

*Case Study 5:  
Water Supply And Health  
In Lumajang District, East Java*

## Abstract

The Second Water and Sanitation for Low-Income Communities Project (WSLIC-2), developed by the World Bank in cooperation with the Ministries of Health, Planning and Public Works, Home Affairs, Education, and Finance has been implemented in Indonesia since 2000. It aims to improve the health status, productivity and quality of life of poor rural communities; project activities focus on improving health and health behavior, providing better access to water and sanitation, and community participation. In Lumajang district, East Java, where the project began in 2002, 75 percent of targeted villagers in villages visited by the research team now have access to project water supply (though the tank-to-household ratio of between 25 and 43 to 1 is rather high). Distances traveled by water collectors have shortened and water quality is better. Quality of life has improved, in terms of reduced time spent collecting water, increased income and savings, and greater peace of mind. Notably, kindergartens have opened in two villages now that parents have more time and money to spend on taking children to classes and paying for instructors. Villagers enjoy an increased sense of ownership of water supply systems; some have even agreed to increase maintenance fees to pay for a more expansive system. System sustainability is an open question, with management and maintenance problems in one village; in at least one more, maintenance staff are paid only when problems occur, reducing staff's commitment. It is impossible to say whether the project has been responsible for improved health, as supporting data is lacking. Health behavior has, however, improved since the project began, though likely more because of increased availability of clean water than any health activities under the project. Villagers' willingness to take the initiative in improving other aspects of village life has increased as a result of the project's emphasis on community involvement. In one village, for instance, villagers copied their maintenance fee scheme to pay for the construction of 2 km of concrete roads. Other factors contributing to success include local leaders' support, well-designed water systems, effective water use regulations and Maintenance Organizations (in most cases), a careful process of village selection for project support, and national-level decentralization. High or inaccurately estimated maintenance fees, prior negative experiences with other water supply projects, and language difficulties put off some villagers, at least initially; and in one village, the need to share water sources is causing conflict. Some Maintenance Organization members are unmotivated because they are not local or not regularly paid. The project's sustainability may be threatened by high dependence on external facilitators and financial support, while its impact is difficult to assess without baselines or effective monitoring—particularly an issue for women, children and the poor.

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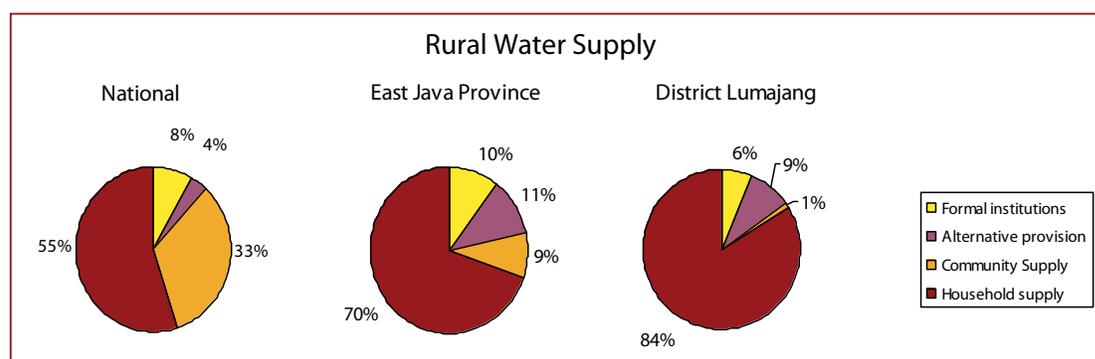
## Introduction

### The Study Site: Lumajang District

Lumajang is one of 38 districts (kabupaten) in East Java province and has 21 sub-districts (divided into 197 villages), 7 urban centers (*kelurahan*), and a population of over 1 million.<sup>116</sup> A rural district, Lumajang has a poverty rate of 31 percent, almost double the national average of 17 percent and significantly higher than the provincial average of 20 percent. More than fifty percent of the district's income comes from the production of rice, sugarcane, corn, vegetables and fruit. The majority of the population are Javanese and Madurese and speak their native languages on a daily basis; 60-70 percent of Madurese are unable to speak the national language of Bahasa Indonesia. The majority of the population is Muslim.

### Water Supply And Health In Lumajang

Lumajang residents obtain their drinking water from four types of sources: a formal, semi-governmental institution called the District Company for Drinking Water (Perusahaan Daerah Air Minum or PDAM) which pipes water directly to houses; community sources such as wells, pumps, and tanks; household and natural sources such as wells, rivers, springs and rain; and alternate sources such as independent water vendors.<sup>117</sup> Obtaining water is especially problematic in the district's mountainous areas, where wells must be deep and there are few springs.<sup>118</sup> Provincial roads in East Java are excellent, though, so water vendors can reach virtually all villages.



Sources: *The World Bank, Indonesia: Averting an Infrastructure Crisis: A Framework for Policy and Action (June 2004)* and *Village Potential Statistics Province of East Java (2003)*.

Over 80 percent of Lumajang residents' drinking water comes from household wells (58 percent), springs (20 percent), household pumps, and rivers.<sup>119</sup> Supply is not too great a problem during the rainy season, though household water collectors frequently must travel about 2-5 km from home, but during the dry season, rivers and wells dry up, forcing collectors to travel greater distances. Water vendors are widely available, but at a cost ranging from Rp. 15,000 to Rp.

<sup>116</sup> Lumajang District (2004).

<sup>117</sup> World Bank (June 2004).

<sup>118</sup> Lumajang District Health Bureau (2003).

<sup>119</sup> Central Bureau of Statistics, Jakarta (2003).

