

**F**our o'clock in the afternoon during the rainy season in Java. The sky grows dark, lightning flashes and then the heavens open. Within minutes the rivers and canals swell, burst their banks and rush down with terrific force into the valleys where the paddy fields are already submerged in water.

In many parts of Java and across Indonesia the force of the water rushing down into the plains is not exploited. But the village of Curug Agung in the west of Java obtains green electricity from this natural energy source. For more than eight years the local people have been operating a small hydro-electric plant, seven hundred meters above sea level, which was set up at a barrage weir on an existing irrigation canal.

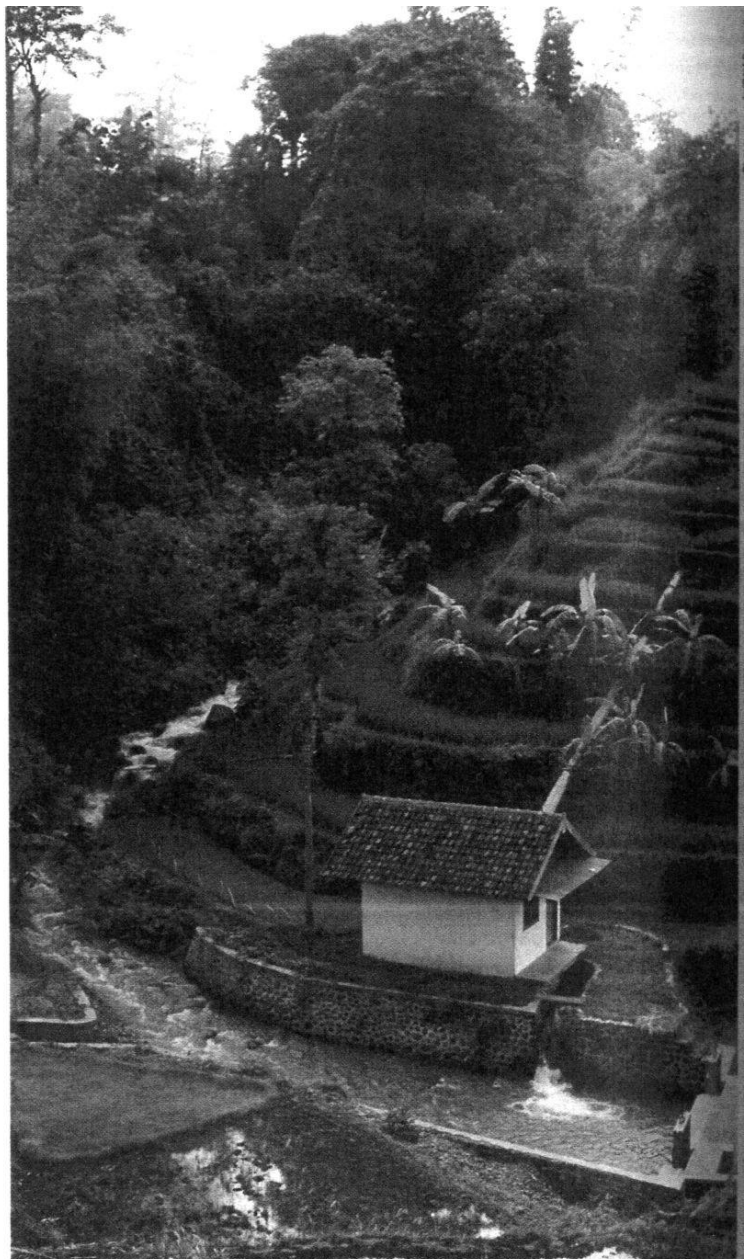
### Electricity supply from the national grid

Ano Heriano and his wife Enung Rohanini operate and service the 12 kW plant, which was installed with the aid of the German Association for Technical Cooperation (GTZ). "We sometimes have problems if the power house is struck by lightning," says Ano, pointing to the large control box. "Occasionally something blows." Sand, mud and leaves, which collect in front of the three-meter-high weir during the rainy season, also cause problems.

Apart from that, Ano seems very pleased with the mini-power station which in the past supplied electricity to homes in the village and a sawmill. In the mid-Nineties the mountain village was linked up to the grid of the national energy company PLN, and since then the plant has not been operating at full capacity. Nowadays most of the villagers receive their electricity supply from the national

grid. However, Ano hopes that once the local power station is connected to the grid, the turbines will soon be turning again at full speed.

But that will only happen if PLN actually pays for the hydro-electricity. Despite frequent declarations to that effect, it has so far failed to keep its word anywhere in the Indonesian archipelago, which is the fourth-largest country in the world. But that is nothing out of the ordinary in a country where law and order is having to recover from 30 years of the Suharto dictatorship, corruption condoned at the highest level and nepotism. Priv-



**New and old technologies:** The terraced rise fields of Seloliman on East Java provide a scenic backdrop for a 12 kW mini hydro power plant.

# Water turbines instead of mufflers

## Democratization opens up new scope for hydro power in Indonesia

by Dierk Jensen

ately owned hydro power only stood a chance in regions which were not linked to the grid.

