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# RWSGEAP

## NOTES

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### COST RECOVERY

### MOVING MOUNTAINS FOR WATER

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*The story of an Indonesian community that built a drinking water supply system in 1989 and tunneled through six hills to save on construction costs. The original project grant for the village included the building of the spring source, the main pipeline and four public standposts with bathing and washing facilities. Today, the community has increased the four public facilities to thirty, all on its own initiative. What can we learn from this remarkable anecdote?*

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"It was 10 o'clock on a Sunday night during the month of *Muharam* in 1989 that Pak John came to the village." Pak Akhmad, the village head of Tanjungkarang was describing his first encounter with John, an NGO field officer, to the authors during their visit to the village in June 1995. *Muharam* was the Muslim New Year and the village head appeared to have that date permanently imprinted in his memory.

#### The Village

Tanjungkarang is a small Sundanese village located on the side of the Galunggung Mountain in Kabupaten Tasikmalaya in West Java Province, Indonesia. It is about 1,500 meters above sea level and two and a half hours by car from the provincial capital of Bandung. The village has a population of about 3,650 people or about 712 households. The villagers are mainly farmers, and a small number are retailers and a few civil servants and school teachers. The main source of income is from the production of palm sugar, tea, coffee, and other agricultural products. Rice is cultivated but mainly for domestic consumption. The village has a hilly terrain and sits amidst the thick pine forest of the Galunggung Mountain, an active volcano that last erupted in 1982. The inhabitants of Tanjungkarang live on the higher slopes of the mountain and cultivate their narrow rice terraces on the lower slopes from where they also get their drinking water. It is about 1 kilometer downhill to

the closest paved road and about 10 kilometers from the local Health Center (*Puskemas*).

#### Health and Water Problem

Diarrhea and skin diseases used to be common here before 1989, especially among the children. The great distance to the Health Center exacerbated the condition. Sometimes the distance could be a matter of life or death for the very sick. The Health Center doctor informed the villagers that one of the main reasons for their health problems was the poor quality of their drinking water which was available only on the lower slopes. Women and children have to walk about 2000 meters down the slopes to fetch their water from natural springs in the ravines or from irrigation ditches at the lower slopes of the village.

#### Community Demand

For many years the villagers complained to the village head about the poor health of the children. Each time, the village head turned the problem back to the people and said it wasn't his problem alone but the whole community. After much discussion and going back and forth, the people agreed it was a communal problem and decided to do something about obtaining better quality water. They had a series of village meetings and all sorts of ideas were proposed. Every idea they had required

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money and technical know-how. Nothing was done for some time because the villagers felt they couldn't afford the construction of a water system. At one local government meeting the village head heard that villages could submit proposals for community projects to the government. He and a few of the village elders put together a simple proposal for a water system for the village and submitted it to the *Camat* (sub-district head) who, if he deemed the proposal worthy, would in turn send it to the *kabupaten* (district).

### Community Planning

The village first submitted the proposal to the *kecamatan* in 1975 and continued submitting it yearly for the next 14 years. The answer came that memorable night during the month of *Muharam* in 1989 in the form of a visit by an NGO field officer by the name of John Danasasmita. John belongs to an international NGO, that works in collaboration with local government to provide various development services to villages in several provinces in Indonesia. The NGO's development philosophy is to help people who want to help themselves.

John stayed in the village for several weeks getting to know the people, the community and its problems. Together with the villagers, he surveyed the surrounding hills for potential water sources for four full days. After he had gained their trust and studied their water situation carefully, he informed them that he could help them only if they were willing to put in a lot of hard work and contribute a portion of the required money and local material.

The villagers were disappointed at first because they had expected the government to build a water system for them. John told them that there was no guarantee that they could obtain a free water system from the government; even if they did, they would have to wait for many more years and meanwhile their children would continue to get sick and the women would have to trudge up and down the slopes for water. People wanted to know what the system would cost and how much they would have to contribute. John informed them that it was possible to build a gravity flow pipe system from a spring source in the forest 4 km away. He made a rough estimate of the total cost, and said his organization would provide a grant for 4,866 meters of main pipes and four public standposts with bathing and washing areas. He himself would provide the technical assistance to construct the system. The community would have to pay for the secondary pipes and provide all the labor for construction. In addition, the people had to be fully responsible for the operation and maintenance of the completed systems and pay for all spareparts and repairs.

After much calculations, recalculations and discussions, the villagers agreed to build a community water system.

