



RUPES:

An innovative strategy to
reward Asia's upland poor for
preserving and improving our environment





Duku (*Lansium domesticum*) from agroforest. H. de Foresta



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The upland poor are often forgotten protectors of the hillsides and mountains that cover almost half of Asia.¹

"Asia's upland poor—often indigenous minorities—manage forested areas that provide *environmental services* such as clean water and biodiversity conservation, that benefit all of humanity," says Dr. Dennis Garrity, Director General of the World Agroforestry Centre (ICRAF), based in Nairobi.

"But the upland poor seldom get rewarded or recognized for their efforts in protecting those fragile environments."

ICRAF and its partners hope to change that through an innovative new program called RUPES—*Rewarding the Upland Poor for Environmental Services They Provide*. RUPES was formed through a funding partnership with the International Fund for Agricultural Development (IFAD), and is coordinated by ICRAF's Southeast Asia Regional Programme, based in Bogor, Indonesia.

"The rural poor earn income by harvesting natural resources, such as by cutting rain forests to sell timber, and to clear new farm land," Garrity explains. "But ironically, protecting those environmental resources provides no income."

"At least, not yet. RUPES is working with partners on how rewarding upland farmers for their role as stewards of upland landscapes can reduce their poverty while supporting environmental conservation—globally, as well as in the Asian uplands."

¹ Of Asia's 1,700 million hectares, 14% have slopes steeper than 30%, and 39% have slopes of 8 to 30%. (Source: February 2001. *Program for Developing Mechanisms to Reward the Asian Upland Poor for the Environmental Services They Provide*. IFAD/ICRAF Final Design Project.)

Environmental services

Asia's upland poor, who comprise almost a fourth of Asia's *absolute* poor,² inhabit the hilly areas where forests and crops intermingle, and some of the world's last great rain forests. Those ecosystems slow global warming by trapping vast amounts of carbon from the carbon dioxide and other "greenhouse gases" that cars and factories spew into the atmosphere.

"Agroforestry systems are also a haven for bio-diversity," Garrity says. "Plants in the forested areas—many not yet identified—will give us and our children new medicines, foods, and industrial products."

Healthy upland watersheds filter rainwater, to provide clean water for drinking, sanitation, irrigation, and power. They also prevent erosion, landslides, and flooding in the lowlands. And the forest beauty offers ecotourism benefits for ecologists and tourists—which means economic opportunities for poor communities.

But the upland ecosystems—which make life better for all of us—are deteriorating rapidly. Forests are falling to the chain saw. Housing developments, road construction, and ploughs to open new land for farming are forever changing hillside ecosystems. "Jungle rubber" agroforests—reservoirs of plant and animal diversity that also produce large amounts of rubber—are giving way to monoculture plantations of rubber and oil palm. Population and economic pressures force farmers to adopt environmentally unsustainable farming practices such as slash-and-burn agriculture on steep slopes, with insufficient fallow periods to recover the soil's health. The result is erosion, landslides, and flooding.

Upland farmers, especially in Asia, bear an unfair share of the negative side of development, IFAD has pointed out. They are often victims of economic exploitation because they often lack legal rights to farm, or even live on, the land that they work—much less to pass that land to their children.

Upland farmers seldom have a choice in environmental degradation. Many have no rights to the land, so they have few incentives to protect it. The poorest of the poor, bypassed by economic development and with few livelihood options, often must destroy, or stand by and watch others destroy, the natural resources that feed and sustain their families.

² About 250 million people.

Background to RUPES

RUPES was initiated at a February 2002 regional workshop in Indonesia, with 61 participants from potential consortium partners in 9 countries. With expertise provided by specially commissioned papers, working groups discussed the development of transfer payment mechanisms for environmental services. They agreed that a fundamental approach of RUPES would be to work in an action research mode—learning by doing—at specific sites around the Asian region.

