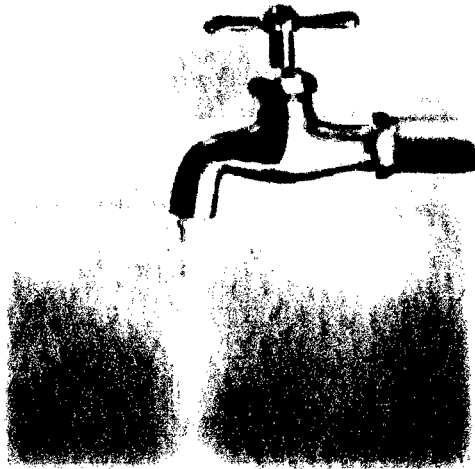




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## **Sulawesi Rural Community Development Project Phase IV**



Submitted to:

**Community Water Supply Management Workshop**

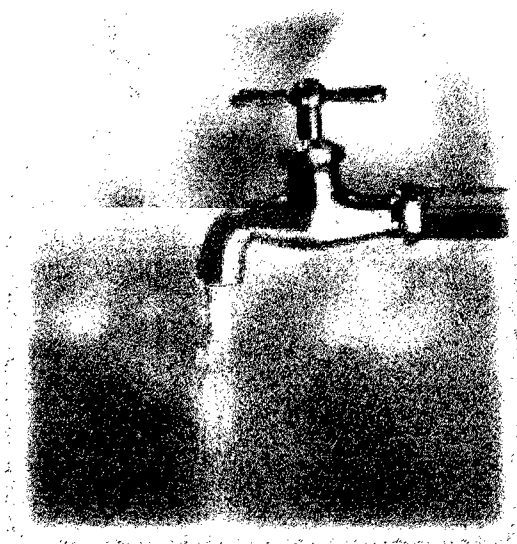
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CARE International Indonesia

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**SULAWESI RURAL COMMUNITY DEVELOPMENT  
PROJECT PHASE IV**

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Submitted to:

**Community Water Supply Management Workshop**

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## LIST OF ABBREVIATIONS

<b>BAPPEDA</b>	Badan Perencanaan Pembangunan Daerah (Regional Development Planning Agency/Board)
<b>BPD</b>	Badan Perwakilan Desa (Village Representative Board)
<b>CIDA</b>	Canadian International Development Agency
<b>CII</b>	Care International Indonesia
<b>CDN</b>	Canadian
<b>CMA</b>	Community Management Approach
<b>CS</b>	Central Sulawesi Province
<b>EHHC</b>	Environmental Health and Hygiene Campaign
<b>GAD</b>	Gender and Development
<b>GOI</b>	Government of Indonesia
<b>HSE</b>	Health and Sanitation Education
<b>IB</b>	Institutional Building
<b>IGA</b>	Income Generating Activities
<b>LFA</b>	Logical Frame Work
<b>LSM</b>	Lembaga Swadaya Masyarakat (NGO)
<b>MOU</b>	Memorandum of Understanding
<b>NGO</b>	Non Government Organization
<b>O &amp; M</b>	Operation and Maintenance
<b>PKK</b>	Program Kesejahteraan Keluarga (Family Welfare Program)
<b>PRA</b>	Participatory Rural Appraisal
<b>SRCD</b>	Sulawesi Rural Community Development
<b>SS</b>	South Sulawesi Province
<b>SES</b>	Southeast Sulawesi Province
<b>TOR</b>	Terms Of Reference
<b>USAID</b>	United States Agency for International Development
<b>VWSIC</b>	Village Water and Sanitation Implementation Committee
<b>VWSMC</b>	Village Water and Sanitation Maintenance Committee
<b>WSP</b>	Water Source Protection

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## Executive Summary

### 1.1. SRCD IV Project Summary

**CARE Indonesia's SRCD IV Project, funded by CIDA Canadian International Development Agency, was aimed to provide rural communities in Sulawesi with access to clean water and facilitation of construction of sanitation facilities to address a basic human need while enhancing social welfare.**

Started in April 1999, the SRCD IV was implemented in three provinces in Sulawesi until December 2001.

It has constructed 44 water supply and sanitation systems to serve 33,119 people in 44 villages (16 in South Sulawesi, 10 in Central Sulawesi and 18 villages in Southeast Sulawesi). The project exceeded the original target of 30,000 people in 35 villages. During the final phase, the Districts of the Government in South and Southeast Sulawesi requested CARE to implement additional water and sanitation supply projects in 9 more sites. CARE's performance during the SRCD I – IV instilled confidence and trust with the government, the request for CARE's assistance was further strengthened with the offer of government paid pipes and materials for those additional sites.

The Project was designed for 60 – 80 l/c/d with a demand growth rate of 3 % per year over 15 years. The total coverage up to the end of the project implementation period for water supply has reached 91.93 %. The facilities constructed for water supply systems include;

- 60 Spring Captures
- 13 Storage Tanks
- 6 Slow Sand Filter Tanks
- 263,783 M' pipeline
- 6,210 House Connection
- 96 Public Taps.

The achievement for sanitation facilities is 99% of targeted latrines; 100 % of targeted water drainage systems and 100% of targeted garbage disposal units. The family latrines were constructed through a revolving fund system managed by the Village Water and Sanitation Implementation Committee.



The community were encouraged to take a strong leadership role in this project in terms of planning construction, management of the systems and collection of water user fees. The project believes that resources contribution from the community will encourage a sense of ownership and higher level of responsibility towards the process and the equipment. The government also contributed considerable resources in materials. The

following table outlines the contributions to the SRCD IV Project.

**TABLE 1: CONTRIBUTIONS TO SRCD IV PROJECT**

<b>Government</b>	Rp. 1,632,113,815.
<b>Community Cash Contribution</b>	Rp. 981,711,254.
<b>Community In kind contributions</b>	Rp. 1,552,135,770.
<b>CARE/CIDA</b>	Rp. 1,968,110,706.
<b>TOTAL</b>	<b>Rp. 6,134,071,545.</b>

The over all total construction cost was Rp. 6,134,071,545.-, equal to approximately US \$ 613,407. or about 681,563 EURO.

All of the 44 established VWSMC personnel have been trained by project staff in all aspects of WSS operation and maintenance technically, financially and administratively. One of the aspects is a User Fee Collection system. The tariff collected for each sites is varied from Rp. 1,000 depending on their agreement made with the community and the calculation formula suggested by the project staff. Up to December 2001 the community's committee have been collecting Rp. 37,631,000 of user fee.

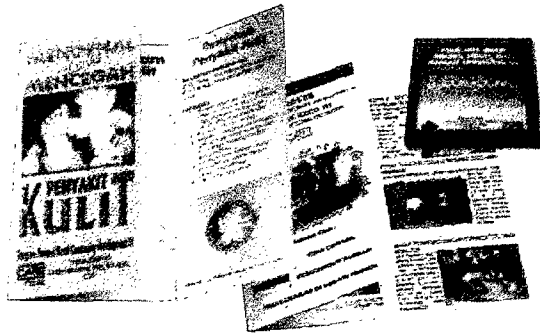
**TABLE 2: SURVEY DATA**

<b>Item</b>	<b>Pre Survey - %</b>	<b>Post survey - %</b>
Access to water	19	70
Latrines	8	47
Drainage systems	12	62
Garbage Disposal Units	16	66

The results of the baseline survey conducted in the SRCD IV sites from July to August 1999, indicated that only 19 % of the community had access to water, only 8% had latrines, 12% had drainage systems and 16% had garbage disposal units.