90,000 per month (depending on the village), this water is too expensive for the poor who have a monthly per capita income of below Rp. 270,000 (US\$30).<sup>120</sup>

Available data on water-related health problems in the district are incomplete and inconclusive. The Village Potential Statistics show that diarrhea epidemics for all age groups were worse in Lumajang than in other districts in the province in 2003. The national SUSENAS socio-economic survey found that in 2001 and 2002, district residents had a higher incidence of diarrhea than did residents elsewhere in the province, almost twice as high as the national average for those years, but by 2004 the incidence had been cut nearly in half, from 14 out of 1,000 people in 2001 to 8.5 out of 1,000 in 2004.<sup>121</sup>

### **The Project: WSLIC-2**

The Second Water and Sanitation for Low-Income Communities Project (WSLIC-2), developed by the World Bank in cooperation with the Ministry of Health, the Ministry of Planning (Bappenas), and the Ministry of Public Works, was inaugurated in five provinces including East Java in 2000.<sup>122</sup> WSLIC-2 is funded by IDA (the World Bank), AusAID, the Government of Indonesia, and local people, and aims to improve the health status, productivity, and quality of life of poor communities in under-served rural villages in the project provinces. Project components include:<sup>123</sup>

- Improving health behavior and community health services related to waterborne diseases. By the end of the project implementation period in December 2006, sustainable water and sanitation systems are to have been built in approximately 2,000 villages in 32 districts, including 46 villages in Lumajang.<sup>124</sup>
- Providing safe, adequate, cost-effective, and easily accessible water supply and sanitation services. Method of participatory assessment and participatory hygiene and sanitation transformation (MPA-PHAST) is supported in communities and schools, including development and production of MPA-PHAST materials and integration of community-selected health and hygiene topics into school health programs. The project pays a small stipend to health and school staff for implementation of project activities, as well as training them in the use of MPA-PHAST methodology; materials for small health and sanitation activities such as washbasin construction are provided.
- Community participation to promote sustainability and effectiveness of project activities. Under this component, many types of stakeholders are involved in project implementation, including villagers and village and hamlet leaders, health and sanitation workers at village, sub-district and district levels (including midwives and kader or village health volunteers), and school teachers.

<sup>120</sup> In Purworejo village, the cost is Rp. 15,000 per month for unlimited water a few hours a day, but in Kalisemut and Merakan it is Rp. 1,500 per 25 litres, so the average household using 50 litres a day faces a monthly cost of Rp. 90,000 (US\$10).

<sup>121</sup> Data on the incidence of diarrhea reflects the likelihood that a person has had diarrhea in the month prior to data collection.

<sup>122</sup> The first Water Supply and Sanitation for Low Income Communities Project (WSSLIC), under which community water supply systems were constructed and child diarrhea was reduced, was implemented from 1993 to 1999 (World Bank, May 2000).

<sup>123</sup> World Bank (May 2000).

<sup>124</sup> Government of Indonesia WSLIC-2 Project Preparation Consultant Team (March 2000).

## Research Questions And Methodology

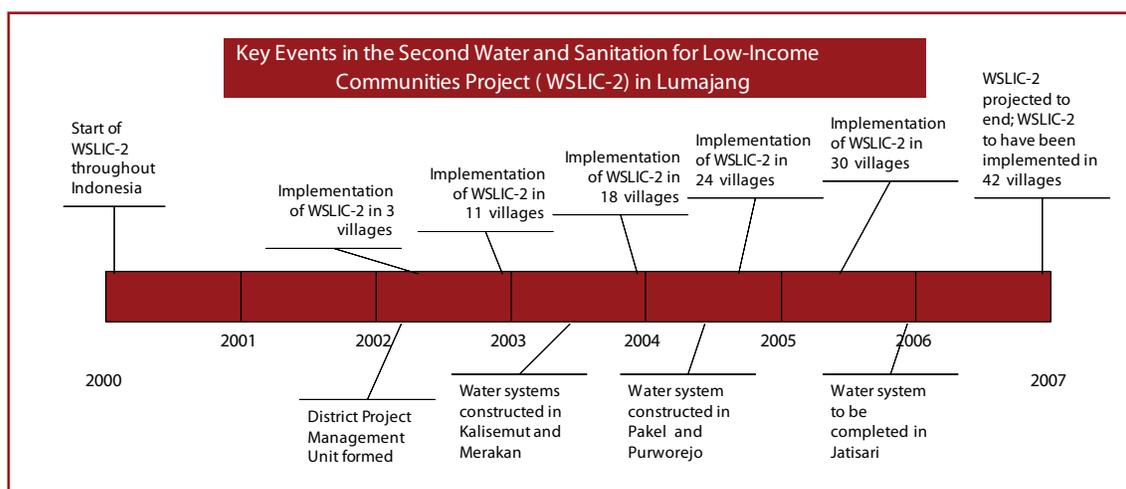
The research team visited the field for ten days in March and April 2005, travelling to five villages in four sub-districts of Lumajang: Jatisari (Kedungjajang sub-district); Kalisemut and Merakan (Padang sub-district); Pakel (Gucialit sub-district); and Purworejo (Senduro sub-district). These villages were chosen because they represent a variety of experiences in project implementation: successful and less successful water supply systems, completed and ongoing construction, the challenge of negotiating shared water sources, and unexpected follow-on innovations. They also all have poverty rates higher than the district average, ranging from 37 to 45 percent.