RUPES Coordinator Fiona Chandler says, “Action research sites were included if they showed that they could overcome certain *killer criteria*—factors that were expected to make success unlikely. This included sites with very high value in alternative land uses, places with unresolved civil conflict, and sites that were too large to manage.”

Other international organizations that are committed to rewarding managers of fragile ecosystems joined IFAD and ICRAF to form an International Steering Committee. They include the Centre for International Forestry Research (CIFOR), the World Resources Institute (WRI), Conservation International, Winrock International, the International Institute for Environment and Development (IIED), IUCN, Ford Foundation, the Nature Conservancy and WWF.

The Philippines and Indonesia recognized that their uplands provide important environmental services, not only for the world but also for their own countries, and formed national RUPES committees.



Participants of RUPES Inception Workshop February 2002.
M. delos Angeles



Insect diversity (*Pterasperrum* sp.), Lampung, Indonesia. *K. Smets*



Tree canopy in tropics. *G. Vincent*



Small crater in Kalahan, Philippines. *M. van Noordwijk*

In 2003, RUPES focused on site selection, building partnerships, and raising awareness of the potential of rewarding and recognizing environmental services as a tool to alleviate poverty. After intensive review of 50 candidate areas, “action research sites” were initiated in the Ikalahan Ancestral Domain, Philippines, and in Kulekhani, Nepal. Four more research sites were started in 2004: Bungo, Sumberjaya, and the Singkarak Lake watershed in Indonesia and the Bakun watershed in the Philippines.

Six “associate” research sites have been identified in Indonesia, Philippines, and southwestern China. They will share information and exchange experiences. Vietnam and China have conducted studies, including surveys of RUPES-related research and opportunities and constraints for RUPES projects. Sri Lanka and Laos are also exploring RUPES involvement.

The RUPES strategy

// The heart of the RUPES strategy is to test a range of methods by which beneficiaries of environmental services can pay upland communities for their environmental stewardship,” Chandler says. “We’re also testing methods and institutional innovations that upland communities need to increase their options for livelihood by providing recognized and valued services to others.”

“To do that, communities must learn to monitor and measure the environmental services they provide, so they can have greater knowledge and control in terms of “selling” these services to potential buyers.

“RUPES makes available the knowledge, skills, and attitudes that upland communities need to increase their options for livelihood by providing a recognized and valued service to others.”

Rewards to upland communities include development of credit and market infrastructure, providing improved tree and crop varieties, better extension services to promote such agroforest technologies, and direct cash payments.

“Helping upland communities determine what rewards and reward mechanisms work best for them is a RUPES priority,” Chandler says.