The project's pre close out survey conducted in February 2001 indicated that water access had increased to 70 %, latrines 47%, drainage 62.% and garbage disposal units to 66 %. The impact of the project goes beyond the construction of facilities and includes improved income and economic well being of people in poor rural areas as measured against the project's Logical Framework Analysis's performance indicators. Based on the close out survey result conducted in February 2001 (prior to the No Cost Extension period), the number of hours saved for collecting water is more or less 3 hours per day.





A planned outcome for the SRCD IV Project included an improvement in health and specifically a decrease in water borne diseases amongst children under five years of age. According to the close out survey, medical expenditure for diarrhea decreased by 71% with incidents of diarrhea decreased by 25%. Prior to the project, skin diseases were treated with local herbal medicines or by a "dukun" – witch doctor. Subsequent to the project, medical expenditure for skin

diseases increased, by 8%, indicating the message delivered concerning seeking professional medical care was moderately received by the community. A comprehensive Health and Hygiene Awareness component was conducted in tandem with the construction activities. The education and awareness raising activities were partnered with health cadres and members of the village water committees.

## **1.2. SRCD Project Evaluation Summary**

The SRCD Evaluation, conducted by Yayasan Indonesia Sejahtera (YIS) Solo, was aimed to assess the effectiveness of the project execution, particularly the impacts and consequences of facilitating water supply and sanitation activities with rural communities. The evaluation was started in early September and continued to the end of October, 2001. Data collection in the field was carried out from September 26 to October 13, 2001.

According to the evaluators it was highly successful in achieving the project's goal. The project's success is apparent in both the technical and non technical aspects of the project. It succeeded in acquiring the community's full participation to plan, design, implement, and manage the operations and maintenance of the water supply system, so that a sense of belonging in the community was fostered.

Community awareness of proper hygiene practices and utilization of sanitation facilities was significantly increased by the augmented availability of clean and abundant water.

In general, the fulfillment of clean water, as executed by the project has been adequate. The water discharge available as a result of installation of water systems satisfy the community's needs, reaching the standard of 60 liters/person/day. On average, the water quality is good, as revealed in a survey and water testing analysis, and has been in line with the project design.

Participation was the key to the SRCD IV's project's success. The project's implementation process achieved true community involvement in all of it's phases. This approach represents one of the main strengths of the SRCD IV Project. CARE calls this approach the Community Management Approach (CMA).

The operational and maintenance features are the most decisive points of the project. This is where evidence lies of the depth of community commitment to the systems. The project provided training and extension media to build strong skills and eliminate a commonly held trepidation when facing technical disrepair. The sustainability of the project will be realized through the work of the Village Water and Sanitation Maintenance Committees (VWSMC). The majority of the



VWSMC have a strong foundation of community support, technical skills and overall comprehension of the systems and its advantages.

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## **2.0 SRCD IV PROJECT DESIGN**

The SRCD IV project was designed as the following :

**Project goal :**

- To improve access to basic human needs and so improve social welfare and economic growth in poor rural areas

**Project purpose :**

- To provide water and sanitation facilities and complementary health and hygiene programs in at least 28 participating villages for the benefit of 30,000 people, using participatory “Community Management” Approaches.

**Project Impact :**

- Improved income and economic well-being of people in poor rural villages.

**Project Outcomes :**

- Improved health in target villages due to improve access to clean water, improved sanitation and improved environmental health and hygiene practices.

**Project Output :**

- Adequate water supply in 28 villages for 30,000 people
- 65% of household with newly constructed sanitation facilities
- Environmental health and hygiene campaigns designed and implemented in 28 villages
- Village project communities active in successfully co-ordinate all project activities
- Women are involved in all phases of project activities, including representation on village project, communities and sub-communities
- Community contribution of resources
- Water-user fee collections and O&M activities established in target villages

### **2.1. Project Gantt Chart**

The SRCD IV Project’s GANTT Chart of Implementation may be viewed in Appendix 1.

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## **3.0 PROJECT ACTIVITIES COMPLETED**

At the end of the project, implementation of the planned activities has been completed as outlined in the project’s Gant Chart of Implementation. During the implementation, there was some flexibility in scheduling and activities realization, but overall targets were achieved, except for a small percentage of water supply and sanitation facilities which are still in the process of finalization. The process and the result of project activities is explained in the next section.

### **3.1. Milestone I: Site Selection**

The following steps outline the process and activities included in achieving the Site Selecting Milestone.

▪ <i>Select the district and sub-district sites with the local government</i>
▪ <i>Promotion of SRCD IV project at Sub-district level</i>
▪ <i>Select project site with NEED criteria</i>
▪ <i>Conduct water quality test.</i>

**3.1.1 Activity: *Select the District and Sub-districts sites***

To select the district, the provincial government in coordination with CARE staff analyzed potential sites using a set of criteria. The districts were selected based on the recommendations and secondary data from the provincial government. The project selected nine districts out of twenty eight contenders/candidates: five of those districts were in South Sulawesi, two in Southeast Sulawesi and two Central Sulawesi.

To select Sub districts, the District Government was facilitated by CARE staff applying similar criteria. The project selected nineteen subdistricts of a long list of twenty nine sub districts

**3.1.2 Activity: *Promotion of SRCD IV project at Sub-district level***

Prior to village level selection, the project staff conducted project promotion to all selected sub districts. The promotion was aimed to inform potential project partners and stakeholders of the benefits and design of the project. Project promotion was anticipated to encourage the Sub district Heads to coordinate with the Village Leaders to send letters of intention with data or pertinent information on their village to the district government with a request for selection in the SRCD IV project.

**3.1.3 Activity: *Select project site with NEED criteria***

In consideration of the Requisition Letter sent by Village Heads to the District and the recommendations from the District Government, the Project staff facilitated the government to select project sites by conducting a preliminary site and raw water source survey. From the results of the survey, site selection was finalized utilizing CARE’s selection criteria “NEED” or No Excuse for Easy Desa (village) methodology. The criteria for site selection using the NEED method are covering at least (i) Inadequate water supply systems, (ii) Inadequate sanitation systems, (iii) High incidence of water borne diseases and (iv) High community participation in previous development activities.

**3.1.4 Activity: *Water Quality Testing***

The Water Quality Monitoring was conducted routinely by field staff and the community before and during the implementation of the project. Testing was conducted twice by the Provincial Health Department Laboratory for all sites, testing for turbidity, and biological (bacteria and fecal) and chemical (nitrates, carbon dioxide, manganese, and iron) contaminants.

**3.2. Milestone II: Community Preparation**

The following steps outline the process and activities included in achieving the Community Preparation Milestone.

▪ <i>Conduct village baseline survey</i>
▪ <i>VWSIC formation and general work plan</i>
▪ <i>Conduct household survey (health and gender)</i>
▪ <i>Conduct technical survey</i>
▪ <i>Conduct cross visit (training)</i>

### 3.2.1 Activity: Conduct village baseline survey

The baseline survey was initiated in August 2000. The process of data entry, analysis and reporting involved the project staff and the community. Included in the analysis was an extensive process of cross checking of questionnaires.

A total of five survey forms were applied by the project staff in the selected survey sites. The survey foci were (i) Social, Economic and Health, (ii) Technical survey, (iii) Household, Environmental Health and Hygiene Campaign and Gender Survey, (iv) Family sanitation sketch and (v) Village self survey

The Baseline and Closeout Survey Data may be viewed in Appendix 13.

