MANUAL ON
SUSTAINABLE WATER SUPPLY SYSTEMS
IN RURAL COMMUNITIES IN NORTHERN LAO PDR

METHODOLOGY – LESSONS LEARNT - RECOMMENDATIONS FROM THE SCALING PROJECT

January 2022

Sustainable Change Achieved through Linking Improved Nutrition and Governance

INTRODUCTION

WHY this manual:

- Despite some progresses since the past 10 years, malnutrition is still major concern in Lao PDR. Poor hygiene practices and low access to clean water are underlying causes of malnutrition to be addressed to improve the nutritional and health conditions of rural communities in Lao.

  This manual aims at sharing all the knowledge and lessons learnt from SCALING project to all Development partners and Government counterparts for future interventions or projects aiming at improving hygiene conditions in rural communities in Northern Lao PDR.

- This manual contributes to build the capacities of Nam Saat and Government counterparts involved in SCALING implementation, as part of SCALING exit and sustainability strategy in the 4 provinces where the project has been implemented.

- The manual aims to document some innovations developed during SCALING implementation, particularly the installation of a water meter at household level.

For WHOM:

- WASH technical staff, Nam Saat technicians and all technicians in charge of the construction/rehabilitation of a water supply system at community level
- Community facilitators (with advanced level) and all stakeholders in charge of the socio-organization and community mobilization related to the construction/rehabilitation of a water supply system at community level
- Development partners, local Authorities, Government counterparts and all stakeholders involved directly or indirectly in the construction/rehabilitation of a water supply system at community level.

HOW to use it:

- Each part can be read separately. The manual aims to be as practical as possible, with key information and recommendations.
- Details and templates are presented in Annexes as references and can be adapted
- As much as possible, the use of technical words has been avoided (or a definition is provided). Details and technical guidelines are presented in Annex.

The manual is available in Lao and English version for a broad and open dissemination.

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ACRONYMS

AFD	Agence Française de Développement
BN	Boun Neua
BoQ	Bill of Quantities
CCL	Comité de Coopération avec le Laos
CF	Child Fund in Laos
DAFO	District Agriculture and Forestry Office
DAO	District Administration Office
DHO	District Health Office
DREO	District office of Natural Resources and Environnement
EU	European Union
GoL	Government of Laos
HH	Household
HUA	Huaphan province
INGO	International Non-Governmental Organization
LNT	Luang Namtha Province
LPB	Luang Prabang province
MoA	Memorandum of Understanding
NNS	National Nutrition Strategy
NNSAP	National Nutrition Strategy Action Plan
NO	Nyot Ou
PHO	Provincial Health Office
PIN	Partnership for Improved Nutrition
PSL	Phongsaly
SCALING	Sustainable Change Achieved through Linking Nutrition and Governance
SCI	Save the Children
WASH	Water Sanitation and Hygiene

ACKNOWLEDGMENT

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Thanks to all SCALING teams and partners who contributed to the development and the finalization of this manual.

1. PRESENTATION OF SCALING PROJECT

In response to a persistent and widespread malnutrition, the Government of Laos (GoL) has developed the National Nutrition Strategy (NNS) and its action Plan (NNSAP) for 2016-2025. In this view, "Sustainable Change Achieved through Linking Improved Nutrition and Governance – (SCALING project) aims to provide support at scale to the goals of the GoL's NNSAP and its convergent approach, in line with the objectives of EU's Partnership for Improved Nutrition (PIN). SCALING is funded by the European Union and has been implemented between December 2017 and December 2021 by a consortium of 4 INGOs:

- Save the Children, leader of the consortium, was in charge of the implementation in Luang Prabang province (7 Districts targeted and 140 villages) and provided expertise on health and nutrition
- ChildFund Laos was in charge of the implementation in Huaphan province (1 District, 30 villages) and provided its expertise on nutrition
- CARE in Laos was in charge of the implementation in Luang Namtha province (3 Districts, 100 villages) and provided expertise on nutrition and gender,
- Comité de Coopération avec le Laos was in charge of the implementation in Phongsaly province (3 Districts, 80 villages) and provided expertise on nutrition and WASH within the consortium.

SCALING overall objective is to improve the nutritional status of adolescent girls, pregnant and lactating women, and children under 5 years in the targeted districts, with the 3 following intermediary outcomes: **iOC1**: nutrition and hygiene-related behaviors are improved as well as in access to quality nutrition and Reproductive, Maternal, Newborn and Child Health (RNMCH) services in the 14 Districts; **iOC2:** local environment mitigates the adverse underlying causes of malnutrition in the 14 Districts; **iOC3:** nutrition governance is strengthened at district, kumban and community levels in the 14 Districts

What is the link between nutrition and WASH?

Low access to WASH facilities has direct impacts on a child's nutritional status (such as diarrheal diseases, intestinal parasite infections and environmental enteropathy) as well as indirect consequences (e.g. necessitating walking long distances in search of water and sanitation facilities and so diverting mother's time from child care). These effects are recognized in the NNS under SO 6 and PI (Health) 13 of the NNSAP.

In its theory of change (see figure 1), SCALING includes WASH as one of the key components to address at community level the malnutrition that affects children under 5 years.