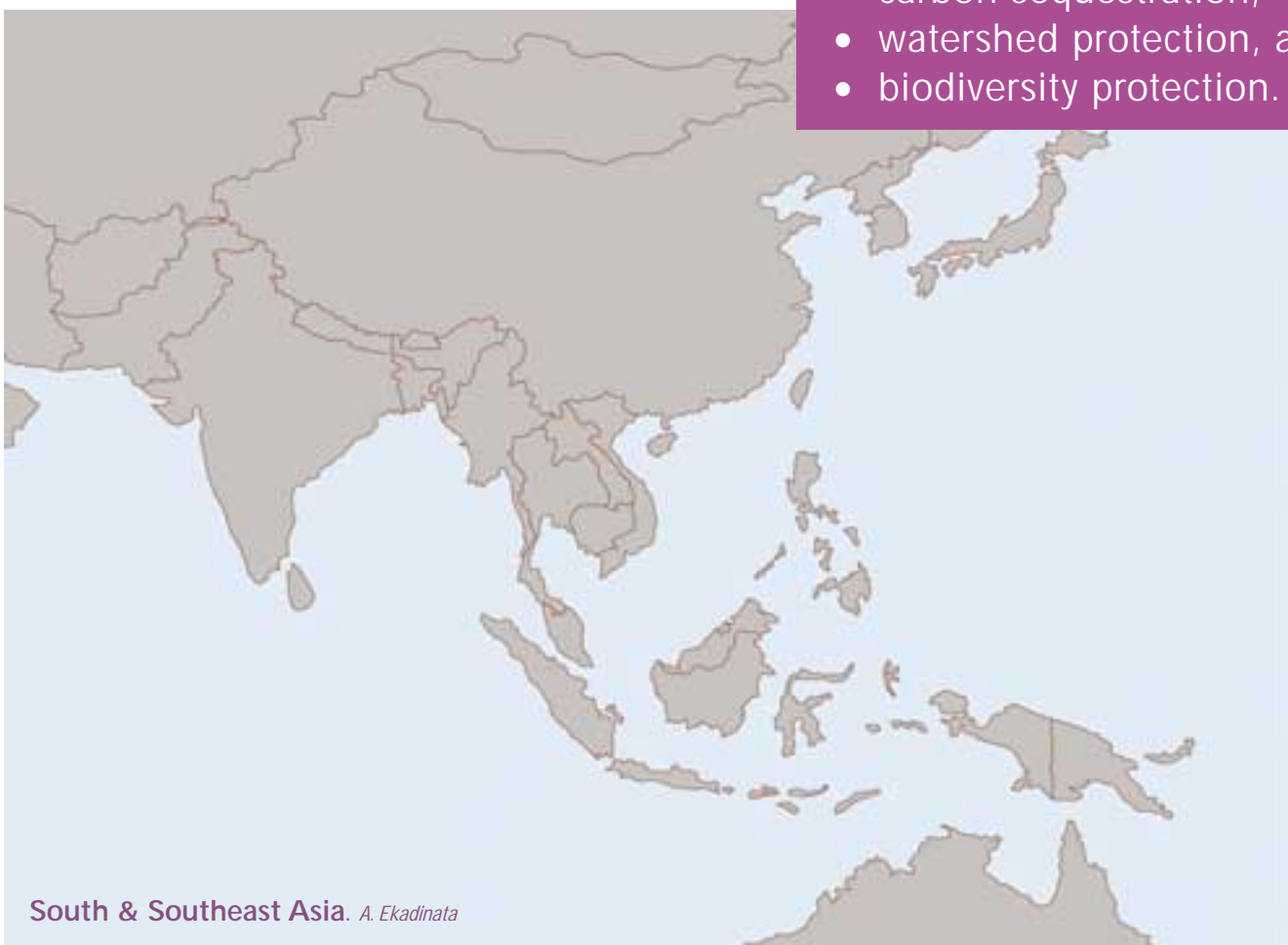
Land tenure can be an enabling mechanism or a detriment to providing environmental services.

In Indonesia, for example, millions of farmers live—often illegally, according to current government policy—on state forestland. Participation of such farmers in programs to improve natural resources is difficult unless they are provided security, through land use or property rights.

But in the Philippines, RUPES works with indigenous groups whose land tenure is secured through certificates of ancestral domain. Nepal has a policy of encouraging local people to participate in the management of common property resources.

Environmental services for which upland communities may be rewarded include:

- carbon sequestration,
- watershed protection, and
- biodiversity protection.



Carbon sequestration

// Greenhouse gases" in the earth's atmosphere, such as carbon dioxide, methane, and nitrous oxides, allow sunlight to enter the atmosphere freely. But when that sunlight strikes the earth, some heat is reflected back toward space. Greenhouse gases trap that heat in the atmosphere.

Most environmental scientists agree that increasing levels of greenhouse gases cause global warming, which may soon raise the earth's temperature by 1 to 5 degrees Celsius. This could trigger glacier melting, which would change the ecosystems of the Himalayas, the Andes, and the lowland regions that depend on them. Melting ice caps may raise sea levels, inundating low coastal regions such as southern Bangladesh, Vietnam's Mekong Delta, and much of Florida and Louisiana. Several Pacific islands would disappear from world maps. Other impacts of global climate change are severe climate change, coastal erosion, increased salinization, and loss of coral reefs.