The primary research tools were semi-structured interviews and focus group discussions in which timelines, institutional and political analysis, and transects were used. In the chosen villages, six water facilities (including tanks and pumps), two sub-district health centers (puskesmas), and two schools were visited. More than 100 people were interviewed, including the head and 5 staff of the District Health Bureau, the Project Manager, 12 facilitators and consultants, 25 members of 5 different Maintenance Organizations, 6 local health staff including sanitation specialists, 10 teachers, and 50 villagers. In addition, about 20 people in Merakan, Purworejo, and Kalisemut were interviewed while actually using pumps and tanks, with follow-up visits to their homes to observe household sanitation facilities. Focus group discussions were held with Kalisemut villagers at weekly project implementation meetings.

Three hypotheses were tested during the fieldwork:

- WSLIC-2 has increased villagers' access to water, which has improved their quality of life.
- WSLIC-2 has increased villagers' feeling of ownership of water supply systems, which has increased the systems' sustainability.
- WSLIC-2-sponsored health education in schools and health care centers has improved villagers' health and health behaviour, in part because the project involves many stakeholders.

## Impact Of WSLIC-2



## ***Has WSLIC-2 Increased Villagers' Access To Water?***

Yes. Prior to project implementation, villagers had to walk far to collect water for drinking, cooking and bathing, particularly in the dry season when sources closer to home dry up. Now, piped water systems connecting large natural sources to community tanks have been constructed in 24 of the 46 villages targeted by the project in Lumajang.<sup>125</sup> Most of the new water supply tanks are reliable, clean and close, replacing sources that were unreliable, dirty and far away.

Once villages have been accepted for funding by the project, it is up to villagers to decide in which hamlets to build the water supply systems. In the villages visited,<sup>126</sup> 5 out of the 17 hamlets did not receive project funding for water supply systems because they are already served by community tanks or pumps. In the remaining 12 hamlets, nearly 75 percent of villagers now have access to water through the project.<sup>127</sup> The remaining 25 percent include: about 30 households in Kalisemut and one hamlet in Purworejo who feel the maintenance fees are too expensive, and 360 households in 1.75 other hamlets of Purworejo who were initially unwilling to participate because (a) they didn't believe the project would work, (b) they had access to water vendors, and (c) some of them preferred to continue using river water—these households are slated to join the project soon, however. In addition, management and maintenance problems have reduced access in Merakan.

Even in the rainy season, the distance that villagers from participating hamlets must travel for water is now greatly shortened, as the new water tanks are near their homes. The largest area served by a project tank in the villages visited is 30 ha (in Pakel village), which would require a travel distance of no more than about 1 km.<sup>128</sup> Many of the better-off families (234 in Purworejo and 30 in Pakel) have even paid extra to install one or more faucets and connecting pipes inside their homes, cutting travel distance to nil.

Water quality has also improved as no villagers from participating hamlets now use the river, polluted by draft animals, bathing, laundry, and defecation, as a source of drinking water. When a problem with the cleanliness of a water source is reported, it is the responsibility of the village Maintenance Organization to repair it. Maintenance Organization members are local people elected by villagers and trained by project facilitators, consultants, and management unit in infrastructure management, maintenance and repair.

<sup>125</sup> Lumajang District Project Management Unit. All project tanks in the district have about 3 faucets each so can serve about 3 people at once.

<sup>126</sup> Construction is ongoing in Jatisari village, the fifth village visited by the team, so it is not included in this data.

<sup>127</sup> Team calculation, assuming 400 villagers in Merakan have access, and not including Jatisari where construction is ongoing.

<sup>128</sup> Assuming a 30 ha rectangle of sides 0.3 km and 1 km in length.

**WSLIC-2 Water Supply Coverage in Villages Visited<sup>129</sup>**

<b>Village</b>	<b>Kalisemut</b>	<b>Merakan</b>	<b>Pakel</b>	<b>Purworejo</b>
<b>Water sources, pre-project</b>	River, community tanks, vendors	River, vendors, community water pump	Community well, spring	Household wells, vendors, river, springs
<b>Number of community tanks built by project</b>	9	10	17	32
<b>Population of targeted hamlets</b>	260 (1 out of 4 hamlets)	435 (2 out of 4 hamlets)	465 (all 3 hamlets)	1227 (all 6 hamlets)
<b>Percent of households in targeted hamlets with access to project water supply</b>	88%	~90-95%	100%	54% <sup>130</sup>
<b>Number of households per community tank<sup>131</sup></b>	25-28	39-43	26 <sup>132</sup>	14-31 <sup>133</sup>
<b>Year of completion</b>	2003	2003	2004	2004

Source: Lumajang District Project Management Unit.

**Has Increased Access To Water Led To Improved Quality Of Life?**

Yes. Improved access to water has reduced the time villagers, particularly the poor, must spend on water collection, allowing them to use that time for other things.<sup>134</sup> Poor villagers and children in particular have benefited. Many mothers now have the time to cook a hot breakfast for their children, who therefore have enough strength to put in a full day at school rather than coming home early.<sup>135</sup> Mothers also now have time to bring their children to kindergarten and assist in the classroom, leading to the opening of kindergartens in Kalisemut and Pakel.<sup>136</sup> Evening classes for adults to finish elementary school have also now opened in Pakel. "Education is very important for our future generations. To set a good example to my grandchildren, I go to evening school," mentioned one grandfather in Pakel. Some villagers use their new free time to go to the mosque; the District Project Management Unit reports more mosques have been built since project implementation began.

Some villagers have also enjoyed an increase in income or savings due to the project. Full-time Maintenance Organization members (there are about three per village) are paid for their work out of maintenance fees (the salary varies from village to village). The water systems have also allowed some villagers to develop new income

129 Not including Jatisari village where construction is ongoing.

130 Within a few months another 360 households plan to join the project, increasing the percent of participating households to almost 85%.

131 Lower number equals the ratio of participating households to tanks; higher number equals the ratio of targeted households to tanks.

132 30 households in Pakel have private connections and do not use community tanks.