### 3.2.2 Activity: VWSIC formation and general work plan

During the implementation phase, the VWSIC was established in all sites to coordinate all activities related to WSS systems. The committees consisted of 20 - 25 members assuming the roles of Management, Technical, Resources Mobilization and Health and Hygiene Sub-committee members.

This committee was replaced with the Village Water and Sanitation Maintenance Committee (VWSMC) after the system's construction was completed.

### 3.2.3 Activity: Conduct household survey (health and gender)

A component of the baseline data survey was the Household survey which focused on Health and Gender. The survey was conducted by Health cadres who had been trained first by the Field Officers on survey techniques.

The purpose of the survey was to know the level of knowledge, attitude and practice on Hygiene and Sanitation in the community as well as perceptions regarding gender and male/female roles. The survey delved into the following issues of

- Knowledges on diarrhea and skin diseases
- Knowledge, attitude and practice in the house and the environment
- Knowledge, attitude and practice of latrines and its use
- Knowledge, attitude and practice on water handling
- Knowledge, attitude and practice on self cleanliness
- Knowledge, attitude and practice on food handling
- Male/Female time line: Productive activity, social activity and free time
- Access and control to land, goods and education
- Opportunities and constraints

### 3.2.4 Activity: Conduct technical survey

The technical survey was conducted to find out data regarding population, kinds of water source, pipelines in meter/km, meteorology data, local materials available, WSS options, number of sanitation facilities available as well as prediction on the budget needed for WSS systems.

### 3.2.5 Activity: Conduct cross visit (training)

To broaden Village Water and Sanitation Implementation Committee's insight on WSS programs, selected members conducted a cross visit to successful SRCD II or III sites to see the WSS

facilities and to discuss with established VWSMC, communities and village leaders on the process and outcomes of early phases of the SRCD project.

### 3.3. Milestone III: Project Planning

The following table outlines the steps involved in achieving the activities conducted to achieve the Project Planning Milestone.

<ul style="list-style-type: none"> <li>▪ <i>Conduct committee training in planning</i></li> </ul>
<ul style="list-style-type: none"> <li>▪ <i>Develop detailed work plan (water supply, sanitation, gender, H&amp;H promotion)</i></li> </ul>
<ul style="list-style-type: none"> <li>▪ <i>Conduct community training</i> <ul style="list-style-type: none"> <li><i>H&amp;H promotion</i></li> <li><i>Gender</i></li> <li><i>Sanitation</i></li> <li><i>Construction</i></li> <li><i>Water quality test</i></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ <i>Community resources mobilization (cash and in-kind)</i></li> </ul>

#### 3.3.1 Activity: Conduct Committee training in planning

Training in Planning for the Village Water Supply and Sanitation Implementation Committee consisted of a SRCD IV program introduction, Training on budget analysis for WSS construction, training on the roles and responsibilities, Training on fund collection and administration, and training on engineering design for spring catchments tank, house connections and latrines.

The facilitators of the training were the field officers assigned to the project sites and sometimes government staff, particularly Health service staff. As part of the training, some VWSIC conducted cross visits to nearby sites within the provinces.

#### 3.3.2 Activity: Develop detailed work plan (Water supply, Sanitation, Gender, H&H promotion)

To guide the VWSIC and the community to implement the project, the field staff facilitated them to develop a detailed work plan for water supply and sanitation development, gender equity issue and health and hygiene promotion activities. Since the VWSIC consists of Technical section and Hygiene and Sanitation section, each sub unit developed a work plan, which was then integrated into an overall work plan.



#### 3.3.3 Activity: Community training

To enable communities to recognize symptoms of dehydration, causes of diarrhea and simple preventative methods, training was provided by the Village Committee in cooperation with local health agencies. Technical training was also provided to increase capacity in maintenance and repairs of water sanitation systems.

#### 3.3.4 Activity: Community resources mobilization (cash and in-kind)

The Project was built around the precept that community contribution of resources, both cash and labour, will result in a higher sustainability for the water and sanitation facilities. Projects using cash contributions direct to communities to construct systems often fail to sustain, the community

perceives the system as belonging to the funder. The project assumed contributions would be shared between CARE, the government of Indonesia and the community.

The community contribution of resources for this project in the form of cash and in-kind (gravel, sand, wood, labour etc). In the early stages of project development, there was an agreement between the project and the community on which part is the community share, CARE's share and the government's share. Based on the calculations of the total project budget the community contribution in cash is discussed, agreed, divided and applied to all households. From that amount, the members agree on a time frame needed to collect the remaining needed cash and in-kind contributions.

### 3.4. Milestone IV: Project Implementation

The following table outlines the activities conducted to achieve the Project Implementation Milestone.

▪ <i>Construct water supply and sanitation</i>
▪ <i>Conduct gender training</i>
▪ <i>Health and hygiene campaign</i>
▪ <i>Facilitation of Civil Society and Good Governance</i>
• <i>Promote Income Generating Activities</i>
▪ <i>Formation of Village Water and Sanitation Maintenance Committee (VWSMC)</i>
▪ <i>Village Water and Sanitation Maintenance Committee Training</i>
▪ <i>Actual community contribution</i>

#### 3.4.1 Activity: Construct water supply and sanitation systems

All of the water supply systems installed in the SRCD IV project were gravity-fed piped water supply systems. The water sources included primarily spring catchments, but also occasionally river or small creeks. Technical components for water supply construction include the following:

Intake works (commonly called "capturing")
Collection/storage tank
Slow sand filtration tank (In some sites only)
Main pipe line
Break pressure tank (some sites)
Secondary pipelines leading to House connections or Public taps.
Water points: House connection and Public tap

The systems were designed to accomplish 60 – 80 liters per capita per day, with an assumed demand growth rate 3 % per year over 15 years.



The target for sanitation system construction was to reach 65% of houses with newly constructed sanitation facilities. The sanitation facilities include: Latrines, Drainage disposals and garbage disposals. Latrine construction was facilitated by the project staff and represented 100% community contribution. However, those communities who fell under the "under welfare family category" according to government standards, (which was

**TABLE 4: GENDER/DISAGGREGATED QUALITATIVE PARTICIPATION**

QUALITATIVE PARTICIPATION IN ACTIVITIES	WOMEN			MEN		
	Always	Seldom	Never	Always	Seldom	Never
Presence in the meetings	86,2 %	13,8 %	0 %	85,7 %	14,3 %	0 %
Meeting Leadership	0 %	70,4 %	29,6 %	92,6 %	7,4 %	0 %
Giving Suggestion/input	48,3 %	51,7 %	0 %	92,9 %	7,1 %	0 %
Decision making	33,3 %	66,7 %	0 %	100 %	0 %	0 %
Involved in training	85,7 %	14,3 %	0 %	96,4 %	3,6 %	0 %
Involved in WS construction works	74,1 %	22,2 %	3,7 %	100 %	0 %	0 %
Providing HS extension	89,3 %	10,7 %	0 %	50 %	50 %	0 %
Involved in VWSIC	17,9 %	71,4 %	10,7 %	82,1 %	17,9 %	0 %
Attending VWSIC monthly meeting	76,9 %	23,1 %	0 %	96,2 %	3,8 %	0 %
<b>Rate</b>	<b>56,9 %</b>	<b>38,3 %</b>	<b>4,9 %</b>	<b>88,4 %</b>	<b>11,6 %</b>	<b>0 %</b>