Poor people are especially vulnerable because they depend on the weather for their livelihoods, and they are concentrated in the tropics, where global warming will have the greatest impacts.

The combustion of fossil fuels such as gasoline, diesel, and coal for industry and transportation generates about 65% of the greenhouse gases. Globally, agriculture, including brush burning for slash-and-burn farming, generates about 20% of the greenhouse gases.



Pollution from industry (pulp factory). G. Michon



Forest Fire. R. Permana

World carbon emissions are 1.1 tons per person yearly. That's high, but emissions are 3.1 t/ha in developed countries, and 5.6 tons in the United States.

The Kyoto Protocol, signed by 180 nations in 1997, commits 38 industrialized countries to cut their emissions of greenhouse gases, by 2012, to levels 5.2% lower than in 1990.³

Living plants trap and store, or *sequester*, atmospheric carbon, so their maintenance can help counter global warming. Decomposition and burning of organic matter returns carbon to the atmosphere.

³ The Kyoto Protocol has not yet been ratified by enough countries to come into force.

Ecosystems differ in efficiency as “carbon sinks.” In mature forests, decomposition offsets carbon sequestration. Relatively young forests have the highest rates of net sequestration.

“A hectare of nonproductive cropland or grassland traps no carbon,” says Meine van Noordwijk, ICRAF’s Southeast Asia Regional Programme Coordinator. “But when shifted to agroforestry, that hectare can trap more than 3 tons of carbon.”

“Carbon swapping” is a strategy through which companies in industrial countries can help finance projects that trap greenhouse gases, such as maintaining carbon sinks through forests, as a tradeoff for their own carbon emissions.⁴

“Carbon swapping has potential, and RUPES is looking for opportunities for carbon swaps to reward farmers in Asia’s uplands for their stewardship,” Chandler says. “But a lot of work remains to make carbon payments practical and profitable for small-scale farmers in Asia.

“Meanwhile, by focusing—right now—on other environmental services like watershed protection, biodiversity, or landscape beauty, upland communities can set up reward mechanisms and empower local institutions to take advantage of them.

“Those communities will be better prepared to take advantage of carbon swapping, when it becomes more feasible, than communities with no reward mechanisms.”

⁴ The concept of carbon swapping is controversial. Many environmental groups see it as a loophole that allows industrial countries to continue to pollute, rather than taking expensive steps to control their pollution.





Watershed protection

We pay a heavy price for degradation of Asia's upland watersheds. Today, a fifth of the earth lacks safe drinking water, and half lacks proper sanitation.

Flooding leaves thousands of people dead, and hundreds of thousands homeless, every year. Property destruction costs billions of dollars. Siltation of hydropower reservoirs makes electricity less reliable, and more expensive. Nutrient pollution threatens the fish, animals, and plants of delicate aquatic ecosystems, and the quality of water that we drink and use for sanitation.

Van Noordwijk says, "Forests have three major functions in maintaining healthy watersheds.

"First, forest soils have a high rate of water infiltration, so forests help even out the flow of water in rivers and streams. Forests also provide a relatively slow drainage system, with lots of temporary storage of water on its way to rivers."

But we don't need full forest cover to take advantage of these functions, van Noordwijk points out. "Farmers can grow trees, along with crops, on their farms and the world will have similar benefits."

Clearly, guardians of the watersheds that prevent erosion and flooding, and that ensure abundant and clean water for drinking, sanitation, irrigation, and power, should be rewarded.

Upland communities can market watershed protection through services such as better forest management and protection, and reforestation.

Commodities to market watershed protection include:

- **Water quality credits.** Beneficiaries of reduced sediments, chemicals, and nutrients in water may pay the upland stewards with water quality credits through which to improve the watersheds and thus, upland people's own livelihoods.
- **Watershed protection contracts.** Set payments may be negotiated between watershed protectors and downstream beneficiaries such as hydroelectric plants, water districts, and irrigation systems.
- **Salinity credits.** In areas where excessive salt in the soil is a problem, as in much of Australia, the planting of trees lowers water tables and thus, reduces salinization of surface soils through evaporation. This decreases salinity in runoff water, benefiting both the uplands and the lowland areas that they serve.