133 234 households in Purworejo have private connections and do not use community tanks.

134 It is likely that women are the primary beneficiaries of this change, though no gender-specific data is available.

135 Elementary school teachers in Kalisemut and Merakan.

136 Parents and members of Village Implementation Teams.

generation schemes. Prior to project implementation, no one in Kalisemut produced bricks or raised fish, both cottage industries that require a reliable and convenient source of water. Now, there are four or five brick producers and four people who raise fish in the village.<sup>137</sup> Villagers who previously purchased water at a daily cost of Rp. 3,000 now spend between Rp. 1,000 and Rp. 7,000 a month for a nearly unlimited supply—a savings of up to 90 percent, which is now available for other things. Higher income and savings have made some families more able to contribute to kindergarten instructors' salaries, which was instrumental in the opening of the new kindergartens in Kalisemut and Pakel.

Some small business owners, such as a female bread producer in Kalisemut, have brought their businesses back to their home villages in response to the greater availability of clean water, a potential boost to the village economy.

Finally, the project has given many villagers greater peace of mind. As one person recalled, "Before WSLIC-2, in the dry season there were days when we looked for water all night." Since the project began, participating families have no longer suffered from a water shortage, and in many families the breadwinner has thus been able to leave home in search of work, sometimes outside the district or even the province, with major potential financial gains for his family.

### ***Has WSLIC-2 Increased Villagers' Feeling Of Ownership Of Water Supply Systems?***

Yes, if one uses villagers' willingness to make contributions of money and time as proxies for the intangible "feeling of ownership." Most villagers in targeted hamlets contributed their labor and money to construct the systems and pay a monthly fee for maintenance.

*Pride in achievement. Kalisemut villagers in a focus group discussion told the research team, "We are happy and proud of [the water system]; we celebrated the birth of the water system on the evening of the fifth of May with bull-races," "Together with the facilitators we have created the water infrastructure," and, "WSLIC-2 is the first time the people have been trusted." The head of Pakel village explained that "WSLIC-2 woke up sleeping people; it gave them the incentive to... take matters into their own hands."*

WSLIC-2 pays up to Rp. 200 million for a village water supply system; for larger villages with higher project costs, the consent of the Management Unit is required. Villagers are required to contribute 20 percent of the total (4 percent must be in cash and 16 percent in kind and labor). Because of Lumajang's geography, only piped water systems—the most expensive type—are possible, so the project has paid the maximum, Rp. 200 million, for each village system in this district. Each village has therefore contributed Rp. 8 million (US\$900) in cash and Rp. 32 million

(US\$3,600) in kind and labour, demonstrating ownership of the systems from the beginning of construction.

<sup>137</sup> Facilitator for Kalisemut.

Average monthly maintenance income and expenses, Purworejo			
INCOME (Rp.)	Amount	Sub-total	
Basic monthly household maintenance fee	3,000	2,010,000	670 contributors
Additional fee for individual household connections	2-4,000	468,000	234 direct connections to the house
Sub-total income		2,478,000	
EXPENSES (Rp.)			
Maintenance	40,000	40,000	Expenses ranged From Rp. 15,000 to Rp. 205,000 monthly in the past 8 months
Maintenance Organization head salary	100,000	100,000	
Maintenance Organization worker salary	100,000	100,000	
Maintenance Organization staff salaries	50,000	100,000	2 staff
1 Health worker	20,000	240,000	
5 Health volunteers		247,800	Each receives 10 percent of the maintenance fees s/he collects <sup>138</sup>
Sub-total expenses		827,800	
<b>MONTHLY BALANCE</b>		<b>1,650,200</b>	

An even greater burden was placed on Purworejo because of its large population—five times the number of participating households than in Kalisemut. Though there is a project mechanism by which a large village may apply for more WSLIC-2 funding, this requires a long waiting period. Purworejo villagers did not want to wait, so they decided to pay for the necessary extra costs of a water system extensive enough to serve them all, including more piping and more community tanks. In the end, Purworejo villagers each paid a one-time construction fee of between Rp. 20,000 and Rp. 50,000 (depending on income level), totalling about Rp. 29 million (US\$3,200),<sup>139</sup> or over three and a half times more in cash than required by the project. This certainly demonstrates villagers' ownership of the system.

Once the water supply system has been built, households begin monthly maintenance payments. Each village has its own maintenance fee system, which may depend on household

income, amount or type of water usage (household, agricultural or business), and/or the extent of household connections to the system. In Pakel and Kalisemut, the 100 percent payment of maintenance fees is evidence of a

<sup>138</sup> Assuming that they systematically collect all the fees.

<sup>139</sup> There were 870 contributors since not all hamlets agreed to the higher fees. A total of Rp. 29 million assumes one-third of the contributors paid 20,000, one-third paid 30,000, and one-third paid 50,000, but the actual breakdown is unknown.

sense of ownership of the systems, while in Purworejo, despite a payment rate of only 76 percent,<sup>140</sup> the Maintenance Organization still has a balance of Rp. 3.2 million in its account after 8 months of operation.<sup>141</sup>

Local ownership is also apparent in the willingness of project participants in some hamlets to voluntarily increase previously-set maintenance fees to cover needed costs. In Purworejo, all the Maintenance Organizations decided to increase the basic monthly fee from Rp. 1,000 to Rp. 3,000, with an additional Rp. 2,000 per month for one household tap, Rp. 3,000 for 2 household taps, and Rp. 4,000 for 3 household taps. The increase was necessary both because the size of the village required a lot of pipes, so there was no project money left over to build the tanks, and because villagers elected to build a large number of tanks—32—to further cut the distance water collectors would have to travel. In Kalisemut, villagers agreed that more money was needed to ensure system maintenance in the future, but rather than paying more cash, they decided to raise 500 Sengon trees (a type of timber tree) for sale.