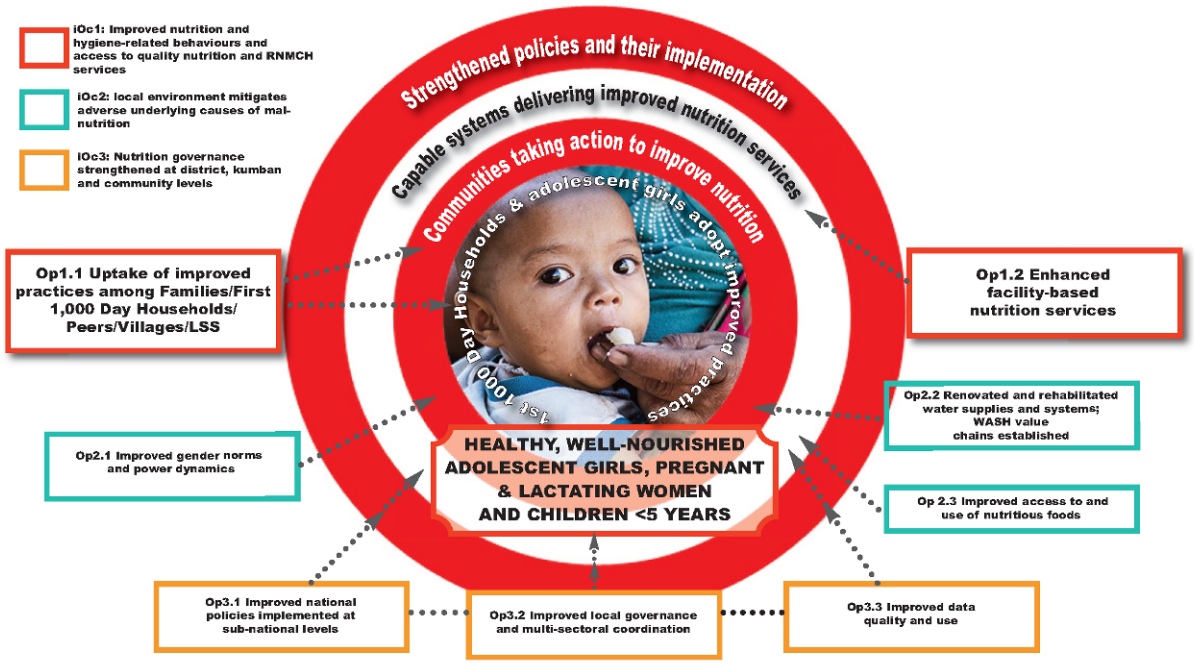


Figure 1 : SCALING socio-ecological theory of change. WASH is one of the key component (Op2.2)

SCALING theory of Change is based on a socio-ecological approach (cf ToC diagram above), which means working at and strengthening linkages among the individual/household level (at the centre), upthrough villages, systems, and policy (the outer rings). SCALING does this by addressing the 3 main drivers of stunting in Laos: 1) The predominance of suboptimal practices related to adolescent and maternal health and nutrition (Red), 2) The lack of local environment support for improved nutrition (Blue) 3) Limited governance capacity, particularly at provincial, district and community levels. (orange)

What SCALING has done under WASH component?

- **Capacity building of Nam Saat and local partners:** trainings (on water supply system identification, design and construction and on WASH marketing promotion), exchange visits, … The dissemination of the hereby manual is part of SCALING capacity building strategy

- **Construction/rehabilitation of water supply systems at community level,** and capacity building of a water management committee in each community involved to ensure the sustainability of the new/rehabilitated construction

- **Wash marketing promotion and hygiene education:** through the promotion of water filter, the support to the construction of latrines by households, hygiene education sessions organized in Lower Secondary Schools, and the facilitation of new linkages between local vendors of hygiene products and the communities.

Some results in figures

Table 1: some results in figure for WASH infrastructure construction/rehabilitation supported by SCALING

Province	**Phongsaly**	**Luang Namtha**	**Houaphan**	**Luang Prabang**
Number of water supply systems built/rehabilitated	13	20	4	48
Number of beneficiaries for water supply system built/rehabilitated	4,328 (1,600 women)		1,334 (654 Women)	
Water meters	Installation of water meters at each household		at household level in 1 village	at household level in 6 villages
Village taps	No	No	3 villages	42 villages
Community contribution in cash for construction/rehabilitation of water supply system	700 000 to 1 M kip / household	470 000 to 1.6 M kip /household	150 000 kip/household	350 000 kip/household

Table 2: some results of WASH marketing promotion under SCALING

Province	Number of DHO staffs have trained	Number of community WASH focal point trained	Number of private sector trained	Number of HHs having constructed a latrine	Number of HHs having procured a Water Filter	Villages have completed ODF
LPB	14	210	9	4,169	89	118
HUA	6	20	3	762	57	7
LNT	35	72	6	1,919	353	25
PSL	15	75	2	1,055	487	37
TOTAL	**70**	**377**	**20**	**7 905**	**986**	**187**

2. TECHNICAL PART : CONSTRUCTION/REHABILITATION OF A WATER SUPPLY SYSTEM

To build a water supply system needs to follow **13 steps** as summarized in the table below:

To remind!

- To build or rehabilitate a water supply system takes time! In average, it needs **11-12 months** from the site identification to the hand over to the community.
- For an easier and smooth implementation, to make a **retro-planning** is useful and helps to prevent any delays. Taking into consideration the weather (rainy season) is also important, many villages are still hard to reach several months every year.
- **Preparation steps** are essential and decisive for a smooth implementation and sustainable use afterwards.
- **Many stakeholders** have to be involved at different steps:
  - Department of Health (Nam Saat)
  - Department of Agriculture and Forestry
  - Department of Environment and Natural Resources
  - Local Authorities (District Governor, chief of the village, …)
- To build sustainable a water supply system **is not only technical aspects**. Socio-organization support to the community is essential. **Capacity building at community level** takes a lot of time but is necessary.

STEP	ACTIVITIES TO DO	WHO	WHEN – DURATION	WHERE	FORMS AND DOCUMENTS AS REFERENCE
1. INITIAL FEASIBILITY ASSESSMENT	- Site assessment: accessibility, water source, interest of community, community leadership - Risk assessment (safety, child safeguarding, community risks…)	- District authorities - Project Manager - Village authorities - WASH and community development officers - WASH expert / civil engineer	1st step 1 day/village minimum	Village level	Annex 1: criteria for site selection Annex 2: child safeguarding risk assessment form for water supply system construction Annex 3: environment risks assessment form
2. STANDARD DESIGN APPROVAL	- Provincial Nam Saat or Project civil engineer approve standard design drawings	- Provincial Nam Saat - WASH expert / civil engineer	Before implementation the activity At least 1 week	Provincial level	Annex 4: standard drawings of water supply system
3. TECHNICAL AND SOCIO-ORGANIZATION SURVEY	- Meetings at community level (village authorities, community representatives), definition of responsibilities - Data collection on community profile - Technical survey: Yield of the source (L/s), Ground surface information (elevation, length of pipe line and coordinates, type of water supply system required	- Survey team: DHO, DAFO, DREO, DAO officers, Project officers (WASH and community development officers) - WASH expert / civil engineer - Village authorities	Based on selection Preferably early in dry season At least 2 days/village + several days for preparation	Village level At the water source	Annex 5: how to discuss with the community before surveying in details Annex 6: schedule for water supply system construction Annex 7: survey form by Abney instrument Annex 8: survey form by GPS Annex 9: use of Abney Annex 10: use of GPS Annex 11: how to survey in details Annex 12: example of MoA signed with the community Annex 13: agreement with households for water meter