Source: FGD result in February 2001 at project sites

The project staff developed four new modules<sup>1</sup> for gender activities, to be used in the community training. The modules are:

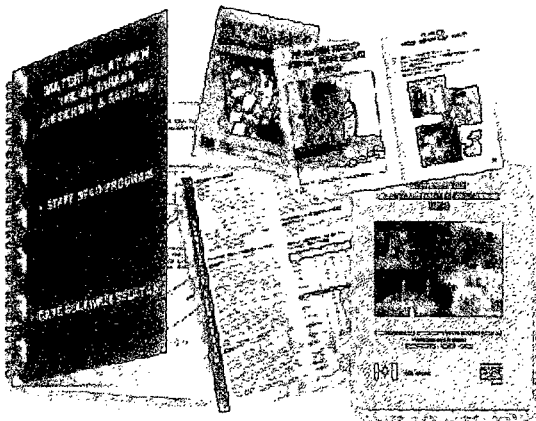
- The involvement of women in WSS construction
- Role of women in the planning stages of WSS construction
- Role of women in activities implementation stage
- Role of women in the Operations & Maintenance stage

**3.4.3 Activity: Health and hygiene Campaigns**



Environmental Health and Hygiene Campaigns were conducted in keeping with the original plan, during the project implementation. Before the project was initiated, Health, Hygiene and Gender surveys were conducted by Health cadres as well as a self survey by the community. The community was provided with training prior to executing the self survey. The was community also involved in planning, implementation and monitoring of the Environmental Health and Hygiene

Campaign. They were asked to develop a concept or idea for an effective health and hygiene leaflet, billboard, booklet and books to be produced by the project. They developed simple billboards for using local language.



The objective of the Environmental Health and Hygiene Campaign (EHC) activities was to increase the knowledge of community on environmental health and personal cleanliness. Its end target was to decrease the diarrhea and skin diseases morbidity rate in the project villages. The communications strategy was carried out through village institutional capacity building, participatory

community involvement and effective communication routes.

#### 3.4.4 Activity: Facilitation of Civil Society and Good Governance

The project sites have experienced some conflicts related to Water and Sanitation facilities construction. The Project attempted to facilitate the discussion and discovery alternative solutions when these types of disagreements arose. The following outlines a number of issues that arouse and CARE's application of Civil Society and Good governance principles in resolving the clashes together with the community.

**Central Sulawesi:** One of the targeted sites in Central Sulawesi experienced a conflict between the community and the village head due to deforestation, which was being executed by a company who were granted a decree from the District Head. The company cleaned the land (taking out the woods) and the community were to use the land to plant crops. The problem was that in this project the Village Head received Rp. 15,000/m<sup>2</sup>, the company took advantage of the cleared woods, but the community got nothing because the land could not be cultivated due to the slope of about 75°. Another problem that emerged was that the water source used for the SRCD IV project was within the planned deforestation area. The community blamed the Village Head, who appeared to be serving his own interests, and not the community as a whole. After discussions did not reap satisfactory results, the community assembled into a more formal protesting body. CARE's role here was facilitating the community to continue with the project peacefully, but still keep on seeking solutions from the government so the government could see that they just wanted to be treated fairly and in the end the project of the company to cleared the land was stopped by the government. Through this problem, the community was motivated to try to know more about their rights and responsibilities as a community.

**South Sulawesi:** The spring that was to be used for Jatia hamlet, was owned by Jatia people but was located in another hamlet. This other hamlet could not be served by the project due to it's surrounding topography where the spring was lower than the hamlet, and the only water source used by the community was this spring. The problem arose some time after the communities were ready to construct the spring catchments tank. The villages from the non project hamlet destroyed all the material needed for the construction. The project staff were facilitating the two hamlets to discuss alternative solutions. At the Village and Sub district Heads meeting, there was no solution put forth, which further incensed the villagers. The project staff facilitated the Jatia leaders to meet the District Head and request a swift solution. At first they agreed to stop the activity, but the District Head Assistant insisted on pursuing the activity in Jatia hamlet and visited the location and worked with the communities for a win-win solution. At last the project was continued and government promised to proposed a budget for a water supply project for that hamlet within the next years. The SRCD IV project is completed and the community is happy with the results.

#### 3.4.5 Activity: Promote Income Generating Activities

Income generating activities were proposed to the community during the second semester of project implementation. Initially, the project staff discussed the possibility of implementing this activity and the various kinds of IGA that could be conducted. The project provided small funds to groups who submitted a simple proposal to CARE for a small enterprise. Since this was a pilot activity, the project chose two sites with two groups to test the implementation of IGA. The two villages selected in South Sulawesi were Barugae in Bulukumba District and Tokesan in Toraja District, Niitanasa of Kendari District, in Southeast Sulawesi and Tojo and Tongku in Poso district

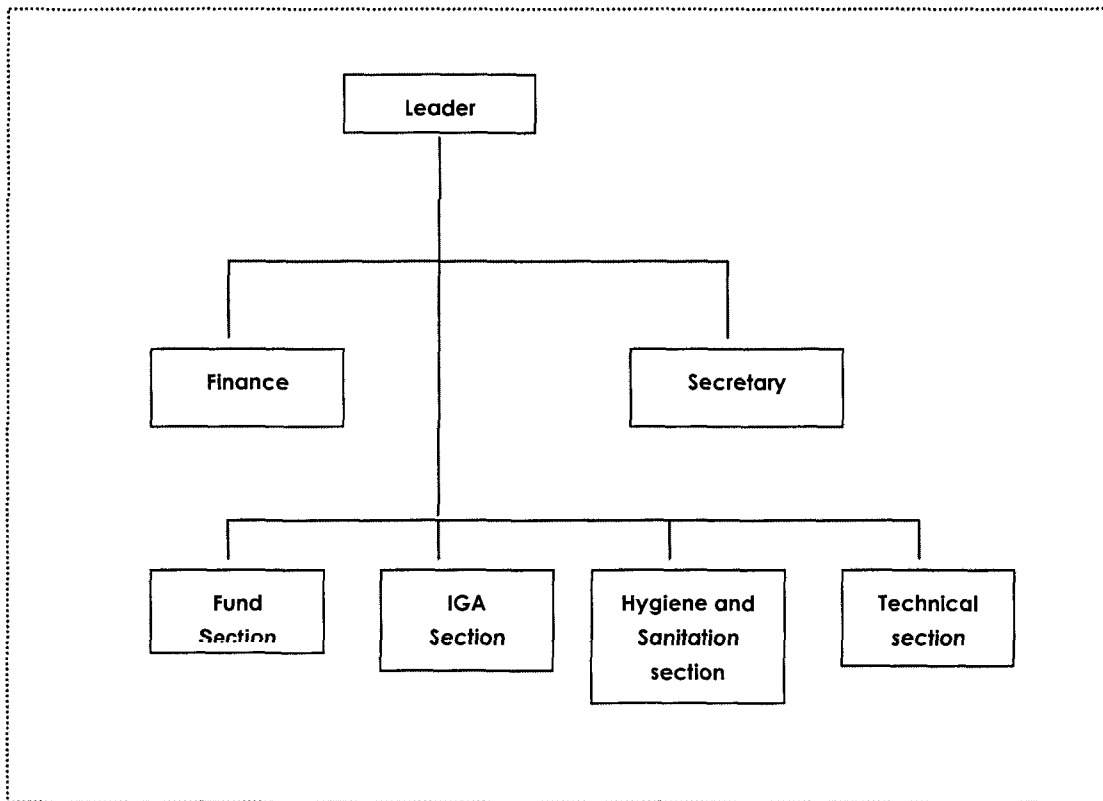
in Central Sulawesi. In total, five groups implemented IGA, three produced snacks such as banana crackers, cassava crackers and sago cookies and one group produced brooms.