### ***Has A Greater Sense Of Ownership Increased The Sustainability Of Water Supply Systems?***

In Purworejo and Pakel, the water supply systems have been operational for less than one year, and in Merakan and Kalisemut, for less than two years. The short time period, and the lack of any technical or financial evaluation of the systems, gives very little basis for assessing their sustainability. The degree to which villagers' sense of ownership might have increased the likelihood of sustainability is also difficult to ascertain without in-depth interviewing of stakeholders.

The available information implies that Merakan's system is not sustainable without major changes. Since its completion in 2003, the system has suffered from problems with management, maintenance and financing. Maintenance fee collection is decreasing. The fact that the Maintenance Organization members are not from the targeted hamlets has likely reduced villagers' sense of ownership. All this has led to poor financial and technical prospects for sustainability of their system. The systems in the other three villages have a greater potential for sustainability, though how much this is due to villagers' sense of ownership is an open question. Maintenance fees have mostly been paid and have easily covered the costs of needed repairs—which in Pakel have not been insubstantial. In both Purworejo and Pakel, villagers have adjusted their schemes' management to address problems with a view to sustainability. In Purworejo, villagers raised fees, while in Pakel, where water availability has been slowly decreasing as a result of erosion near the source, villagers have agreed to supply water to two hamlets on an alternating schedule, one in the afternoon and one at night, to ensure continued supply. There is, however, a major threat to sustainability: in some villages, Maintenance Organization members are only paid when there are problems.

<sup>140</sup> The low payment rate is due to one hamlet's refusal to pay because of maintenance fees that are higher than initially promised by the village head. About 360 households in 1.75 other hamlets had refused to pay at the start of the project so are not included in this rate; they are slated to join the project soon as they are now convinced by the project's success elsewhere.

<sup>141</sup> This balance is much lower than the product of 8 months and Rp. 1,650,000 (the average monthly net income, see table above) because of the large additional costs of the water systems in Purworejo which were paid for in part out of maintenance fees.

## Has WSLIC-2 Health Education Improved Villagers' Health And Health Behavior?

It is impossible to say whether the project has been responsible for improved health. Health workers, sanitation workers, and doctors from sub-district health centers do report a decreased incidence of serious cases of diarrhea and skin infections in project villages, and assert that the improvement is due to both the greater availability of water for household uses and healthcare, and the increase in programs promoting healthy behaviour since WSLIC-2 began. Supporting health data is collected three times during the project's lifespan: to provide baseline information, during a mid-term review, and one year after the project is completed. This data is gathered using MPA-PHAST, but the guidelines are not always followed,<sup>142</sup> and thus data is not representative. District health data from sub-district health centres show a remarkable decrease of diarrhea incidence in some villages, but fluctuations or even increases in other villages; in any case, district health data is well-known to be frequently inaccurate and does not distinguish between project and non-project households.

Healthy behavior has, however, increased as a result of the project—though it seems this is more a result of increased access to clean water than of health education.<sup>143</sup> The research team observed villagers in non-project villages collecting river water next to cows and bathers, while in project villages the proximity of cleaner water has reduced the need to rely on this polluted source. Prior to project implementation, three of the four villages relied at least partly on polluted rivers for their drinking water, but now only some villagers of 3-4 hamlets continue to collect river water. According to interviewees, the greater availability of water and time have enabled many villagers to cook a morning meal and bathe daily. Merakan sanitation workers and midwives report that midwives are pleased to have a supply of clean water to use in deliveries: "Now that clean water is available, delivery of babies happens with this water, whereas before we had to use what was available." Teachers in the two elementary schools visited, villagers, and staff of the Maintenance Organizations in Kalisemut and Pakel report that since the water tanks were built, students come to school freshly bathed, while teachers in Merakan and Kalisemut also mention that they can regularly clean their schools with the now-abundant water. Villagers in Pakel have been particularly innovative. Though they were not willing to make separate contributions to a local health care fund, once it was decided to connect water system maintenance fees to the Rp. 1,000 health fund payments, all households agreed to pay the extra amount. The health fund allows them free consultations at the puskesmas. Villagers said, "We're happy with the health fund because we can get free health care."

Project health education activities being implemented in Lumajang include:

- a government program begun in the 1970s to teach students and families how to bathe and use the toilet;
- a "hand-washing" program (cuci tangan) which teaches children to wash their hands with soap before eating.

<sup>142</sup> Project guidelines require that data be collected in a representative manner from villagers, disaggregated by income level and gender. However, the team observed that in some cases data was not gathered in this way.

<sup>143</sup> The Project Appraisal Document itself included only general indicators for health behavior: "[number of] village PHAST programs carried out, number of school programs [for health] functioning, number of functioning Village Implementation Teams established, ... knowledge and practice of good hygiene and health" (World Bank, May 2000, pp. 31 and 33).

Teachers and health staff have built washbasins (from paint buckets or other available material) for the children to use, and health staff have trained teachers to check students for cleanliness. In Pakel, teachers record the cleanliness of their students on daily attendance records. It is evident that students' behavior has changed, as students are now able to go to mid-day prayers; before, they could not because they were unable to do the required ritual cleansing.

- a "bathing twice a day" program for students and their families; and
- construction of a "healthy house" (rumah sehat) in Pakel and school cleaning in Merakan to increase villagers' health and sanitation awareness.