The next step was to put together a work plan and the first item on the plan was to design the water system and the pipe layout. The pipeline would have to skirt six hills before it reached the village. The costs were recalculated and the proportion of contribution from each household was determined. John left the village agreeing to return after a few weeks thus giving the community time to develop a resource mobilization plan. Meanwhile, several well respected persons were selected by the community to be the water committee. They went on a cross-visit to see the completed system in another village and attended a one week training course organized by John's organization in yet another village.

### Resource Mobilization

How to find and raise enough money for their portion of the cost sharing agreement with the NGO was an immense undertaking for the community. The NGO had agreed to provide for over four kilometers of main pipes while the community would pay the remaining costs plus all the local material like sand, stones, wood and bricks as well as provide all the labor for construction. It was a major challenge for the community. They agreed to organize fund-raising through community events and through the collection of cash from each household that would pay according to three assigned income levels--high, medium and low.

Still it was a lot of money for the community. At one of the community meetings, an old man suggested cutting through the hills to save on the village's share of the pipe cost. Several young men laughed and said it was a foolish idea from a foolish old man. They could not imagine digging through six hills. The village head asked the man to explain further. The old man said that if farmers could tunnel through a hill for irrigation purposes, why couldn't they do the same for the water pipes. The village head then summoned the person who could help the village. Pak Ohin was a 60 year old farmer who had helped many of his neighbors find water for their rice fields. He was affectionately called *Si Landak* (loosely translated as mole man). He listened to the village head's request, visited the location and said it was possible to dig through all six hills.

### Community Action

When John returned to the village he was informed of the resource mobilization plans and the tunnel idea. John was sceptical at first but since the villagers were convinced it could be done he agreed to their plans. Measurements were taken of each hill and height

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calculations were determined for each tunnel. A *selamatan* (small feast) was held to appease the spirits of the hills and to pick an auspicious day to begin digging. When the day arrived, 250 able-bodied men were assembled to help the Mole Man. He first threw a raw egg against the spot on the first hill to be tunneled, and then placed a piece of shiny leaf (*pelapah*) from the node of a bamboo plant on a 50 cm pole stuck in the ground in front of the hill. The shiny leaf directed the reflection of the sun to the spot which would be the center of the tunnel and with a pick began digging a hole about 1 meter wide and 1.25 meter high. Through the day, the light reflecting from the bamboo leaf directed the men in their tunneling. This kept the digging on track and in the right direction. An assistant of the Mole Man began digging simultaneously at the other end of the hill using the same reflection technique. Several villagers were assigned to haul the dirt from the tunnel. The women cooked and brought food to the men at work. The children came out to watch and there was a festive air about the place. The tunnels of the Mole Man and his assistant met and were accurately aligned.

Altogether, six tunnels were dug; they were 80 meters, 40 meters, 30 meters, 25 meters, 8 meters and 5 meters in length. It took 6 weeks to dig the tunnels and saved the community 1,680 meters of pipe at a cost of Rp. 6.16 million (@ Rp. 3,666 per meter). Less than a year later from the night of John's visit, the community of Tanjungkarang had a new water supply system and four public bathing and washing facilities. In addition, half a dozen ventilated pit latrines had been constructed with John's help.

#### Project Information 1989

|                        |                     |             |          |
|------------------------|---------------------|-------------|----------|
| System type:           | Gravity pipe system |             |          |
| Water source:          | Spring (6 lt/sec)   |             |          |
| Facilities:            |                     |             |          |
| a) Capturing box       | 1 unit              |             |          |
| b) Water intake        | 1 unit              |             |          |
| c) Silt box            | 2 units             |             |          |
| d) Reservoir           | 6 units             |             |          |
| e) Communal facilities | 4 units             |             |          |
| Budget:                | <u>Rupiah</u>       | <u>US\$</u> | <u>%</u> |
| Grant* (external)      | 9,545,740           | 5,387       | 46       |
| Community (cash/kind)  | 11,175,555          | 6,307       | 54       |
| Total Cost             | 20,721,295          | 11,694      | 100      |

\* TA costs not included

## The Village Today

What we saw during our June 1995 visit to Tanjungkarang showed us a village where the total number of households had grown by 50% since 1989. The water supply system was well operated and maintained. In fact, the public bathing and washing areas had increased from the original four to thirty facilities. In addition, twenty five households paid for their own house connections and built private bathrooms and pour flush latrines.