3.4.6 Activity: Formation of Village Water and Sanitation Maintenance Committee (VWSMC)

The VWSMC was established in 44 sites and trained in overall aspect of WSS management. The structure of the VWSMC can be seen in Table 4. A Technical Guidance book was developed to guide the VWSMC in operations and maintenance of the WSS systems.

Routine monthly VWSMC meetings were organized in every village to discuss problems that may have arisen and plans for resolution. The VWSMC workshop in Bulukumba District of South Sulawesi Province was presented and fully funded by the District government. The findings of that workshop were that they wanted to establish a VWSMC communication forum and proposed to have annual meetings between the VWSMC and the District Government. Budgets will be contributed from both sides. The table below shows the number of VWSMC and its members, male and female.

TABLE 5: ORGANIZATIONAL STRUCTURE VWSMC



3.4.7. Activity: Village Water and Sanitation Maintenance Committee (VWSMC) Training

Subsequent to facilitating a democratic process to identify committee members, the Village water Maintenance Committees were provided with training. A component of the Catchments Area and Water Source Conservation activity included training to the VWSMC which addressed technical aspects of catchments and water source area, proper fencing and tree planting for protecting of the catchments area. The community themselves, through the VWSMC, issued a “Surat Keputusan” (Letter of Decision) based on their agreements on the catchments area and water source protection. Other trainings included Government laws on forestry, Water sources, Ground



water hydrologic, Symptoms and causes of catchments area and water source problems and Technical solutions for water source conservation

#### 3.4.8. *Actual Community Contribution.*

The community cash and in-kind contribution for this project is Rp. 2,533,847,024.- equal to 41% of the total project cost of Rp. 6,134,071,545.-. Community contributed resources, such as cash, manpower and in-kind contributions, i.e. sand, stone, gravel, wood, etc. The community contribution exceeded the original target since unpredicted factors emerged during the implementation process, such as the need for an additional spring catchments tank, or need to build a storage tank or a slow sand filtration tank due to the spring's condition, or the material purchased had already increased in price from the inception phase of the project.

### 3.5. Milestone V: Operations and Maintenance

The following activities were conducted to achieve the Operations and Maintenance Milestone.

▪ <i>Water user fee collection</i>
▪ <i>Close-out survey (household)</i>
▪ <i>Institutional strengthening local NGO/GOI</i>
▪ <i>Capacity Building for Local Institutions</i>
▪ <i>Technical Assistance to Local Government</i>

#### 3.5.1. *Activity: Water user fee collection*

The water user fees, determined by the community and the VWSMC, varied for each location, ranging from Rp. 1,000.00 to Rp. 10,000.00. Each area determined a reasonable amount for the fee, to maintain and repair the systems. In general, each community was willing to provide the fee, realizing the value of the water system. It is the duty of the VWSMC to collect the water user fees on a monthly basis.

The total amount of user fees collected as of the last monitoring by the project staff was Rp. 37,631,000

#### 3.5.2. *Activity: Close-out survey (household)*

The project's Close out survey was conducted in 17 project sites with 866 respondents. In general, the purpose of the close out survey was to describe the impact of the project to the community and specifically to see the prevalence of diarrhea and skin diseases. The survey also served to measure the knowledge and practice levels of the community, measure the results of the gender awareness trainings, to detail water supply and sanitation construction achievements, and to assess the levels of the community contribution. The activity was conducted from January to march 2001. See Table 36, Close Out Survey Findings for more details.

#### 3.5.3. *Activity: Institutional Strengthening local NGO/GOI*

In implementing the project at the village level, CARE established working relationship with village planning boards, family welfare boards, groups of ten families in each villages (Dasawisma) Youth groups, prayer groups, religious organizations, and schools, by involving them in the VWSIC, in implementing the project, monitoring, training, and surveying.

CARE provided a recommendation to the government to use a local NGO named Bulan Matasak to implement a water supply system in Rante Limbung Tana Toraja District with a total budget from the Government of Rp. 30.000.000. CARE also recommended to Sinjai District to use a local NGO named Yayasan Peduli Insani (YAPIN) with a total budget the from the Government of Rp. 100.000.000.

*3.5.4. Activity: Capacity Building for Local Institutions*

To enable local institutions such as Village planning board, family welfare board, youth group to become more involve in WSS management, training on water supply and sanitation management, Technology option, Personal Health and Hygiene and environmental health were provided to them, including direct involvement in implementing the project.

*3.5.5. Activity: Technical Assistance to Local Government*

Technical Assistance to the local Government was in the form of assisting them to:

- preparing a TOR
- conducting a special meeting/workshop on WSS at the district level
- cross visits to another province
- preparing Detailed Engineering Design for additional sites fully funded by the district government; Implementing a National Meeting between CARE and the government every year.

## 4.0 DEGREE OF PROJECT ACHIEVEMENTS

TABLE 6: SRCD IV PROJECT OUTPUTS, INDICATORS AND ACHIEVEMENTS

OUTPUTS	PERFORMANCE MEASUREMENT INDICATOR	FINAL ACHIEVEMENT
<b>Output 1:</b> Adequate water supply in 28 villages for 30,000 people	40 Liters of clean water daily per person for 30,000 people	60-80 liters of clean water daily per person for 33,199 people
<b>Output 2:</b> 65% of households with newly constructed sanitation facilities	Number and % of households with newly constructed latrines	63% of household with latrines; 65% of targeted drainage disposal; 65% of targeted garbage disposal
<b>Output 3:</b> Environmental health and hygiene campaigns designed and implemented in 28 villages	H&H surveys indicate improved environmental health practices (household drainage, maintenance of culverts, garbage disposal)  H&H surveys indicated improved personal hygiene practices and household cleanliness	Increase of practice 31% from 4% baseline survey result to 6.55% closeout survey result  Increase of practice 38% from 8% baseline survey result to 11% close out survey result.
<b>Output 4:</b> Village project communities active in successfully co-ordinate all project activities	Village committees established and meet regularly	44 Village Implementation and Maintenance Committees established and functional in managing the WSS systems
<b>Output 5:</b> Women are involved in all phases of project activities, including representation on village project, communities and sub-communities	% of women on village project committees and sub-committees	South Sulawesi: 70 women (36 %) and 125 men Southeast Sulawesi: 40 women (32 %) and 86 men Central Sulawesi: 52 women (45 %) and 64 men Average % of women on committee 37%
<b>Output 6:</b> Community contribution of resources	Community contribution of at least 30% of total value of project inputs	Community contribution 16% cash; 25% in-kind contribution Total contribution 41%
<b>Output 7:</b> Water-user fee collections and O&M activities established in target villages	User fee collection accounts maintained by project sub-committee	As of November 2001, user fees collected in Central Sulawesi Rp. 12,672,000; Southeast Sulawesi Rp. 4,065,000; South Sulawesi Rp. 20,894,000.- Total fees collected Rp. 37,631,000.