					installation
4. DESIGN	- Data analysis: -Daily water demand of the village in the next 10 years - Side of reservoir tank in m^3 - Natural, static and hydraulic grade line with the graphic to find the rest pressure of water in the pipe line - Preparation of technical design and drawings: intake, reservoir tank, water standing tap, air valve, sediment valve, … - Mapping the pipe line from the intake to the village, village area, water catchment area, intake point, reservoir tank, water taps points	- Nam Saat technicians - WASH expert / civil engineer	In average 2 – 3 days/village	Office work Collaboration with Nam Saat staffs at Provincial and District level	
5. ESTIMATION COSTS AND PLANNING	- Preparation of the bill of quantity (BoQ) with estimated costs and quotation sheets	- Nam Saat technicians - WASH expert / civil engineer	1 day/village	Office work Collaboration with Nam Saat staffs at Provincial and District level	Annex 14: Example of bill of quantities Annex 15: Cost estimation sheet Annex 16 : MoA for water supply construction - SCALING Project
6. COMMUNITY MOBILIZATION	- Discussion and signature of co-operation agreement with Government departments and communities (role and responsibility of each party, expected support from GoL, community contribution and project support) - Safety awareness at community level - Initial orientation session for material storage	- Government authorities and department - Village authorities - WASH expert / civil engineer - Community development officer	After designing and estimating costs and potential contribution Minimum 1 week with 1 day at community level	Village level	Annex 12: Example of MoA signed with the community
7. TENDER PROCEDURE FOR	- Call for proposal - Selection	- Finance department - Project Manager	2 months	Office work	Annex 17: bill of quantities template for procurement

MATERIAL SUPPLY	- Contracting with suppliers *Details of the steps depend on specific financial rules and manual to be applied (case-by-case adaptations may be required)*	- Representative of Government department (head office)			Annex 18: tender conditions document and forms Annex 19: announcement for national tender Annex 20: table for bid analysis (conformity, eligibility) Annex 21: example of minutes – opening bidding session Annex 22: example of contract
8. PREPARATION	- Orientation and preparation at community level (book at village level, storage facilities, safety, GoL policies; construction planning, …) - Water safety planning training: setting up village water safety committee, rule management (Plan village's water safety plan (A)	- WASH expert - Government Technical department (DHO, DAFO, DONROE, DGO) - Village committee and authorities	After all documents completed, before the delivery of materials 1 week / village	Office work And village level	Annex 23: banner for water safety planning training Annex 24: cleaning and repairing water supply system Annex 25: evaluation form for community water safety planning Annex 26: water management committee training on finance Annex 27: finance form for water fund Annex 28: water safety planning step by step Annex 29, 30,31,32,33: posters for community training
9. DELIVERY OF MATERIALS	- Checking quality and quantity delivered - Checking storage facilities	- Village committee and authorities - WASH expert - Local authorities - Project manager and Finance department	1 day / village	Village level	Annex 34 : delivery sheet for material water supply system Annex 35 : delivery certificate Annex 36 : Community contribution payment certificate
10. CONSTRUCTION IMPLEMENTATION AND SUPERVISION	- Orientation meeting with construction supervisor on site (Nam Saat staff): technical drawings, safety, duration of activity - Meeting and discussion on construction planning with community members and head of village	- Nam Saat staff, - WASH expert - Communities - Village authorities and committees	In average 30 days / village	target village	Annex 37 : DHO agreement for supervision

	- Daily orientation on construction and safety - Technical supervision and monitoring - Weekly inspection by DHO and project staff - Weekly progress report by Nam Saat staff on site and head of village				
11. 50% AND 100% /FINAL INSPECTION	- 50% inspection after the intake, laying main pipe from the intake to the reservoir tank are completed - 100% / final inspection after all activity completed at 100%	- District authority representatives - DHO, DAFO, DONROE officers - Head of village - Community representatives - WASH expert - Project Manager	1 or 2 days / village / visit	Village level	Annex 38: 50% water supply system construction check list Annex 39: 100% water supply system construction check list
12. HANDING OVER TO COMMUNITIES	- Preparation of hand over with local authorities - Handing over ceremony: management, use the water safety plan; awareness on water management and sustainable use of water - Documents to be handed over to community representatives	- District authority representatives - DHO, DAFO, DONROE officers - Head of village - Community representatives - WASH expert - Project Manager - Village (all)	1 day / village	Target village	Annex 40: hand over document to community
13. **MONITORING AND EVALUATION OF VILLAGE WATER SAFETY PLAN**	- Supervision and evaluation of management and use - Test of water quality - Supervision and evaluation of water safety plan as the cycle (A)	- District authority representatives - DHO, DAFO, DONROE officers - Head of village - Community representatives - WASH expert - Project Manager - Village (all)	6 months and 1 year after hand over 1 or 2 days/village + test in lab	Target village	Annex 41: evaluation form for community water safety planning after 6-month use

2.1. INITIAL FEASIBILITY ASSESSMENT (STEP 1)

OBJECTIVES

- Identify the interest of the community, its needs, strengths and constraints for a water supply system now and in the future (actual use of water, source of water used now, contamination level, commitment to the conditions required by the project, understanding of responsibilities including water source protection, hygiene situation in the village, …)
- Analyze the feasibility to build a water supply system (is there a source of water, can the water supply the village, is the construction cost-effective, potential issues for its sustainability)

WHAT TO DO

- In consultation with the District Health Office (Nam Saat), identify the target villages
- Prepare and collect information that are already available: population, past experiences of support/project in the village, maps, etc.
- Prepare and inform in advance the village about the purpose, planning and content of a visit in the village and surrounding

HOW TO

1. ***Meeting with village authorities and kumban***
    - Present the objectives of the visit and discuss about: the use of water by the community now, the needs and constraints without a water supply system in order to make sure that they need (or not) a new water supply system
    - Discuss further on the past experiences of project and support in the village, the community mobilization and the role of village authorities
    - Present the steps to be followed for the construction of a water supply system, the conditions that the community must follow if it is built, including a contribution in cash and/or in kind, the maintenance, the protection of the water source, …
2. ***If possible, try to discuss with some households*** after the meeting with village authorities to cross check the information, gather the needs and assess the real interest and motivation of the community
3. ***Go round the surrounding area of the village*** to identify the potential different water sources that can be used for supplying the village. When identified, pay attention to the safety, the environment of water sources and identify the potential problems and impacts that need to be addressed before conducting a detailed survey.

RECOMMENDATIONS

Feasibility assessment of any activity is **necessary** and important to ensure the success and the sustainability. Make sure to take enough time for it! ***To spend 1 day at least per village is necessary***

Make sure to collect and cross-check the data (interview can be formal but also informal to get the deep understanding of the context of the village). Don't look only at the technical part, the interest and commitment of the community is very important too.

