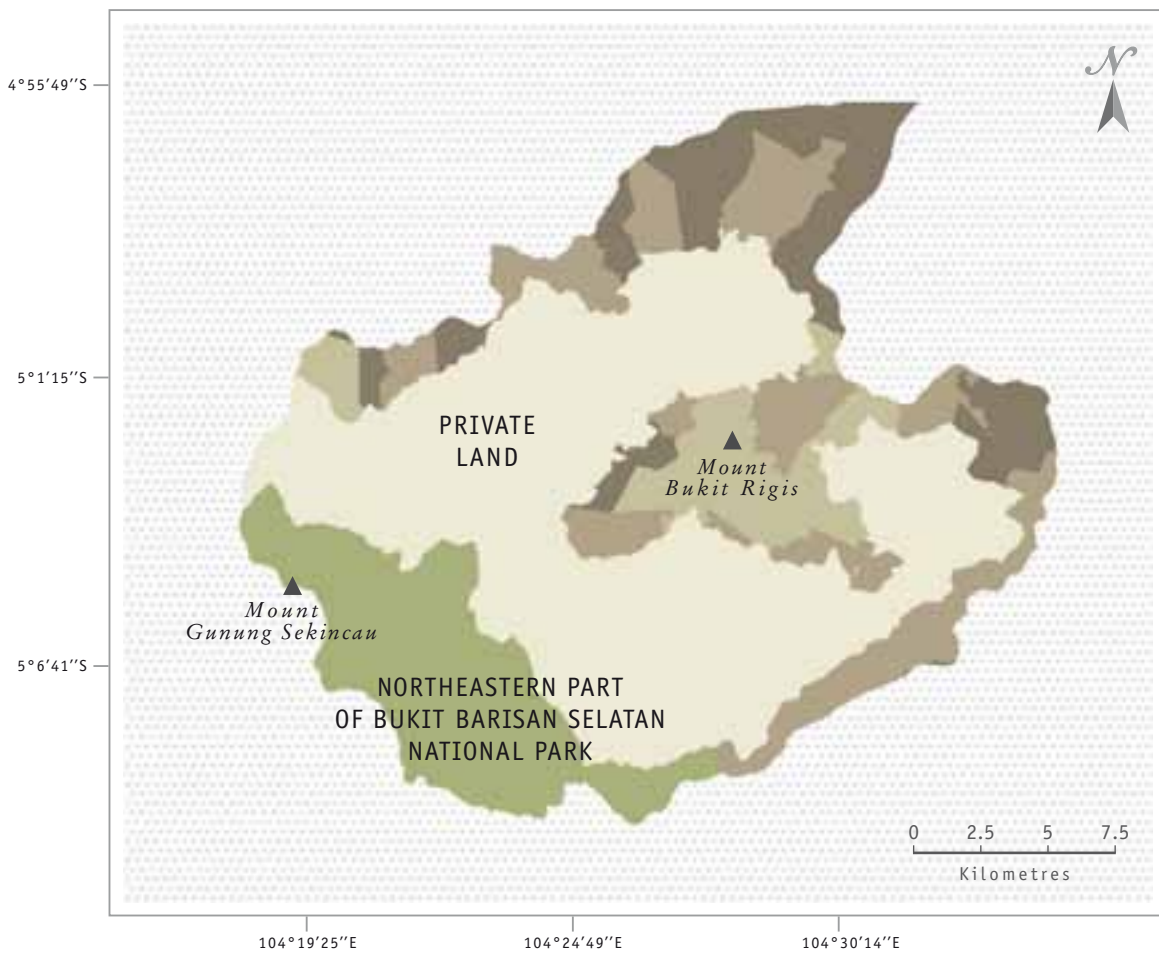


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**Current pages (from left to right):**

- Agroforestry of robusta coffee (*Coffea canephora*) provides a suitable habitat for different bird species, although frugivores and specialist and endangered birds will be less represented than in natural forests.
- Sumberjaya district produces about the 20 percent of the total coffee output of Lampung province.
- Village settlement of Buluh Kapur near the Besai Watershed, which has been involved in RUPES activities aimed at improving the livelihoods of the poor in the Sumberjaya district.