Singkarak watershed, Indonesia. K. Jeanes



Biodiversity conservation

An estimated 24% of the earth's mammal species and 12% of the bird species face a high risk of extinction, according to the Food and Agriculture Organization. Loss of habitat is the main cause of extinction. Tropical deforestation will cause an estimated loss of 5 to 15% of the world's biological species between 1990 and 2020, according to the World Resources Institute.

Impoverished upland communities can act as guardians and stewards for the rich biodiversity of plants, animals, and microorganisms of the forested areas. But the poor communities seldom have the means to support to protect that biodiversity. RUPES is monitoring the emerging trends for markets for the protection of forest biodiversity.

Commodities used to market biodiversity protection services include:

- **Biodiversity business shares.** Commercial businesses that profit from biodiversity may issue shares to pay poor communities for protecting their forest resources.
- **Bioprospecting rights.** Purchasers of bioprospecting rights—to collect and test genetic material from a forest area—could include pharmaceutical and biotechnology companies, and research institutes.
- **Biodiversity credits.** When development reduces biodiversity, developers might be required to offset this damage by issuing credits to enhance biodiversity elsewhere.
- **Biodiversity-friendly products.** Some biodiversity-friendly products bring higher prices than conventional products. The price difference can be applied to biodiversity protection. For example, shade-grown or Bird Friendly coffees, marketed by Smithsonian Institution, are grown organically, under canopy trees. The alternative is “sun coffee” farms, which require the cutting the canopy trees. Sun coffee farms provide little or no bird habitat, and require large amounts of polluting pesticides and fertilizers.



Macaca fascicularis, the long tailed monkeys. C. Fay

Research and development opportunities

The five key research and development activities of RUPES are:

- **Quantifying environmental services.** “We can't transfer benefits as rewards until we learn, and quantify, who generates and who benefits from environmental services,” Chandler says. At the RUPES action site in the Singkarak Lake watershed of West Sumatra, environmental services such as reforestation that will help rehabilitate land around the lake are being identified and measured, along with constraints to their implementation.
- **Developing environmental service agreements.** No single reward mechanism can meet all situations. “That's why we're studying an array of mechanisms to reward the transfer of environmental benefits,” Chandler points out. That includes land tenure rights, distribution of taxes on water use, reforestation programs, and direct payments.
- **Supporting an enabling environment.** “We're identifying, and will address, constraints to the transfer of rewards, including inadequate political will, legal support, and funding,” Chandler says.
- **Raising awareness of the value of environmental services.** Understanding of the benefits must be circulated widely. In 2003 alone, RUPES has participated in 17 national and international fora on strategies for marketing of environmental services and pro-poor development. RUPES is a member of the Katoomba Group, an international nonprofit organization that is dedicated to advancing markets for environmental services provided by forested areas such as watershed protection, biodiversity habitat, and carbon storage.
- **Forming effective partnerships.** “A strong consortium of research and development partners is being developed to formulate and broker agreements on environmental services,” Chandler says.

No single reward mechanism can meet all situations. That's why RUPES is studying an array of mechanisms to reward the transfer of environmental benefits



Upland women in Lijiang, China. B. Leimona

The RUPES sites

Action research, mostly IFAD-funded but with growing commitment from a number of other investors, has begun at six RUPES action sites:

Ikalahan Ancestral Domain, Nuevo Vizcaya Province, Philippines

The Ikalahan Ancestral Domain covers 58,000 ha of mountainous forest and farmlands from 550 to 1,717 meters above sea level, 270 km north of Manila on Luzon. About 90% of the Domain's 20,000 inhabitants are of the Ikalahan tribe.