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 1: Criteria for the selection of villages
Annex 2: Child Safeguarding Risk assessment form for water supply system construction
Annex 3: Environment risk assessment form for water supply system construction

2.2. STANDARD DESIGN APPROVAL (STEP 2)

OBJECTIVES

- Unify the different types of water supply systems through standard models approved by Nam Saat and project partners - this step is recommended if the project is implemented in several provinces. Otherwise, it can be done at the Provincial level only.

WHAT TO DO

- Organize meetings with Nam Saat and projects partners
- Describe the water supply system model used in each province and the standards to be used by the project

HOW TO

1. ***Meeting with Nam Saat officers and local authorities*** (from different provinces if the project is implemented in several Provinces) :
    - Let each Province representative to present its own water supply system model that has been used in the past.
    - Facilitate a discussion between provinces on the strengths and weaknesses for each model
    - Suggest some improvements such as: improvements at the intake level (add a filter box, wing wall to protect from flooding in case of heavy rain, set for filter material), use of the air valve, sediment valve of pipe line, improvements at the reservoir tank level (construction of a filter box at the top of reservoir, making the box covering the gate valves), selection of PE pipe quality, GI pipe
    - Facilitate a common agreement on the changes and additions to get a standard model to be used

2. ***Design the standard model***

3. ***Share the standard model designed to Government counterparts***

The standard design is shared to Nam Saat in each Province and District involved in the project

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 4 : Drawings of water supply system

2.3. TECHNICAL AND SOCIO-ORGANIZATION SURVEY AT COMMUNITY LEVEL (STEP 3)

OBJECTIVES

- **Data collection**: technical information for design; overall information about the village
- **Socio-organization assessment** of the village, leadership, use by villagers, ...
- **Risk assessment**: safety, water use, contamination,
- **Identification of needs for support** to the community: technical (type of water supply system required…) and socio-organization support to the community

WHAT TO DO

1. ***Preparation of the survey***
   - Coordination meeting with DHO representative and all relevant departments: presentation of the objectives, proposed schedule of visits, identification of focal points within each Department to be involved throughout the whole process
   - Informing he village: objectives, details of participants expected, date and time proposed for the survey, logistics required
   - Initial data collection: Village Basic Information Collection Form, Land surface Survey Form mapping of village boundaries and maps of water sources near the village using Google Earth
   - Preparation of community discussion (PowerPoint presentation or A0 sheet): objectives of the project, examples of water supply system, roles and responsibilities, example of "success story", templates of minutes for village consultation and consent forms

2. ***Data collection***
   - Yield of the source
   - Ground surface information: elevation, length of pipeline and coordinates
   - Overall village data collection: population

See Annex 11 for details

3. ***Community discussion***
   - Discussion on roles and responsibilities of each party
   - Discussion on the type of water supply system that may be recommended, impacts on land use and water level, …

WHO DOES WHAT

District Administration Office	Overall management, Facilitate problems solving with communities (land issues, village boundaries, potential issues between villages for use of water source…) Coordination with relevant District offices and policies
Provincial/District Nam Saat With Project support (expertise)	Technical survey Design Construction planning and budgeting Monitoring and Evaluation
District Agriculture and Forest Office	Land allocation to the village Dissemination of land use policies and support land management to the village (no use of land close to water source, no use of chemicals close to water)
District Natural Resources and Environment Office	Environmental monitoring and remediation of environmental impacts (agriculture practices, use of chemicals and pesticides, livestock)
Office of Public Health	First responsible for the survey, especially: coordination with all relevant departments, villages and stakeholders
Project	Technical supports for survey and community facilitation; technical expertise Budget support

MATERIAL REQUIRED and INDICATIVE BUDGET

- Steel tape measure 5m
- Fiberglass Long tape 50 m
- Abney tool 1 unit
- Barometer tool 1 unit
- Calculator 1 unit
- Hard folder for writing
- Ruler, pens, pencils
- Water bottle for sampling water to testing
- LCD for presentation the design of the water system to be built
- Compass
- GPS device to mark important coordinates
- Bucket (12.5 L) to measure the volume of water in the stream
- Timer
- Knife
- A power point presentation of the design to be presented to the community

Description	Unit	Unit costs	
DSA	8 people * 2 days	100 000 kip	1 600 000
Fuel	2 cars	500 000 kip	1 000 000
Equipment	Set	300 000 kip	300 000
Spray	3	30 000 kip	90 000
GPS battery	2	15 000 kip	30 000
Total			3 020 000 kip

RECOMMENDATIONS

- **Survey is a very important step and shall include :**
  - the accessibility of the water source, the quantity available as well as how many months.
  - the actual use of water and in the future (especially for farming, home gardening…)
  - Is the water part of the village boundaries? shared with another village
  - Are villagers ready to participate in the construction, in kind and/or in cash

Taking more time in survey … may save time afterwards

- **Being participative to increase village's ownership**: the more the stakeholders will be active and involved during the survey (technicians, villagers), the more their ownership will increase and the system will be sustainable
- **Divide the responsibilities** between Government Departments, village and project team

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 6: Schedule of water system construction
Annex 7: Form survey, Abney instrument
Annex 8: Form survey by GPS
Annex 9: Use of abney
Annex 10: GPS use
Annex 11: How to survey in details
Annex 12: Example of MoA signed with a community
Annex 13: Agreement with households for water meter installation

2.4. DESIGN (STEP 4)

DEFINITION: To design the water supply system of a village in order to be consistent, sustainable and adapted to the technical and environmental characteristics of water sources available in the area and the needs for a sufficient, convenient and sustainable use of the water by the population in the next 10 years.

OBJECTIVES

- Assess the water demand of a group of people or a village based on the reserve capacity of the water source identified
- Calculate the water pressure in the water pipe to be able to deliver water to the area
- Identify the required water supply system type, such as a gravity fed water system, borehole system, pumping system from a low to a higher point
- Describe the technical specifications of the water supply system at each point (water source, intake, reservoir…) taking into consideration the safety and feasibility of the construction at community level
- Draw the water supply system in order to quantify all needs for the construction (materials required, labor force, water safety planning requirements, …)

WHAT TO DO

1. ***Preparation of the design***

Organization of the data collected during the survey: overall information of the village, volume of water source, ground information (height and length of water pipes needed), village boundaries to estimate the main pipes and distribution pipes within the village required, location of water taps to be installed, number of households that will require the installation of a water meter

2. ***Designing***

High skills are required

- how to calculate the water pressure in the pipe, previous experience in designing water supply system and construction
- Computer skills: Word, Excel, AutoCAD or software equivalent, Google Earth
- Use of GPS

Materials required

- recommended software: Microsoft Word, Excel or equivalent; AutoCAD or equivalent, Google Earth
- computer with a performant processor (equivalent to Intel5 or Intel7 minimum due to calculations) and printer

Recommendations for a good design

For the intake

- Make sure that the intake suits the conditions of the stream
- Make sure the intake is strong and resistant to floods in case of heavy rains

- The intake must have a high barrier or Wing walls to prevent floods
- The intake shall have a suitable water filter system

For the water tank

- Make sure that the tank suits the volume of water that can be reached in one day (the tank size should not be too big or too small.
-

The pipes

- Select the pipes that can support the water pressure or choose to use a pipe that can receive a pressure of 100 meters (PN10).
- Determine the number of steel pipes across the stream, cable crossings, air valve, sediment valve and tanks to reduce the pressure
- Make sure to plan the water pipeline in the area of the village that suits the area of the village, such as in groups, with different heights, the number of outlet pipes of the tank.