Now, however, the bureaucratic PLN headquarters in the capital, Jakarta, are showing the first signs of a new feed-in policy. Spurred on by the first democratically elected government in the post-Suharto era, the state-owned company plans regularly to reimburse the operators of privately owned power stations for generating electri-

city — at least according to its first declarations of intent to the operators in Curug Agung.

This village in the district of Subang to the north of Bandung with a population of two million has thus set a precedent in Indonesian energy policy. If the PLN does in fact adopt a conciliatory stance, it could provide the first real impetus not only for hydro power, but for all renewable energies in the Southeast Asian tiger economy.

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that would at last breathe life into the three-year-old government program to promote environmentally sound sources of energy. So far plans have only existed on paper, and many experts believe that originally the item was only included on the agenda to make the international financial backers at the time believe Indonesia's economic policies were sustainable.

## The key lies in local activities"

But the government had no interest whatsoever in sustainability. The result was the total collapse of Indonesia's economic and financial system. The crash was relentless, and exposed gigantic structural errors in the economic policy of the Suharto party machine. Once the old powers-that-be resigned, the banking system saw its chance, and now that first cautious attempts at a new policy are starting to take shape, the opportunities for hydropower are increasing again.

That, at least, is what Mark Hayton, hydropower expert employed by the Swiss consulting and engineering firm Entec, based in St. Gallen, hopes. He is helping to implement the project funded by Switzerland's Federal Economics Office, the GTZ and in the future also the EU, and is adamant about the importance of the direct approach: "The key to our work lies in local activities," says Hayton on the fourth floor of his office block which has a magnificent view over the large sprawling city of Jakarta.

"Instead of wasting unnecessary time with officials at some meeting or other in some highrise, we talk directly to the people on the spot." As he speaks he gazes out of the window at the constantly gridlocked, multi-lane highways of this warming metropolis with its 20 million inhabitants, the mirrored glass facades of the skyscrapers and between them the sea of roofs of the slums.

## Low price of oil prevents competition

Hayton's local approach is proving successful. More than 100 small-size power stations with a capacity ranging from 10 kW to 100 kW now generate electricity in Sulawesi, Kalimantan, Sumatra and Java. The power stations are deliberately located in places in which the national grid does not reach, such as Seloliman on the edge of a mountain range in Eastern Java. Here a 12 kW hydro-electric power station nestles perfectly into a valley with terraced fields providing up to three rice harvests a year. The energy

produced here supplies an environment center and the village of Janjing. The only access to the 135 villagers is via a rough track cut through the tropical forest. The hydro-electric power provides for lighting and television in most of the houses. Each house pays €3.5 (\$3.25) a month.

So there is a lot to be said for activating this energy source, which has the added advantage that it produces no emissions. Yet the absurdly low price of oil, which is very highly subsidized in Indonesia, an oil-producing country, does not allow for any real competition in the energy market. "There's nothing you can do when diesel costs €0.06 (\$0.05) a liter," Hayton laments the status quo. Many Indonesians even say a rise in energy prices is unthinkable and would cause "a revolution." That explains why hydro and solar power, biomass and wind energy have had a hard time of it so far in Indonesia. "At ideal wind energy sites they would rather just set up diesel engines to produce electricity."

## High investment costs as a handicap

But it's not just the low price of energy that scares off many potential users. It is also the investment needed

"The new government has introduced greater regionalization," Raharjo says, "and the more independent the regional authorities become from Jakarta, the more open they are to hydropower." Even in Java, where most areas are now on the grid, companies are registering demand. Dewata, for example, which produces tea in the mountains of Bandung, plans to meet its energy needs for its drying and fermenting sheds from a nearby river – instead of using wood and coal to heat them as it has done up to now. It also plans to feed in surplus electricity into the national grid in return for cash payments.

## Prepared to deliver 100 turbines a year

If the 200 kW power station planned for Dewata is built soon, that would be in line with the principles of Swiss hydro-power expert Mark Hayton. "In the Nineties we were concerned exclusively with supplying electricity for the domestic sector. Now we want to use larger plants to reach industrial companies in the regions, too." The operators in Seloliman want to double the capacity of their plant in order to supply enough energy for a local spinning mill.

### Operating instructions:

A GTZ staffer explains the control panel of a mini hydro power plant in Curung Agung village near Bandung (Java) to the operator.



for the installed kW. Up to 5,000 dollars has to be shelled out per kW. It comes then as no surprise that so far Indonesian companies in regions on the national grid have been holding back. Yet the Javanese turbine manufacturer Kusetiadi Raharjo remains optimistic. He is the managing partner of Heksa Prakarsa Teknik in Bandung which employs 15 staff to construct, build and install small-size turbines.

At least Heksa Prakarsa is prepared to meet the demand for the delivery ex factory of up to 100 turbines a year. At present it only has eleven orders on its books. So there is still plenty of capacity in the workshops where during idle time the 15 staff punch out, solder and weld mufflers for motorized two-wheelers – instead of surging ahead with hydro-electric power in Indonesia. ●