Figure 39  
**Occurrence of privately-owned and community-owned forests under the community-owned forest programme (HKm) in the sub-district of Sumberjaya**



**LEGEND**

- HKm permit
- HKm in process
- No HKm
- Areas that cannot be contracted for HKm

Adapted from original map by Andree Ekadinata (ICRAF)

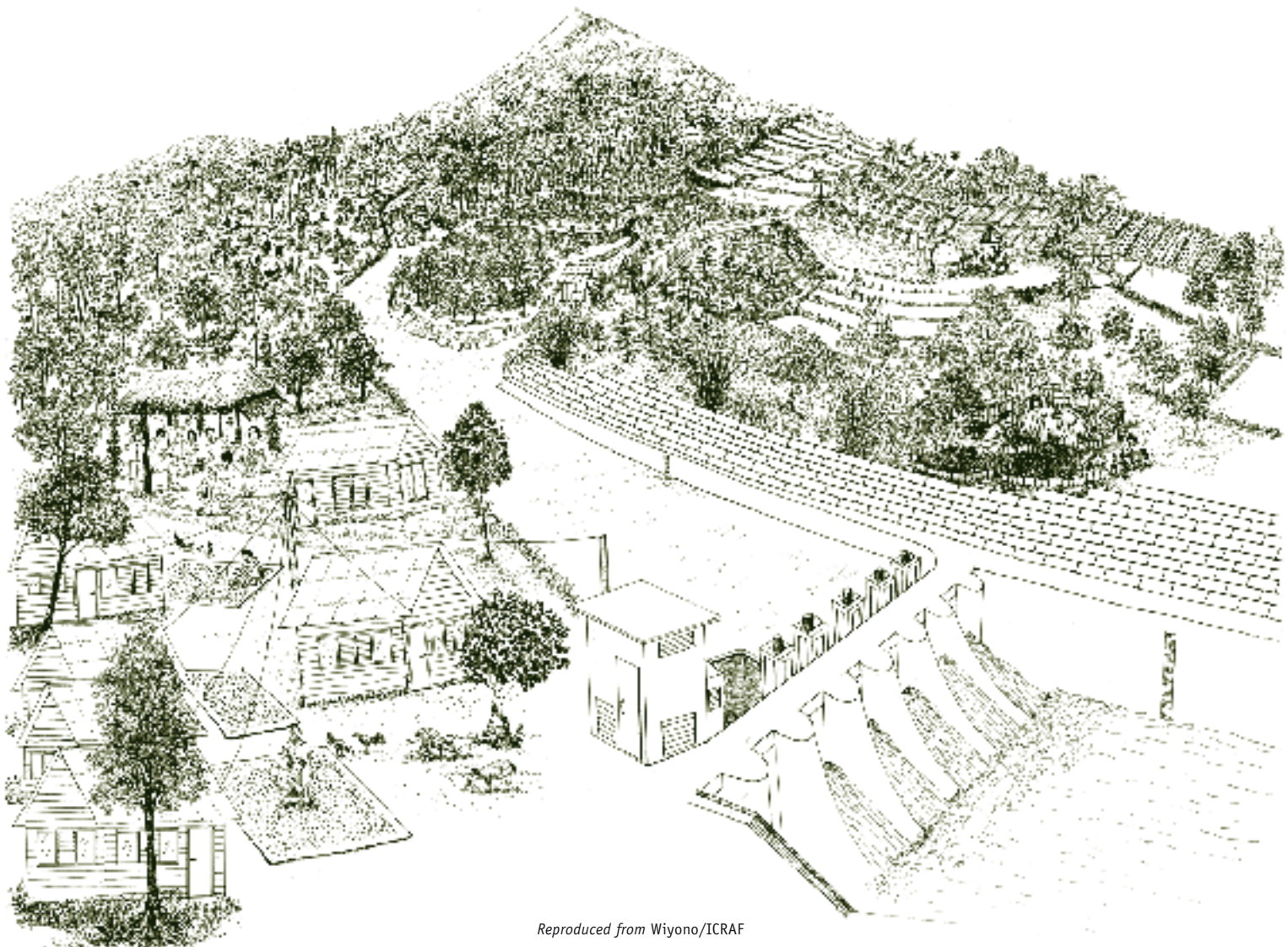


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Figure 40  
Healthy landscape mosaics and clean water for hydro-electricity



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**Current pages (from left to right):**

- The Way Besai hydropower dam provides about 60 percent of the electricity for Lampung province, but its functioning is seriously affected by a very high sediment load coming from the upper watershed.
- All watershed users need to work together to reduce the sediment load downstream.
- In Sumberjaya, the community forestry programme has resulted in impressive livelihood gains, increased equity and a sense of responsibility for land care.

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