Mistakes to avoid

- The intake design does not guarantee strength, has no wing walls and no water filter system
- Reservoir size is too big or too small
- Choosing pipes that do not receive high pressure and pipes with low quality
- There is no steel pipes across the stream, cable crossings river, air valve, sediment valve and tanks (this is required to reduce pressure where it is necessary)
- There is no plan for laying water pipes in the village, the number of joints is not specified, the number of joints is insufficient or the equipment plan is not complete as required
- The budget is too limited to meet the needs, without taking into consideration the future needs and use of water (a minimum of 10 years projection is recommended)

GOOD EXAMPLES

Good intake has:

- Good spinway
- Good structure
- Good filter box
- Big reservoir tank
- Good box to cover the gate valve

A good intake has:

- Good wing walls at both sides to protect from the landslides and flooding in case of heavy rains
- high than dam level about 40cm
- The wall of intake box is higher than the dam level about 40cm and can protect from flooding

A good reservoir tank has:

- Good foundations using two layers of reinforcement and 20cm thickness.
- Wall of reservoir tank uses two layers of reinforcement and 20cm

AND BAD EXAMPLES … NOT to follow

A bad intake has :

- Spinway that can't block water
- Poor structure
- No filter box
- Small reservoir tank
- No box to cover the gate valve
- Intake with very basic design

A bad intake has:

- No wing wall at both sides to protect from landslides and flooding in case of heavy rains
- Intake damage or broken due to flooding

A bad reservoir tank has:

- location unsuitable and there are risks of accident
- no box to cover the gate valve and footpath around the reservoir tank

2.5. COST ESTIMATION AND PLANNING (STEP 5)

DEFINITION: a **bill of quantities** is a document prepared to calculate the quantity of materials needed, as well as the quality and quantity of work required from the contractor to do the work

OBJECTIVES

- Survey the unit price in the market of the materials required for the construction of water supply system based on the design (inflation may have to be taken into account if the project period is over 1 year),
- Calculate the price of materials required for the construction of the water supply system based on the design
- Identify the contribution from each part such as:
  - Community / beneficiaries: labor force and local materials available (sand, gravel, …) and cash contribution if necessary/feasible.
  - Development partners: procurement of necessary equipment and building materials not available at local level or that can't be provided by the community

WHAT TO DO

1. ***Preparation of the bill of quantities (BoQ)***

The preparation of BoQ must be based on the following documents:

- A detailed list of required equipment for the water supply system at each point: for the intake, the length of the main pipe, the number of GI pipes across canal, cable across river, air valve, sediment valve, tank reducing the pressure, the reservoir tank, the distribution pipe in village,
- The unit price of each item – considering the best quality/price available on the market (local, national level)

2. ***Example of BoQ***

How to identify the community contribution and what the development project shall support?

The community contribution is important in order to build its ownership: villagers will understand better how it works and how to maintain if they build it **by themselves and for themselves.** The community contribution shall be defined with them, with case-by-case considerations. For instance:

- ***Labor force***: make sure that labor force is available within the community and during the implementation period. In some cases, some schedule conflicts may appear if the construction is done at the same time as a peak of farming activities (rice field preparation, harvests, …) or traditional festivals. In areas where migration is significant (to work in the city or abroad), the availability of labor force may be lower.

Discussions with the community representatives are very important: make sure with them about the planning and how they will organize the community mobilization, make sure that they will not use child and pregnant women labor.

In some cases, the community may be ready to pay for labor force instead of doing by themselves. In this case, make sure that decent conditions are ensured for the workers (safety, minimum average wages, …)

- ***Local materials**:* this shall be discussed carefully with the community to know which materials can be provided by the community, such as sand, gravel, wood…
Make sure that the community contribution respects environmental risks and has a low impact on their local environment: for the extraction of sand, the collection of wood, …
This shall be done closely with the District Department of Agriculture and Forestry and District Department of Environment and Natural Resources. If negative impacts on the local environment are identified, alternatives have to be discussed (bought by the community somewhere else where the impacts are lower, provided by the development project, …). For instance, in Chicho village, in Phongsaly Province, SCALING project provided wood sheets in order to make sure that the community will not cut trees in the protected area nearby.

- ***Cash contribution**:* this depends on the project design*;* it can be required or optional (as in SCALING project). The community contribution is also a sensitive issue. It is very important to discuss with the community representatives and the chief of the village on the following answers: who can participate in cash in the community (all households?)? What can be done for the poorest (no contribution or a lower or project pays for them)? Are there any risks of insolvent debts for some households (or over-debt)? What is the best period for the money collection (after harvesting for instance) to make sure that all households have enough cash to cover also their family needs and their activities (if they need to buy seeds for the next season for instance?)? Who will be responsible of the collection of money? How the money will be handed over and to whom (the supplier of materials, the project)?

➡ ***All of this shall be clearly explained in the Memorandum of Agreement (MoA) signed with the community before the construction***

Recommendations

- Priority shall be given to the best quality of materials: this doesn't mean obviously the most expensive. Take time to identify the quality by surveying different markets.
- Include as much as possible details of the materials required, to ensure that the best quality will be provided
- Some donors don't accept some origins: verify the donors' regulations first (ex: EU doesn't accept items made in China if the contract is above 10 000 €)
- In the planning, take into consideration the time needed for the company to import some items from other countries.
- Be careful with the quantity to be purchased: if necessary, a small provision of additional equipment can be added in case some are broken during the construction.
- Try to avoid as much as possible to buy additional materials during the construction (it may need additional steps for procurement and waste of time)
- MoA with the community shall be signed before launching the bidding process to make sure that the community agrees on its contribution and can prepare it (in kind and in cash)
- Indirect costs shall also be taken into consideration to have a complete budget of the construction. This includes the costs for the supervision and monitoring of the construction, by Nam Saat officers (with the support of a WASH expert if necessary), the community mobilization and capacity building: before/during/after the construction, the test of water quality after 6-months use
- In case of very extensive work / list of equipment to supply, the tender can be divided in several lots (1 per District for example)

LINK TO USEFUL FORMS AND DOCUMENTS

ANNEX 14 : Example of bill of quantities
ANNEX 15: Estimation costs sheet
ANNEX 16: MoA CWS construction for SCALING Project_Lao

2.6. COMMUNITY MOBILISATION (STEP 6)

DEFINITION:
This step aims at defining clear roles and responsibilities of all parties involved. A Memorandum of Agreement is signed to officialize the agreement and commitment of all sides.