## 5.0 GOVERNMENT RELATIONS

CARE's relationship with the Government, particularly the three Provincial Governments (Southeast, South and Central Sulawesi) continues to be harmonious and cooperative. After working for more than 30 years in Sulawesi, CARE has received a good reputation with the communities, NGOs and the Government. In the three provinces the SRCD IV Project works in,



CARE has a formal agreement called a "Technical Arrangement" with each provincial government board. The technical agreement signed by the CARE Country Director and the Governor of each province is valid for five years. For the annual project implementation, CARE is obliged to sign another formal agreement annually with each province. The annual agreement, called "Annual Operating Plan" is signed by CARE's Chief Representative in South Sulawesi and the Head

of Bappeda (Regional Planning Board) of each province. Including in the annual operating plan are the kind of project activities, names of project sites and budget shares for each project from the Community, Provincial/District Government and CARE

### 5.1. Government Contributions

The project has received good support from the provincial and district governments in terms of funding and implementation assistance, with a total government contribution of US \$ 163,211. or 181,346 EURO in the form of pipe and fittings.

The following table outlines the contribution from government, community and CARE. The Government's contribution is approximately Rp. 1,632,113,815.- or 27% of the total cost of the project for the WSS construction.

TABLE 7: GOVERNMENT CONTRIBUTION: WSS CONSTRUCTION

CONTRIBUTION	CENTRAL SULAWESI	SOUTH SULAWESI	SOUTH EAST SULAWESI	TOTALS	%
CARE	1,088,329,115	438,619,750	441,161,841	1,968,110,706	32
GOI	145,000,000	971,247,815	515,866,000	1,632,113,815	27
COMMUNITY CASH	421,864,199	372,998,555	186,848,500	981,711,254	16
IN-KIND	682,890,620	430,755,750	438,489,400	1,552,135,770	25
TOTAL	2,338,083,934	2,213,621,870	1,582,365,741	6,134,071,545	100

### 5.2. Decentralization Laws

The Government of Indonesia released the local autonomy policy or Decentralization laws (Laws 22/1999) in 1999, which supported the District level Government to plan and develop their own areas with district level budgets. The mechanisms for implementing the new systems is still under discussion but the concepts are accepted by the District Government. The implication for future programming is that bureaucratic matters will be relatively less complicated, with CARE coordinating with the district government and parliament level instead of the national level. CARE will be required to engage more with the Government at the district level on project operations because the legal aspects of joint programming is with the District Government. However, coordinating work with the provincial governments is still extremely important, since the control of all development work at the provincial level is with the Provincial Government.

## 6.0 PROJECT MANAGEMENT

### 6.1. Community Management Approach

CARE Indonesia introduced the Community Management Approach (CMA) during the WSS projects (CSFW, SRCD III) in January 1991, at the beginning of SRCD III.



CMA is a strategy adopted by CARE Indonesia in its project to promote sustainable water supply and sanitation facilities constructed by community. CARE considers CMA an interactive facilitation process which involves representative members of the community in every aspect of water project cycles; (i) project planning, (ii) project implementation, and (iii) post-project operations and maintenance (O&M) activities. CMA thereby increases a community sense of ownership and thus enhances long-term sustainability of WSS system.

The seven stages of CMA project cycles were facilitated using 86 task-specific training modules created by CARE Staff in 1990. Less emphasis was placed on the modules and more on appropriate responses to village interests and information needs. In the past, the modules served the valuable function of assisting CARE field staff with learning and facilitating CMA methods.

#### **The seven stages of CMA are:**

- Introduction to community
- Formation of Village Water Implementation Committee
- Planning and Decision Making : Development of Village Action Plan
- Training for the committee
- Implementation I : Resource Mobilization and Hygiene education
- Implementation II : WSS construction
- Operation and Maintenance

An internal evaluation of CMA was taken in August 1992 to evaluate the CMA process after 19 months of field testing at the trial sites. The evaluation indicated high acceptance of CMA by both communities and CARE staff, however it also recommended that the highly structured task-specific modules to guide CMA project cycle be simplified.

The advantages of using CMA during the internal assessment were:

- Improve community self-reliance
- Decrease community dependence on CARE's staff
- Involves community in decision making
- Increase capabilities of community organization as decision-making bodies
- Enable community to participate in the management of RWSS

- Enable community members to be project implementers rather than passive recipients
- Give community strong ownership of WSS project
- Enables community to identify and mobilize local resources
- Improve community ability to liaise with outside agencies
- Increase lateral exchange between villages through demonstration effects

## **6.2. SRCD IV Project Implementation Management**

CARE International applied community management approaches to rural water and sanitation project. The intervention consists of several components that contributed to the achievements of project goal. The components are Rural Water Supply and Sanitation system, Environmental Health and Hygiene Campaign, Civil society, Spring Protection and Income Generating Activity

CARE International was using a multi-disciplinary approach, which consist of Water and Sanitation Sector composed of four teams. Each team have its own specific function. The Management team (consist of Team Leader and Project Coordinator) were responsible for overall project operation including budget management, (Prepare Quarterly and annual budget), coordinating all project planning, administration and oversee the implementation and monitoring & evaluation, Donor liaison, GOI and NGO relation. The management team were closely coordinate with a Technical Specialist team (Rural Water supply specialist and Health and Sanitation specialist). This team were responsible in ensuring that the technical aspect standard required for the WSS project in term of quality was achieved also in health and hygiene and gender activities. They were resource person for staff, community and local institution training. Thirdly, Implementation team (Project Manager, Project Officer and Field Officers) who were responsible in providing direct assistance to the communities in 44 sites in term of project implementation (assessment, planning, construction, operation and maintenance), Training, civil society, IGA, and monitoring the project performance. Finally, Support team (Accountant, Administration officer, Secretary, Driver, Office helper and Night Guard) who supported all project need in term of financial arrangement, administration, etc.

## **6.3. Monitoring and Reporting System**

The SRCD IV Project's Monitoring and Reporting system an integral part of day-to-day project management. During the preparation phase, the project conducted intensive planning and design of a reliable Monitoring and Reporting system. After reviewing the project proposal as a whole including objective, indicators and project implementation plans, the Monitoring and Report format was designed and the implementation plan was prepared. Appendix 4. shows the monitoring tools developed and the reporting mechanisms.

## **6.4. Project Staffing**

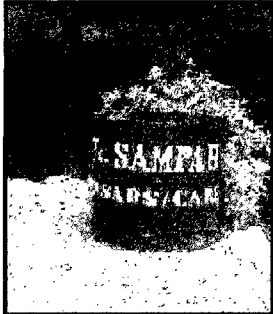
The number and the personnel in the SRCD IV project staff from the Jakarta Central office level to the Field office level underwent numerous shifts and changes during the project lifetime. Originally, the project involved a total of 69 persons, but at the end of the project implementation, (end of the no cost extension period) the project employed 58 staff members, 20 of them were female.

## 6.5. Staff Training and Capacity Building

During the project life, training provided to the SRCD IV staff to increase their capability in implementing the project including Technical, Health-Sanitation and Education, Gender, Report Writing, Computer Statistical Program, Communication Development Trainings and Study Comparison to East Java.

## 7.0 ENVIRONMENTAL ISSUES

### 7.1. Environmental Assessment



As outlined and requested by CIDA, the donor CARE was obligated to conduct environmental assessments. CARE conducted the Assessments between April and December 2000. The assessments were provided to CIDA for approval and utilized by the project staff as vital additional data to the project's implementation methods. A sample of one of the SRCD IV Project's Environmental assessments may be viewed in Appendix 3

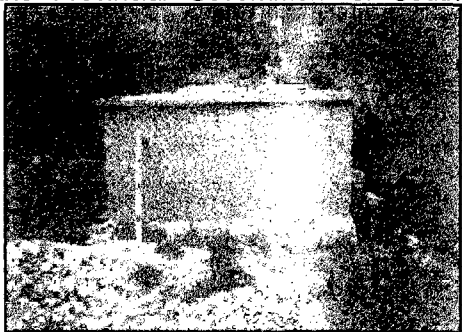
### 7.2. Environmental Protection

Environmental Protection was one of the project components and each of three Sulawesi field offices have developed community based environmental awareness programs. The programs aim at involving community members in maintaining water sources areas and conducting preventive actions to protect the long term availability of water supplies.