The Ikalahan watershed is 70% forest, and provides water for the cities and irrigation systems below.

The Domain's Magat River is downstream from the famous Banaue Rice Terraces, considered the "eighth wonder of the world."

"We've identified more than 1,500 plant species in the Domain," says Pastor Delbert Rice, RUPES Kalahan project leader.

"About 150 bird species have been identified; 35 are on the CITES or IUCN lists of endangered bird species.



Ikalahan Ancestral Domain, Philippines. M. van Noordwijk

"We'd like to establish a 'sister' relationship with a forest community in northern China because some of the birds spend summers there, then winter in the Ikalahan Domain," Rice says. "We want to protect those birds in both places."

RUPES will study the Domain's carbon sequestration, and biodiversity and watershed protection, and test payments for these services. Potential buyers of protection of the Ikalahan watershed include major beneficiaries such as the Magat and Talavera river irrigation systems. Ecotourism may also provide income to bolster the conservation of forest biodiversity.



Bakun Watershed, Northern Philippines

Bakun is the first indigenous area in the Philippines to be issued a Certificate of Ancestral Domain Title. Even with this significant acknowledgement of their rights over this 29,500 hectares in the Cordillera ranges of northern Philippines, the Bakun indigenous people is predominantly poor. It is estimated that 90% of the local people are engaged in rice and vegetable farming as their main livelihood.

Bakun boasts of a rich socio-cultural heritage. Their indigenous way of life governs how they relate with the land, the forests and among themselves, which makes them unique and resilient as a tribe.

The Bakun Indigenous Tribes Organization have been engaged over the past seven years with an IFAD-assisted project that aims to reduce poverty in the 82 remote highland communities of the Bakun. One of the activities that the Bakun people have been involved in as part of this partnership has been reforestation and agroforestry projects that increase their livelihood opportunities and to protect their natural resources. They see this land use practice as responsible stewardship of the environment.

At present there are two hydroelectric power plants operating in the Bakun watershed. While these companies pay taxes to the national and local governments, it is not clear how much direct benefit is getting back to the communities in the Bakun who are providing the watershed protection services through their land use management.

RUPES and the Bakun are working together to support and build the capacity of the local communities, institutions and government agencies in the Bakun watershed to implement fair and equitable mechanisms for environmental service payments.



Recognition of indigenous people - the Certificate of Ancestral Domain Title for the Bakun people. *Bakun Research Team*



Bakun watershed, Northern Philippines. *Bakun Research Team*



Kulekhani watershed, Nepal. *L. Hanson*

Kulekhani, Makwanpur District, Nepal

The Kulekhani watershed, about 50 km southwest of Katmandu, covers 12,496 ha at an altitude of 1,400 to 2,300 m.

“Most of the Kulekhani watershed's 43,000 people are disadvantaged ethnic groups and Dalits, or low caste people,” says Shyam Upadhyaya, RUPES Kulekhani project leader.

Water from the Kulekhani River and its tributaries power two downstream hydroelectric plants. Winrock International will help quantify and value the environmental services that the watershed provides, and identify mechanisms for transfer payments.

The Nepal Electricity Authority, a potential buyer, has expressed interest in reducing sedimentation and increasing water availability in the dry season to enhance the capacity of the hydroelectric plants.



A. Ekadinata



Kulekhani watershed, Nepal. *L. Hanson*

Sumberjaya, Lampung Province, Indonesia

Sumberjaya means *source of wealth*, says Dr. Suyanto, leader of the site's action research programme.

The 55,000-ha Sumberjaya subdistrict in the Bukit Barisan mountain range includes the upper watershed for some of Sumatra's major rivers. Its altitude ranges from 720 to 1,900 m. Its population is 80,000, or 150 persons/km².



Way Besai River in Sumberjaya watershed, Indonesia. *B. Verbist*

About 40% of the subdistrict is classified as "protected forest" and 10%, as a national park. Nevertheless, forest cover has declined from 60% in 1970 to 12% in 2000, leaving vast areas of deforested hillsides bare. Simultaneously, coffee farms have increased tremendously.