### ***Has The Involvement Of Many Stakeholders Been Key To Improving Health Behavior?***

Yes, it has definitely contributed to the improvement. Providing health and school staff with financial incentives and training by health facilitators to promote both new and old healthy behavior programs has increased these stakeholders' support for the project; they in turn have increased pressure on villagers to participate in both project and government health activities. Many other stakeholders, such as local leaders (formal and informal), midwives and village health volunteers (kader), are also involved in the project and have helped to bring health education activities to fruition at the village level. However, as noted above, it is likely that increased access to clean water alone has had at least as much to do with the improvement in health behavior.

### ***What Unexpected Benefits Has The Project Brought?***

The construction of water supply systems is dependent largely on the achievements of the villagers themselves. The project's emphasis on community involvement has strengthened villagers' planning, management, and assessment skills. Through this experience, villagers have come to realize that they have the power to improve other village facilities. They have become less dependent on leadership from outside and now sometimes take the initiative themselves, using the Maintenance Organizations already established through the project. In Kalisemut, the Maintenance Organization has encouraged people to build fences around their gardens by offering a month of free water in exchange. According to the Management Organization, almost 100 percent of villagers have taken them up on the offer. In the same village, people copied their water system contribution scheme to pay for the construction of 2 km of concrete roads. This initiative was well received by the village head who contributed additional financial support toward construction costs. In Pakel, the Maintenance Organization aims to build one toilet for every household by the 17th of August this year.<sup>144</sup> Project participants and the research team see these changes in attitude and behavior as one of the key project benefits.

<sup>144</sup> This goes beyond the project's goal of merely increasing the number of latrines in every village.

## Factors That Contributed To Success

**The poor want to pay.** Officially, the poorest do not have to contribute anything toward construction, though most say they want to contribute just as other households do; project staff say this is because they want to be sure of having the same rights and ownership as other households. The monthly payment fees in Purworejo village range from Rp. 5,000 for the poorest households to Rp. 50,000 for the richest households.

**The project's emphasis on villager involvement in planning, construction, management, maintenance and financing helps ensure the water systems' sustainability, and by empowering some communities, enabled them to improve other aspects of village life as well.** Experience from previous projects, notably WSSLIC, the Village Infrastructure Project, and the KDP (*Kecamatan* Development Project), emphasized the

importance of community participation in planning, production, financing and maintenance to project sustainability.<sup>145</sup> Under WSLIC-2, villagers themselves decide how many tanks to construct and where to put them to ensure accessibility. Mandatory villager contributions for construction and maintenance—set by the villagers themselves—ensure villagers literally own their water supply systems, and are more likely to understand and support the maintenance necessary for sustainability. Villager-elected Village Implementation Teams (Tim Kerja Masyarakat or TKM) (responsible for managing construction) and, subsequently, Maintenance Organizations (responsible for system management and maintenance) keep villagers closely involved in project implementation—indeed, almost all members are local villagers themselves. As a result of this intensive villager involvement, most villagers—including the poor—see the systems as being worth their money, and many have become empowered by the process. New village improvement projects such as latrines and pre-paid healthcare are additional beneficial outcomes.

**The new water supply systems were mostly well-planned and well-executed technically.** Perhaps most importantly, the systems are designed to ensure that water sources do not run dry. Village Implementation Teams in collaboration with project facilitators and consultants carefully calculate the number of households or hamlets that can sustainably be served from each source and plan the system accordingly. Only in areas where water is especially plentiful are private connections an option. Another important aspect of system design is that tanks provide no space for showering. In projects where more sophisticated tanks are built, people often bathe in situ, but this requires more water than the traditional Indonesian bucket bath or mandi at home, and if water is scarce can create conflict.<sup>146</sup> Tank design thus gives people the incentive to take water straight home.

**Leading the way in Kalisemut.** Mr. L., the informal Kalisemut village leader, has always been highly involved in organizing community activities and was a fervent proponent of WSLIC-2 from the beginning. Together with project facilitators, he talked to the villagers at meetings at his home or in the mosque, slowly increasing local support to finance the new water system. After construction was complete, he was elected by the villagers as the head of the new Maintenance Organization.

**The support and involvement of local leaders, both formal and informal, has been crucial to project support.** Leaders have helped to convince villagers of the need for clean water supply, and the potential of the project to provide it. Moreover, local leaders have been instrumental in assuring villagers that they are capable of making the required total contribution of Rp. 40 million (US\$4,400). In successful project villages such as Kalisemut, Pakel

<sup>145</sup> World Bank (September 1996 and May 2000) and Ministry of Home Affairs et al. (June 2002).

<sup>146</sup> District Health Bureau staff.

and Purworejo, village leaders had already been highly involved in hamlet activities prior to project implementation, and quickly became project supporters.

**Water use regulations reduce the potential for conflict.** Participating households are given unlimited access to water for home use, but agricultural and business uses are allowed only if tanks are overflowing, reducing the potential for intra-village conflicts. Regulations have also been effective in reducing inter-village conflict. Prior to the completion of the water system in Bulukubung hamlet of Kalisemut, for instance, the Implementation Team, village head and project facilitators made an agreement with the neighbouring village of Kertowono where the water source is located. An extra tank was built at the source to provide water to Kertowono villagers, who previously had full use of the source. In return for free construction of and access to the tank, these villagers agreed to maintain the pipes that guide the water to Kalisemut's tanks. Villagers from neighbouring villages are also allowed to use Kalisemut's tanks during the dry season when natural water sources are low. As a result, in Bulukubung there have been no reports of water-related problems with neighbouring villages.

Most Maintenance Organizations are trusted and effective, due to their training, their local backgrounds, and the fact that they are paid for their work. After construction is complete, the village elects a Maintenance Organization (sometimes referred to as a Management Organization, or Badan Pengelola) of 8-10 members to manage the water supply system. Maintenance Organizations are independent institutions that are made official with either a village regulation (Peraturan Desa) or an authorization letter listing the members, their tasks, and their terms.