OBJECTIVES:
Prior to initiate the construction, the community mobilization aims at:

- discussing in detail the process to be implemented
- assigning the contribution, roles and responsibilities of all parties in the construction of the water supply system (District health office, village and project or development partners)
- discussing about safety, child protection and storage facilities for materials and construction of water supply systems during the construction, in order to make sure that roles and responsibilities are understood and accepted;
- ensure the commitment of each party, including the community contribution in cash/in kind, and its commitment to use and maintain the facilities in a sustainable way after the construction (creation of water management committee and collection of water fees, protection of water source, …)

WHAT TO DO?

1. ***Preparation of draft agreement***
   the content shall include : contacts including references, objective of the agreement, beneficiaries, the list of village water committee members, their roles and responsibilities, the support provided by the Government departments during the construction and beyond, the expected contribution of the community for the construction (cash, materials, local labor of community…), the Child safeguarding and safety measures during the construction, the community commitment to ensure the maintenance of the system, its sustainable use (saving water, installation of water meter, …), and the protection of the water sources. It can also include the commitment of the community to promote hygiene practices (such as each household has to build latrines; …)

2. ***Organize a meeting at the community level***
   The objective is to present the draft to the community, discuss and adapt it with including the community requests. The draft agreement is read to all to ensure a participative approach. Enough time shall be taken for questions and answers to make sure that all have understood. Measures for the use have to be discussed within the community, the Government officers can provide recommendations.
   Participants shall be: 1 person/ family, the village authorities, Government representatives (Nam Saat officers at least), development partners representatives.

3. ***Finalization of the agreement and signature by each party involved***

RECOMMENDATIONS

Based on the result of the community mobilization, BoQ, estimation costs and planning may be revised

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 12: example of MoA signed with a community
Annex 16: MoA CWS construction for SCALING Project_Lao

2.7. PROCUREMENT PROCESS (STEP 7)

DEFINITION: procurement is the process to purchase the materials required for the construction/rehabilitation of the water supply system. It follows several steps: i) preparation of the documents; ii) tender process which depends of the amount and the financial regulations; iii) provisional selection of a supplier; iv) final decision and contracting.

OBJECTIVES

To select one (or more) companies for the provision of the materials required for the construction/rehabilitation in compliance with the State Declaration on the Construction, Repair and Service of Public Funding, No. 03 / PM, dated 9 January 2004 ; the Legislative Implementation Act, No. 063 / Kong, dated 12 March 2004 and donors' financial regulations (transparency, competitive bidding, absence of bribery, fraud and corruption, no conflict of interest).

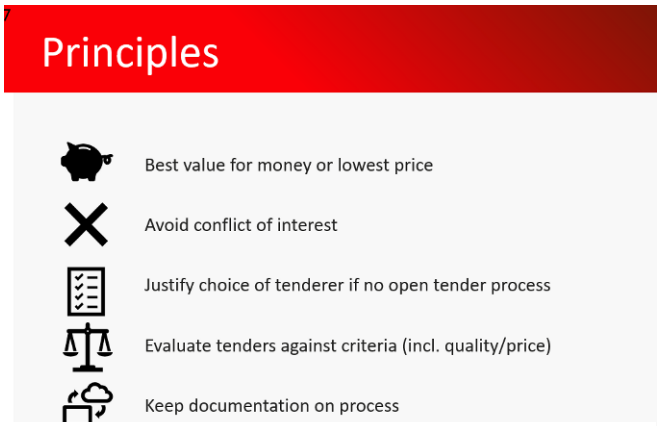


Figure 2: Key principles to follow for procurement

WHAT TO DO

This is the list of successive steps to be followed. However, it may have to be adapted considering donors' regulations and the amount of the contract

1. Preparation of required documents

In case of several lots, 2 options are possible: 1 company can apply only for 1 lot; or 1 company can apply for several lots. Make sure that the option is clearly explained in the tender conditions.

2. Announcement

Based on the financial regulations and the amount of the contract:

- *Minimum 3 (formal) quotations* are required: in this case, the documents prepared are sent to at least 3 companies. A deadline for submission of minimum 10 days is recommended

- *Open tender (local or national level): in case there is no company in the Province, or in order to get a better quality and more choice, a tender can be launched at local or national level. This can be mandatory based on the amount of the contract (for SCALING, above 60 000 USD).*

In this case, announcement can be done in local and national newspapers, at the local radio and Provincial head speakers and announcement display at offices (DHO, project office). A minimum of 3 weeks for submission is recommended to make sure that all companies have enough time to submit their offer.

In the case of an opened tender, you shall keep in mind that the process will take time (at least 2 months!), this has to be included in the planning to prevent any delays.

From the 1st day of announcement to the deadline of submission, you shall make sure that a person will always be available during the working hours to provide the documents to the companies interested.

When a company withdraws the tender conditions and all related information at the office, a list has to be signed (with the date, time of withdraw, the name of the person representing the company and its signature).

From the 1st day of announcement to the deadline of submission, **it is strictly not allowed** to provide any additional information to some companies; to change the tender conditions without informing the companies, to negotiate with some companies.

In case additional information/clarification/changes are required:

- In the case of an open tender: a second announcement following the same way as the 1st has to be done. An extension of the deadline for submission may be recommended if the changes are important. Companies that had already submitted offers have to be informed, their documents can be withdrawn and replaced (if the company wants). However, the final decision will take into consideration the updated version of the tender conditions.

- In case of 3 quotations: the companies have to be informed. Companies that had already submitted offers have to be informed, their documents can be withdrawn and replaced (if the company wants). However, the final decision will take into consideration the updated version of the tender conditions.

3. Reception of bidding

The Financial officer shall make sure that:

- Bidding documents from the companies follow strictly the tender conditions: sealed envelopes mentioning the name of the project, the lot of construction (if any), no other mentions on the envelopes
- the location for submission is clearly indicated in the tender conditions (location, deadline – day and hour)
- a person will always be available to receive the submissions during the working hours.
  When a company submits an offer, a document shall be signed indicating the day and the time of submission. A number shall be given to the bidding (starting from 1 for the 1st submission received, etc.) and has to be written on the envelope when it has been submitted.
- to avoid any misunderstanding, it is recommended to consider only the date of reception by the project / DHO office (and not the date of sending by the company, if a delivery service is used).