## 8.0 LESSONS LEARNED

### 8.1. Technical Constraints

The major constraint faced by the project was below standards quality of the pipes provided by the Provincial Government of South Sulawesi. Due to staff changes in the Civil Works



Department, staff who were in charge of the cooperation between the SRCD IV project and the government were relatively new and did not invite CARE to meet and discuss requirements for pipe quality and other criteria with vendors. Consequently, the vendor sent pipes and fittings which were substandard. CARE coordinated with Civil Works department and also Bappeda (regional planning board) and they promised to replace those pipes, however, it took months to resolve the issue. The result was the delayed

completion of the construction in some sites.

Latrines for the project sites in coastal areas were a major challenge to the project. With various types of coastal area topography, it was difficult for CARE to agree on the type of latrine to be built. Eventually, some sites decided to apply a Latrine Communal System, but it required more money while the income of coastal community was lower than the other rural beneficiaries. The solution was the project staff proposed to local government to share the budget with CARE to support the community in building a communal latrine. A number of communal latrines have been built in some coastal villages.

The level of community awareness on WSS technical standards is low. The project staff instructed them to put pipe lines at least 60 cm down and explained the reasons, but still there are some sites with pipes on the ground, more so where the pipes are plastic.

Safe Construction standards, such as water resistance septic tanks and drainage disposal units, to avoid contamination were not fully applied.

## **8.2. Non-Technical constraints**

The community's awareness of proper water usage is still insufficient. Some community members do leave faucets open 24 hours a day, even though the water is over flowing, or others ignore broken faucets or other minor repairs. Cash contributions from the community were discussed and agreed upon, and the personal contribution was presumed to instill a sense of ownership. However, not all community members responded as planned and despite training from the staff, do not conserve water for the benefit of the entire village.

In addition some community members did not provide their cash contribution within the timeframe assigned, and as a result a number of construction plans were postponed having an affect on the overall village schedule.

Religious conflicts in Poso and other social conflicts in several villages, such as Buton island where there are high population of IDPs shifting from Ambon and North Maluku. The problems with IDPs in Buton ware they tend not want to participate at all in the project and they wanted to have permanent latrines rather than pit latrine produced locally by the community. A lack of funds was a strong factor in their inability to participate in the project with it's highly participatory design. In the targeted villages, there were no cash contributions and the latrines were provided by the local government.

## **8.3. Recommendations to future programming**

- Intensive coordination with the government is necessary, in particular in before project materials are purchased by the vendors.
- Standard coastal area latrines which do not contaminate the environment should be developed.
- Construction standards should be disseminated and stressed to the government and the communities.
- Application and understanding of construction standards which emphasize low or no environmental impacts should be a precondition for project implementation.
- Cross visits and training results should be put in practice, such as water treatment systems.
- Community contributions should be explained carefully and clearly to all members of the community before collecting a water user fee from them.
- Health cadres involvement in the surveys, extension, monitoring and accelerates the improvement of the community's knowledge of Environment, Health and Hygiene practices.
- The staff should be provided with conflict resolution training to reduce conflicts happening in the community.
- Impact of restructuring in CARE organization affected the staff performance as a result of uncertainty in regards to new policies and staff duties.



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## 9.0 BUDGET INFORMATION

The total budget provided by Canadian International Development Agency (CIDA), the donor was USD 1,050,305. to cover personnel costs (46 %) of international and national salaries, outside consultants, travel and per diem, project operations and supplies (19 %), material, equipment and other costs (35 %)

## 10.HUMAN INTEREST STORY

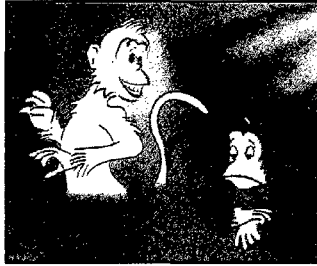
### The White Monkeys of Tojo

Tojo is one of a thousand villages in Sulawesi where CARE Indonesia has been implementing water and sanitation programs since 1999. The village is located close to a beach, approximately 280 kilometers East of Palu, the capital of Central Sulawesi Province, Indonesia. Tojo is by 1,061 people, consisting of mostly indigenous ethnic groups living in 165 houses. Although administratively the village is under the coordination of Poso District, political and religious conflicts occurring on a large scale in the Poso District have not had a significant impact on the community living in this village.

The village stretches a mere 2 kilometers along one of the few asphalt roads of the province and covers approximately 25 square kilometers. Electricity is supplied from Poso town but due to the conflicts and limited supply capacity, is often shut down. Most people in Tojo depend on agriculture practices to fulfill their daily needs. Only a few make a living from fishery. Fifty percent of the total populations have graduated from Senior High School, 35% have graduated from Junior High School, and 11% have a basic education. Within the entire population, only 1% has attended University.

CARE planned to assist the community, through the SRCD IV Project, after the Village Head and its Village Board (LKMD) wrote to CARE and the government of Indonesia (GOI) explaining their village conditions and requesting a water supply and sanitation facility. To field truth the conditions of the village, during the preparation phase of the Sulawesi Rural Community Development (SRCD) Project IV, CARE conducted a survey in Tojo

village. After analyzing the results of the survey, CARE management decided to implement a water and sanitation program in the village.



During project implementation, when the villagers started to work on construction, some of them were beginning to doubt that water could flow from 7,000 meters away to their homes. They thought that it would be impossible to channel the water from such a distance. They believed in the traditional methods for water access, and were skeptical about the water system.

The villagers who thought the system was unlikely to function mocked the others who were working hard on the construction without being paid, and in fact, with their own resources. They said, "When the monkey turns white, that water will flow." With only black monkeys in this area, it was tantamount to saying "when pigs fly"!

Despite the taunts, CARE Field Officer, Ahwaty Nea and the people who were committed and actively involved in the program of water supply and sanitation kept up their good spirits and continued constructing the system. One year later, the villagers who were mocking them had to accept the taunts of the project workers, who proudly display the functioning water system. The skeptical villagers here "Look at the white monkeys walking on the street!" as they pass by. They had to accept a little teasing, since the Village Water Committee in Tojo had successfully channeled the water directly to 165 houses and installed sanitation facilities. Some of the houses belong to the "white monkeys of Tojo".

The Tojo project was made possible by a grant from CIDA, facilitation from CARE and

the volunteered contributions of the local community. The project allocated Rp. 124,738,321 for construction materials, while the community contributed Rp. 119,409,000 consisting of in-kind (local materials and labor) and cash Rp. 15,000,000. Unfortunately, not every village in Central Sulawesi had a similar opportunity as the village of Tojo. There are still hundreds other communities in Central Sulawesi that have never had a chance to receive technical assistance and facilitation from a committed development agency like CARE. The monetary crisis occurred in the country left the purchasing power of vulnerable communities significantly declined and created unexpected critical social problems related to health, education, environment. These constraints and personal sufferings still did not affect the Tojo community's spirit to build a system to bring water and sanitation to their families.