One district-based technical consultant and one district-based community development consultant provide technical advice to two Community Facilitator Teams, which are responsible (together with District Health Bureau staff) for training both Village Implementation Teams and Maintenance Organizations on technical issues, management, needs assessment and health promotion. In many cases, Village Implementation Teams and Maintenance Organizations are composed of the same people, which has increased the effectiveness of the training. Facilitators stay in the villages during the initial stages of the project and can always be contacted for advice. In Lumajang, they are young, energetic people newly graduated from university. Most are from the province, which gives them a personal incentive to support the project, as well as a real bond with villagers. They are more likely to understand the local politics, which makes their advice and training more effective. In fact, they state that the Maintenance Organizations "are more experienced with the infrastructure than we, the trained specialists, and manage to come up with ingenious ways to solve their problems." This has in turn increased the villagers' trust in the Maintenance Organizations, as manifested by continued monthly maintenance contributions.

**From each according to his or her ability.** In a social mapping exercise, villagers list the local criteria for poor, average, and rich villagers, and then divide all village households into categories accordingly. Contribution and maintenance fees are then agreed upon, with higher fees for those in higher income groups. This ensures that everybody can participate in the project. The transparency of the process has increased its accuracy and villagers' satisfaction with it.

**Local solutions to local problems.** The Maintenance Organizations "manage to repair the water systems in ways that we had not considered. They use materials such as bamboo, plastic paint boxes, and wood to repair the infrastructure. These materials are more affordable for them. Our opinion is that the repairs are well done... Over a short time period, the Maintenance Organizations have become more specialized than we [the project consultants]!"

**Villages were required to go through a lengthy process to obtain project support, which created understanding of and support for the project on the part of village leaders and, eventually, villagers themselves.** Villages

with a low availability of clean water, limited sanitation facilities and a high incidence of poverty and diarrhea in children under 5 years were eligible for project support. Villagers had to be willing to contribute to and manage construction and maintenance of water supply systems in order to obtain project funding.<sup>147</sup> Once project villages had been chosen, project facilitators involved all villagers in a careful process of assessing village needs and increasing local awareness of the need for clean water supply. Facilitators explained the financial and time implications of involvement

in the project to villagers in detail. Following this process, villages still interested in participating in the project were required to make community action plans (rencana kerja masyarakat) with the assistance of project facilitators, in which they described the wishes and needs of their community and how they intended to achieve their goal for water supply. Facilitators led focus group discussions and meetings (with a minimum of 40-50 villagers each) to carry out social mapping exercises to fix construction and maintenance fees. Finally, action plans were evaluated by the Central Project Management Unit. Once accepted, villages were allowed to begin collecting contributions for construction.

**Villagers' desire to make better use of water and the positive experiences of the initial WSLIC-2 project villages have made other villages in Lumajang fertile ground for project implementation.** Most people want to bathe, cook breakfast, and clean their homes and schools regularly; they do not want to use polluted water sources. The project's success in providing clean water for households and schools in Pakel, Purworejo, Kalisemut and (to a lesser extent) Merakan has made Jatisari and other villages in the district eager to join. There is no longer a need to convince people of the project's value.

**National-level policy changes related to decentralization and the water supply and sanitation sector created an enabling environment for WSLIC-2.** Decentralization, introduced in 1999 and first implemented in 2001, and the evolving national Rural Water Supply and Sanitation Policy, which emphasizes (inter alia) decentralization of rural infrastructure to local levels, paved the way for village-level management of all kinds of projects, including WSLIC-2.<sup>148</sup>

<sup>147</sup> Government of Indonesia WSLIC-2 Project Preparation Consultant Team (March 2000) and District Health Bureau.

<sup>148</sup> World Bank (May 2000), pp. 4, 5, 124, 132.

## **Limitations To Project Impact**

### **Inaccurately estimated, increased, or relatively high maintenance fees are unacceptable to some villagers.**

About 30 households in the most distant part of Kalisemut feel the maintenance fees are too expensive, so they do not contribute, continuing to collect their water from the river instead. According to the head of the Maintenance Organization, these households may still contribute maintenance fees and use the water even though they did not pay for construction, but they refuse because they feel ashamed. In Purworejo, villagers had initially been promised monthly fees of just Rp. 1,000 by the village head. When an increase in the number of water tanks planned for that village forced fees up to Rp. 3,000, villagers in one hamlet refused to pay—even though they already paid a substantial construction fee. Though the village head had made the same mistaken promise to all hamlets, the people in this particular hamlet were especially upset at the increase because they had been the village head's supporters before anyone else, helping him to convince villagers in the other hamlets of the project's value. Therefore, they feel especially let down by him. Three months after they stopped making maintenance payments, their Maintenance Organization closed off their pipes. The Maintenance Organization hopes that once the dry season starts, the villagers from this hamlet will renew their payments.

**Sharing water sources pose a serious threat to sustainability.** Water sources are usually not conveniently located within village boundaries and most project villages have had to rely on sources outside their borders. Households near these sources which had already been using them feel threatened by the new users and conflict can arise if sources are significantly diminished with greater use. In Merakan, where no regulations had been made by the Maintenance Organization to anticipate and resolve the problem, people from nearby villagers are now stealing water from Merakan's source. Together with the low commitment of Merakan's Maintenance Organization (see next paragraph), resulting in late repairs and a subsequent lack of water, villagers' willingness to pay maintenance fees has greatly decreased.

In some village, regulations were made, but only by the hamlets that use the water systems; hamlets and villages through which the pipes are laid, or which about the sources themselves, were not included, reducing the regulations' effectiveness.