4. Opening session

The committee

- The committee shall be composed at least by: 1 representative of DHO (Director or its representative), 1 representative of Nam Saat (technician), 1 representative of the District Authority, 1 representative of District Office of Plan and Investment, 1 representative of Financial Department, representatives of the Project (Project manager and 1 representative of Admin/Finance department)

- The committee has to be identified at the beginning of the tender process
- The members of the committee have to be informed in advance on the date and time of the session. In case of absence, a representative can be chosen but the other members have to be informed officially in advance.
- In case of less than 3 members, the committee can not proceed to the opening session. Another date has to be decided, all members have to be informed.

Participation of the company representatives

- In the tender conditions, it is possible to allow representatives of the company that submitted an offer to participate at the opening session. They can assist only at the beginning (reception of the envelops) but not during the analysis of submissions by the committee neither during the decision. No negotiation is allowed during the session
- A registration sheet has to be signed by the company representatives, the representatives have to show a document confirming that they represent the company (letter signed by the Director of the company, ID card for the Director of the company, …)

Session agenda

- 1. Opening speech by the President of the Committee
- 2. Presentation of the context of the procurement (by the Project Manager for instance)
- 3. Verification of the envelops: number, sealed, mentions on the envelops
- 5. Open the envelops one by one for analysis

If less than 3 submissions have been received, envelops can't be opened. The session shall conclude that there is not enough applications. The committee has several options: to extend the announcement to a wider level (at national level if it was at local level); to extend the deadline; to revise the documents and conditions (submission by email, several locations for submission, …).

5. Analysis and provisional selection of suppliers

3 criteria have to be analysed carefully by the committee:

- Conformity: this refers to the presentation of the submission (deadline, envelops sealed, mentions on the envelop, presence of all documents required, separation per lots if any, …)
- Eligibility: this refers to the criteria to be selected such as the minimum experience required, the references for similar activity, the legal status of the company, the evidence that the company is not in default situation for tax payment, the presence of bank account, workplan

If the conditions of conformity and / or eligibility are not met, the submission is disqualified.

- Technical and financial quality:
  - Similar experiences in the past
  - Ensured conditions of transportation of the materials (trucks, …)
  - Quality of materials listed (origin, quality provided)
  - Unit costs

The committee has to check all calculations in each BoQ (unit prices and quantity) to make sure that the total amount is correct.

After this, a comparison with standard prices and estimation costs is made to make sure that the prices are not too low or too high.

- In case of mistakes, the committee considers only the unit costs and the quantity mentioned in the submission in order to compare the offers received.

The committee can only compare and analyse based on the same level of information: if the unit cost is missing for some items, the committee can't conclude. A letter has to be sent to each company in order to provide the missing information within 7 days. After this delay, the submission will be disqualified if information are not sent.

If no information is missing, the committee can conclude based on the best ratio quality/price.

A minute shall be signed by all participants of the opening session at its end. The minute shall mention:

- The result of the analysis for each criteria
- The decision of the committee: supplier(s) selected, amount of the contract per lot.
  The committee can provide recommendations or minor clarifications to be discussed. However, **no negotiation on prices can be done in order to comply with an open competitive bidding.**

6. Finalization of the contract and signature

A draft contract is sent to the company selected with a proposed starting date and the conditions of payment. In case the community has to pay in cash the company, this shall be detailed in the contract based on the MoA signed with the community.

- If the company agrees on the conditions, the contract can be signed by all parties; while the other applicants are informed that their offer has not been selected.

No negotiation on the prices, the quantity and quality of materials is permitted. Only minor adaptations on technical aspects (conditions for delivery, …) can be discussed

- If the company doesn't agree with the conditions of the contract, the committee shall be informed. The second-best offer is selected and a draft contract is sent. If the second company agrees, the other applicants are informed that their offer has not been selected.

Recommendations:

- Procurement needs time (in average 2 months between the preparation of the documents to the signature of the contract): this is important to consider from the beginning in order to avoid any delays
- Financial and technical departments shall work closely to make sure that the process comply with internal and donors' regulations
- Templates documents are easy to use but need to be adapted case by case.

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 15: **Cost estimation sheet**
Annex 17: **BoQ template for procurement**
Annex 18: **Tender conditions document and forms**
Annex 19: **Announcement for national tender**
Annex 20: **Table for analysis (conformity, eligibility)**
Annex 21: **Example of minutes – opening bidding session**
Annex 22: **Example of contract**

2.8. PREPARATION (STEP 8)

DEFINITION:

To prepare the construction and making sure that all the conditions are set to ensure a smooth and efficient implementation of the construction. This step includes orientation on water safety planning.

Materials required :
- *Posters on safety*
- *Computer, LCD*
- *Liquid medicine to test the presence of genes'coliform in water*
- *Plastic cups (1/inhabitant)*

WHAT TO DO

- *Preparation*: determine the day to go, prepare the team, necessary documents, presentation, posters, banners for training and materials
- *Training* implementation at village level and way forward

HOW TO DO

Day 1

Participants **:** all villagers, health center staff .

Starting time of activities: 1:30 to -4: 00 pm

1. *In the afternoon: divide the team (Nam Saat, health center and project officers) in 2 teams:*

Team 1 has to collect water samples at each household (drinking water, water for other uses) and start to raise awareness on hygiene (clean water for a better health, garbage, cleaning, …)

Team 2 takes pictures of the environment of the village (dirty places, garbage, …). Then pictures are organized in a PowerPoint presentation

2. At night: organize a meeting with the whole community (children from grade 5 onwards, the elderly people and all adults). This can start around 19:00 after the community members had dinner.

Discussions are held on water safety and hygiene activities through question-and-answer sessions. Some videos related to hygiene and nutrition can be used.

Day 2

Morning: Invite each family, both men and women, to start the activity at 8: 30 to 12: 00

- Introduce the results of test coliform of each HH. Let the community members smell the coliform test samples. Then explain the color of the bottles of the test coliform (with calculating the amount of dung in the village in average 0.2Kg per person per day). You can explain the amount of dung per day, per month and per year and the contamination by hand or by vectors such as flies
- Explain the role of a water management committee in a village (roles, responsibilities, conditions…)
- Facilitate the selection of the committee members and take a picture of the committee once selected ***(** see part 3 on social-organization page)***
- Facilitate the discussion within the committee members on the regulations for the management of the village water safety plan
- Present and explain the water system diagram of the village through GOOGLE Earth
- Present the risks and problems that may occur in terms of water and sanitation in the village and identify area of garbage in the village.