## APPENDIX 1

TABLE 8: SRCD IV PROJECT GANTT CHART OF ACTUAL IMPLEMENTATION

**Project Name:** SRCD IV (The Sulawesi Rural Community Development IV Project)

**Project Goal:** To improve access to Human Needs and so improve social welfare and economic growth in poor rural areas.

	1999			2000				2001			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Milestone I: Site Selection</b>											
Task 1: Select district and subdistrict sites with the local government.	■										
Task 2: Promotion of SRCD IV project at Sub-district level	■										
Task 3: Select project site with NEED criteria	■										
Task 3 : Conduct water quality test .		■									
<b>Milestone II: Community Preparations</b>											
Task 1: Conduct village baseline survey		■									
Task 2: VWSIC Formation and general work plan		■									
Task 3: Conduct household survey (health and gender)		■									
Task 4: Conduct technical survey		■									
Task 5: Conduct cross visit.				■							
<b>Milestone III: Project Planning</b>											
Task 1: Conduct committee training			■	■							
Task 2: Develop detailed workplan			■	■							
Task 3: Conduct community training.			■	■	■	■					
Task 4: Community Resource mobilization.			■	■	■	■	■	■			
<b>Milestone IV: Project Implementation</b>											
Task 1: Construct WSS facilities .					■	■	■	■	■	■	■
Task 2: Conduct gender training.			■	■	■	■					
Task 3: Health and Hygiene campaign.			■	■	■	■	■	■	■	■	■
Task 4: Facilitaion on Civil Society and Good gov.						■	■	■	■	■	■



## APPENDIX 2

TABLE 9: CLOSE OUT SURVEY AND BASELINE DATA

CHARACTERISTI CS SURVEYED	1. SOUTH SULAWESI		SOUTH EAST SULAWESI		3. CENTRAL SULAWESI		4. TOTAL	
	BASELINE	CLOSE	BASELINE	CLOSE	BASELINE	CLOSE	BASELINE	CLOSE
Distance of Water supply from House:								
a. < 100 m	46 %	56%	40 %	68%	53 %	87%	46 %	70%
b. 100 – 500 m	23 %	13%	30 %	2%	20 %	7%	24 %	7%
c. 500 m – 1 Km	15 %	12%	14 %	1%	9 %	1%	12 %	5%
d. > 1 Km	9 %	15%	11 %	13%	8 %	1%	9 %	10%
Incidence of Diarrhoea in Children Under 5 years:								
a. Duration of Illness (days)	19%	14%	23%	19%	32%	19%	25%	17%
b. Cost of Treatment	8	3	5	4	n.a	4	6.5	3.7
	Rp. 16.060	Rp. 27.098	Rp. 25.539	Rp. 25.920	n.a	Rp. 19.842	Rp. 20.799	Rp. 24.287
Prevalence of Skin diseases of children under 5 years:								
a. Duration of Illness (months)	19%	8%	21%	8%	15%	8%	18%	8%
b. Cost of Treatment	2	2	3	7.6	n.a	1.8	2.5	3.8
	Rp. 20.176	Rp. 40.556	Rp. 48.875	Rp. 49.245	n.a	Rp. 31.646	Rp. 34.525	Rp. 40.482
Houses With Access to Water	41%	65%	13%	86%	2%	35%	19%	62%
Houses With a Latrine	15%	43%	5%	40%	3%	57%	8%	47%
Houses With Drainage Disposal	20%	43%	9%	87%	8%	55%	12%	62%
Houses With Garbage Disposal	33%	50%	9%	95%	5%	54%	16%	66%
General Knowledge About Environmental Health:								
a. Diarrhoea and Skin Diseases	9	13	9	13	8	15	9	14
b. Household & Surrounding Cleanliness	3	4	2	4	3	6	3	5
c. Handling Household Waste	5	7	4	8	4	9	4	8
	4	5	4	5	3	6	4	5

Environmental Health Practices:	4	6	5	6	5	6	4	6
a. How to Clean the House and Surroundings	2	3	3	4	3	4	3	4
b. Handling Household Waste	1	2	1	2	1	2	1	2
Knowledge About Personal and Family Hygiene:	5	8	5	9	6	10	6	9
a. Potable Water Handling	1	1	1	1	1	1	1	1
b. Personal Cleanliness	3	4	2	6	3	6	3	5
c. Food Handling	1	2	1	2	1	2	1	2
Personal and Family Hygiene Practices:	8	11	8	11	1	11	8	11
a. Keeping the Water Source Clean	1	2	1	1	1	1	1	2
b. Potable Water Handling	2	2	2	2	2	2	2	2
c. Personal Cleanliness	2	2	2	2	3	2	2	2
d. Food Handling	3	3	3	3		3	3	3

**APPENDIX 3**

**TABLE 10: ENVIRONMENTAL ASSESSMENT SRCD IV PROJECT SITE**

Canadian International  
Development Agency

Agence Canadienne de  
development international

Project Title <b>SULAWESI RURAL DEVELOPMENT PROJECT IV</b>		Project No. <b>472/21468</b>		FEAI NO. [9]		Recipient Country, Organization (Proponent) <b>CARE International Indonesia</b>																		
CIDA Officer <b>JULIE BEDARD</b>		Branch <b>Indonesia/Phillipines ASIA</b>		Telephone: <b>(613)997-4763</b>		Fax: <b>(613)953-3350</b>																		
						Email																		
<b>MATRIX OF ENVIRONMENTAL ISSUES</b>																								
<b>PROJECT UNDERTAKINGS</b>	#	PHYSICAL						BIOLOGICAL																
		Climate	Air Quality	Ground water Quality	Ground water quantity	Surface water flows	Soil stability/Erosion	Terrain and natural hazards	Noise	Vegetation	Wetlands	Aquatic habitats	Fish Stocks	Terrestrial Habitats	Wildlife Aquatic	Wildlife Terrestrial/Avian	Forest Resources	Biodiversity	Ecosystem Function, Terrestrial	Ecosystem Function, Aquatic	Rare Species/Ecosystem	Protected Areas		
<b>Construction - Water System</b>																								
* Spring Catchments tank	1			A	A	A	A																	
* Intake facilities	2			A	A	A	A																	
* Sedimentation tank	3			A	A	A	A																	
* Storage tank	4			A																				
* Break Pressure tank	5			A																				
* Delivery Tank	6			A																				
* Pipe line Construction	7			A			A																	
<b>Construction - Sanitation System</b>																								
* Latrine	8			A																				
* Drainage Disposal	9			A																				
* Garbage Disposal	10						A																	
<b>Interactive Effects</b>																								
<b>Cumulative Effects</b>																								
<b>NONBIOPHYSICAL COMPONENTS (NBP)</b>																								
* Resources Use																								
Health																								
Socio-Economic																								
Cultural/Heritage																								
<b>DESCRIPTION OF CODES</b>																								
A	The project undertaking is not likely to cause significant adverse environmental effects (taking into account appropriate mitigation measure)																							
B	The project undertaking is likely to cause significant adverse environmental effects that cannot be justified (taking into account appropriate mitigation measure)																							
C	It is uncertain whether the project undertaking is likely to cause significant adverse environmental effects (Taking into account appropriate mitigation measure)																							
D	The project undertaking is likely to cause significant adverse environmental effects that can be justified (taking into account appropriate mitigation measure)																							
E	Public concerns for project undertaking warrant referral to a mediator, review panel or advisory committee																							