Establishing and maintaining "shade coffee" as part of the agroforestry system has the potential to slow erosion and a decline in water quality, as well as contributing to farmers' incomes, Suyanto says.

Land tenure rights have been an issue in Sumberjaya for the past 100 years. Watershed issues triggered four military campaigns from 1991 to 1996. Thousands of farmers were evicted from their land, and their coffee farms burned.

RUPES research will focus on three sub-watersheds of 200 to 1,500 ha. Land tenure is the main reward mechanism proposed for watershed protection and carbon sequestration projects.

Local communities and the government have begun negotiations for legal rights to land use, in exchange for better management of state forestland. ICRAF and local nongovernment organizations have helped farmers develop community forestry schemes that envision land tenure for 25 years, after a 5-year trial period.

Farmer groups have already obtained 5-year rights in protected forests, with two requirements: to plant trees, and protect the remaining natural forests.

The state hydroelectric power company, which wants better water quality, is a potential buyer.

The state forestry department is a potential provider of rewards for environmental services, because it can issue permits for land use.



A. Ekadinata

Bungo, Jambi Province, Indonesia

Most rubber is now synthesized from petroleum, but a fourth is from tropical rubber trees. Malaysia, Indonesia, and Thailand produce 90% of the world's "natural" rubber. Jambi is Indonesia's third-largest rubber producing province.

About 97% of Jambi's natural rubber is produced from "jungle rubber" gardens of 5 ha or less. Tapping of rubber from wild trees in these huge reservoirs of biodiversity has been a traditional income source—but is disappearing rapidly, as monoculture plantations of rubber and oil palm replace the forests.

RUPES activities are in Bungo district in the 455,308-ha watershed of the Batang Hari, Sumatra's second-largest river. Only 12% of the land is higher than 500 m. The population density is about 50 persons/km².

RUPES is financing the development and testing of reward mechanisms for communities that protect rubber agroforests and the biodiversity and carbon storage they provide. Potential buyers are the Critical Ecosystem Partnership Fund, the Global Environment Facility, the Government of Japan, and the World Bank.



Rubber slabs transported by bicycle from the agroforest to the village in Bungo, Indonesia. *H. de Foresta*

Singkarak Lake Watershed, West Sumatra Province, Indonesia.



Singkarak watershed, Indonesia. M. van Noordwijk

Intensive upland agriculture and fishing provide income for 77% of the 399,000 people, or 205 people/km², who live around Singkarak Lake—the upstream watershed reservoir of the Inderagiri River.

The 160-m deep Singkarak Lake, one of Indonesia's largest, covers 13,665 ha, nestled at the base of a rugged mountain landscape that volcanic eruptions formed aeons ago. The scenery is spectacular, but the lake is increasingly polluted by bad land use on the surrounding slopes, inappropriate fishing practices like poison and small bombs, and the drawing off of lake water for electricity.

The lake provides water for irrigation, hydropower, and recreation. Singkarak Lake is famous in Indonesia for the popular fish *ikan bilih*—but overfishing, pollution, and sedimentation are rapidly depleting its population.

RUPES focuses on 58,469 ha of the lake's catchment area, which is mostly of nonproductive Imperata grass—also known as cogan grass—which is spreading with deforestation. The local communities are becoming increasingly aware of how important it is to protect and increase the forested areas around the lake. One current reforestation program is named the *Million Tree Planting Program*.

The main environmental services offered are watershed protection and carbon sinks. The state hydroelectric power company and the international community are potential buyers.



Canoeing on Singkarak Lake. M. van Noordwijk

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Front Cover Photos:
Watershed of Solok, West Sumatra. *K. Jeanes* (Above)
An Indonesian woman with papaya fruits. *J. Tukan* (Below)
Back Cover Photo:
A stream through a forest. *H.S. Arifin*

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