**Unmotivated Maintenance Organizations also threaten sustainability.** Merakan's Maintenance Organization members, though from the village, do not live in the targeted hamlets, as villagers were unable to find appropriate leaders from those hamlets, even with assistance from project facilitators. Despite low maintenance payments, the Maintenance Organization is not actively trying to collect fees, and the villagers still have access to project tanks. Project staff realize that local management is crucial to project support, and concede that "in Merakan the leadership is not strong enough to...support...WSLIC-2. We need to learn about leadership."<sup>149</sup>

Being local is not enough to ensure commitment. Some Maintenance Organization members are not regularly paid. For example, in Pakel, members are only paid when there are problems to fix; the monthly checks that they

<sup>149</sup> District Project Management Unit.

perform are unpaid.<sup>150</sup> The head of Pakel's Maintenance Organization was assigned for a two-year period, and was very excited and proud of the water system right after construction, but now says, "I'm tired of doing this work." Stories about paid Maintenance Organization members in other villages make him even more reluctant to continue. He wants to stop when his term is over, but is dependent on the village head to assign another leader for the Maintenance Organization.

**In all WSLIC-2 villages, many people have had negative experiences with other water projects, such that some households still do not believe this project will work, so they do not participate.** In Merakan, prior to WSLIC-2 implementation, water pumps were built under the KDP program. According to villagers and Bureau of Health staff, poor maintenance and incorrect use of the KDP water pump resulted in depleted water flow and a broken pump after six months. The villagers did not know how to repair it so they began to use river water again. While the main reason for low project success in Merakan is an ineffective Maintenance Organization, it is likely that villagers' prior experience with KDP has compounded the problem.

About 360 families in Purworejo and 30 families in the most distant part of Kalisemut were initially reluctant to contribute to construction because they did not believe the water system would work, in part because of bad experiences with other water projects previously (other factors included the ready availability of river water and the ability of some of these families to purchase water from vendors). Thus, they did not receive project support. In recent months, however, many of these villagers have observed the project's success in neighboring hamlets, and have begun to save for the required construction fee to extend the project to their hamlets after all.

**Inefficient utilisation of water supply.** Despite good technical design overall, the water systems could be made more efficient, especially during rainy season. Leakage of water and overuse in schools is a common sight; excess water could be stored or used in gardens for even greater project impact.

**Language difficulties.** Language initially created a problem for facilitators working in Merakan and Kalisemut, where most of the population speaks Madurese. The facilitators were new and did not know Madurese well; however, the project hired a facilitator who speaks Madurese, and eventually the other facilitators learn to cope with the language barrier, so language is no longer a problem.

## ***Making Water And Health Services Work For The Poor***

**The sustainability of project impact after project support ends may be threatened by high dependence on external facilitators and time-bound financial bonuses for local health and school staff.** Project staff are preparing for their withdrawal from the district in 2006. To ensure continued support for project activities, they intend that existing government structures such as the District Health Bureau, sub-district government, and local village heads provide advice to villagers as needed, hoping that this support will be sufficient, and that these structures will merit the villagers' trust.

<sup>150</sup> It is unclear whether this is also the case in Merakan and Kalisemut. In Purworejo, Maintenance Organization staff are paid monthly whether or not there are problems.

**The rather high tank-to-household ratio may have a negative impact on access.**

The number of households per community tank is high, between 25 and 43 in Pakel, Merakan and Kalisemut. Currently it is only 14 in Purworejo, but if all targeted households are reached, this number will increase to 31. According to the project technician for the district, ideally a tank should serve fewer than 28 households. The implication is that competition for water at the tanks is fairly high, possibly affecting the amount of time water collectors must wait at the tanks for their turn, the opportunity cost of this time (children could be playing, studying or helping with housework; mothers could be resting, caring for children, or pursuing income generation activities), and the type of interaction (friendly or stressful) between villagers vying for the water. High competition for water might also push households which can only barely afford it to use their scarce funds to purchase water, or those who cannot afford it to revert to polluted sources.

**Despite the project's focus on poor and needy villages, remote and poor areas are at a disadvantage.** Project villages are chosen not only based on need but also based on how easy project implementation will be, how much it will cost, and how likely it is that water systems will be maintained. Thus, for example, villages close to each other are preferred as a way of reducing project cost and staff time, and villages with dense populations are prioritized over those with scattered households, to keep house-to-tank distances low (it is assumed that this ipso facto increases ownership, maintenance, and thus, sustainability). Hence, a few villages in Lumajang had no chance of project support even though their need for clean water was just as great as that of those selected for project implementation.

**Inadequate baseline information and monitoring makes assessment of the project's impact on health and key segments of the population—women and children—impossible.** Facilitators appear to have greater difficulty gathering supporting data than in implementing the project. Data gathered is unrepresentative, and no evaluation of the data has yet been undertaken. No adequate health data is therefore available that would enable project management to assess the project's impact on health in Lumajang.<sup>151</sup>

Water supply projects are well known to have great potential benefits for women and children, who usually bear the brunt of the water collection task. Again, with no data collection focused on changes in behavior and wellbeing of these two groups (despite many mentions in the Project Appraisal Document about the need for gender-sensitive monitoring),<sup>152</sup> conclusions about project impact are hard to reach. Well-designed, well-implemented and well-analyzed rapid rural appraisal (RRA) or participatory rural appraisal (PRA) would, however, still allow meaningful conclusions to be drawn in the absence of baseline information, indicators and regular data collection.

151 The Project Appraisal Document, for example, calls for regular collection of data on water and sanitation-related disease rates and on time lost to illness or to treating the ill (World Bank, May 2000, pp. 30, 86-7).

152 E.g., World Bank (May 2000), p. 20.

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