According to Pak Akhmad, the impact of the water system was significant. The incidences of diarrhea and skin diseases had decreased; people had more water for cooking, drinking and washing; women spent less time collecting water and more time for productive work; the production of palm sugar increased as women could devote more time making (cooking) it; the land value increased and people improved their houses and built bathrooms and latrines; and the village road was improved with a paving of stones.

Pak Akhmad informed us that the operation and maintenance (O&M) committee under the leadership of Pak Ojon was very active. Besides Pak Ojon, the O&M committee included a treasurer, a secretary and six fee collectors. After a few months of trial and error, the committee now collects Rupiah 1,000 once every three months from each of the 325 households who use the water system. Households with or without house connections pay the same user fee, a decision made by the community as a whole. The money is deposited in a local bank account. The fee collectors are military veterans who feel happy to volunteer their time for a worthy cause. They say their fee collection activity makes them feel as useful members of the community.

There are activities organized for the water system on a regular basis. A new public bathing and washing facility is added once every three months with funds from the user fees. Three groups of 60 persons each from the three hamlets (*RW*) clear the 2 km forest path leading to the spring source on a three monthly basis. Three caretakers, also military veterans, are responsible for checking and maintaining the spring source and the pipes. For their services, they are given cigarette money (*uang rokok*).

In 1993, a period of heavy rain caused a major landslide in the area and washed away 25 lengths (150 meters) of the main pipe. The O&M committee replaced the pipes with what was available locally. Pak Akhmad told us that the pipes were below standard but that they could not purchase the better quality pipes from the local stores as

these were available only from the pipe factory which would not accept a small order.

## Discussion

The case of Tanjungkarang illustrates not only a sustainable community-based water supply system but also an expanded one. Let us review the various elements present in this success story:

- **Community need.** There was a clear need in the community for improved access to water supply from the viewpoint of health of the children and time of the women (distance from the water source).
- **Community demand.** This need was translated into a demand by the community for improving the situation and a request/proposal sent to the government for assistance.
- **Government mechanism.** A government structure was present for the community to turn to for assistance. One of its function was providing information to the community regarding development projects. The community took heed of this information and used the mechanism when it sent in a request/proposal. However, the government mechanism could not respond to the request on its own, for whatever reasons.
- **Intermediary mechanism.** Fortunately, for the community, after waiting patiently for 14 years, an NGO was available to facilitate turning the community's wishes into reality. The NGO had the funds, skilled technical field officers and the appropriate development philosophy. The government mechanism accepted the professionalism and assistance of the NGO and turned it into the direction of Tanjungkarang.
- **Participation/Ownership.** Right from the beginning, the community was involved in the whole project and all aspects of decision making. Selected members were given training in some aspects of management and a whole lot on technical know-how. Almost the entire village was involved in one way or another with the construction. They knew where every inch of pipe was laid across the 4 km path through the pine forest. When the landslide occurred and the pipes were washed away, they replaced and repaired all by themselves.
- **Cost recovery.** Community ownership of the project was developed not only from being involved in planning and implementation but also from sharing

a major part of the cost. In this case, it was 54% of the total physical and construction cost. The people were economic minded and through ingenuity (digging through six hills) saved themselves over 50% of their cost.

- **Community organization.** The ability of the community leaders to organize was very evident in Tanjungkarang where user fees were regularly collected, new public facilities routinely built, and other O&M activities planned and carried out. Good use of community resources and division of labor were also made. The use of military veterans in routine O&M activities appeared to be an appropriate choice as these old men, who received monthly pensions from the government, had the time, interest and the motivation to be still useful to their community. The leadership of the community and the O&M committee was strong and the leaders were governed by the simple vision that everyone in the village should have easy access to domestic water supply.

It took less than one year to implement Tanjungkarang's community-based water supply project and the results have shown to be more than sustainable.

For a community-based water supply project to be sustainable Tanjungkarang has demonstrated to us that the above elements are important. This message is similar to that of many of the research and evaluations undertaken of community water supply projects in many parts of the developing world. The critical element or the missing link in Tanjungkarang's case is the intermediary mechanism--in this case, an NGO--that galvanized the community members into action and gave them the funds and, more importantly, the technical know-how of building a water supply system. What they have learned have stood them in good stead to operate, maintain and expand their system. As development workers, we should promote this intermediary link between the government and the community so that more villages can be galvanized into a similar path as Tanjungkarang.

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*The NGO mentioned here is CARE International which stopped its operation in West Java Province in September 1993.*

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