At this stage, the water management committee is only the focal points for the organization of the construction. Members will be trained in details on their roles and responsibilities after the construction is completed.

Afternoon: Participants are both men and women from each household, starting time: 1: 30 to 16: 00

- Identify priorities on hygiene and health environment in the village (an action plan can be done for instance such as building latrines, …)
- Training of finance and accounting for village's water fund
- Training on techniques to repair and clean the water supply system (another training will be organized the construction is completed)
- Orientation and recommendation on safety during the construction (using posters)

RECOMMENDATIONS

- The notice to the village council must be detailed, clear and send in advance to ensure a full participation of community members
- A meeting within the village to discuss about the water supply system before the construction starts is particularly necessary to discuss on:
  - Do the villagers want to install a water meter at household level (this has already been discussed during the first steps but has to be cross checked before the construction starts)
  - How to save water and control the use to ensure that water will be sufficient all year for all
  - Importance of water fund to repair and maintain the water supply system
- Public taps are less recommended because it is more difficult to control the water consumption. Individual ownership may be lower leading to lower collection of water fees and no willingness to clean the area
- Water Safety Planning Committee includes 8 people, preferably literate. Group leaders can be part, but also women to ensure the women representation within the village

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 23 : Banner on water safety planning
Annex 24 : Cleaning and repairing CSW system
Annex 25 : Evaluation form for community water safety planning
Annex 26 : Water management committee training on finance
Annex 27 : Finance form for water fund

Annex 28 : Water safety planning step by step
Annex 29 – 32 : posters on community awareness

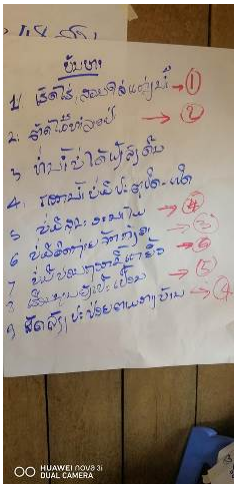
Figure 6 : the responsibilities of village water committee explained

Figure 4: video session on hygiene and nutrition

Figure 5 : community members agree to build the water supply system

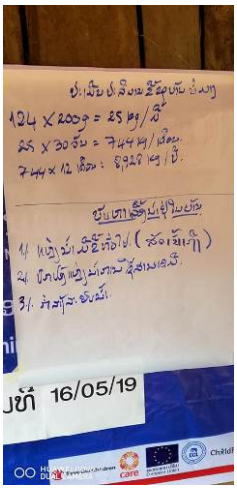
Figure 3 : water safety plan explained to the community

Problems and Risks identified in the village and priorities set for the first water safety planning



A first water safety plan of the village developed by the community and approved with the pal.

How to calculate the amount stool of the village in 1day, 1month and 1year and;
the issues of contaminations



The result of coliform test in drinking water, water for use and drinking water from factory.

1. The red colour is no have the dung.
2. The yellow colour is there is dung.

2.9. DELIVERY OF MATERIALS (step 9)

WHAT TO DO

- Preparation of the conditions for the transportation and delivery of materials to the village: storage, transportation conditions (accessibility, road conditions, …)
- Preparation of the delivery documents
- Ensuring that the community is ready to start (community contribution available, area clean for storage, site construction, …)

HOW TO DO

1. Visit of the village before the delivery

At least 3 days before the delivery, it is necessary to go to the village to make sure that:

- the village is informed in advance about the date and time of delivery of materials
- storage facilities are ready, clean, safe
- area for site construction is ready, clean, prepared
- community contribution is ready, available (in cash, in kind, labor is appointed)
- a safety focal point within the village is available and ready

2. Delivery of materials

The quantity and quality of all materials specified in the BoQ have to be cross checked on site. If the materials correspond in quantity and in quality with the detailed specifications, all parties must sign jointly a certificate of delivery (District Health Office representative, project representative, village representative and the supplier).

If some items are missing or the quality is not met, it is necessary to make a record signed by all and refer to the contract conditions (the company has to supply the missing materials or to replace at its own costs if the quality delivered doesn't correspond to the BoQ). In this case, the certificate is delivered only when 100% of the materials in quantity AND quality are delivered.

Conditions of storage shall be assessed and ensured: cement and steel rods should place at high, not exposed to rain and no risks of robbery.

3. Community contribution in cash

In case of community contribution in cash for the materials, a certificate of payment has to be signed by the representative of the supplier and the representative of the village; witnessed by the district representative (Nam Saat and District Administration for instance) and the representative of the development project /partner.

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 34: Delivery sheet for material water supply system
Annex 35: Certificate of delivery
Annex 36: Community contribution payment certificate

Good storage conditions

Materials delivered have to meet the details in the BoQ : quantity and quality have to be cross checked

If there is no storage facilities in the village; cement can be store under the houses but at high level and covered by good plastic sheet

If there is no storage facilities in the village; pipes can be store under the houses but not on sun light and where children can't reach them

Sand or gravel should be put in flat areas and shall be covered to avoid the rain, children should not be allowed to play inside.

2.10. CONSTRUCTION IMPLEMENTATION AND SUPERVISION (STEP 10)

DEFINITION:
Construction is a major work that requires budget, time, labor, technical knowledge, preparation of construction sites and problem solving before it starts. Monitoring the construction aims at making sure that it respects the initial design and /or to adapt it if the real implementation reveals constraints.

WHAT TO DO

1. ***Appoint an officer for the daily supervision on site***

It is recommended to appoint 1 Nam Saat officer to be based in the village during the construction to supervise the construction daily.

2. ***Organize an orientation session with the officers in charge of the supervision:***

During the session, the implementation planning, child safeguarding and safety principles, the use of check lists and record book are explained to the Nam Saat officers.

Safety is essential: risks prevention shall be made all the time by the safety focal point of the village and the supervision team

3. ***Adapt the planning of the construction based on the date of delivery and the real situation in the village (availability, weather, …)***

Before starting the construction on site, it is important to make sure that the water management committee and the officer in charge of the supervision understand the planning. It may need some adaptations (in case of ceremonies in the village, unexpected event, heavy rains during several days, …)

4. ***Follow-up regularly (phone calls)***

Regular discussions (every 3 days for example) can be done by phone between the chief of the village and the officer on site (and the WASH expert) in order to discuss on the progress. If any issues are identified, it may need to adapt the planning and / or the design. Close collaboration is very important at this stage.

5. ***Plan in advance the monitoring visits at 50% and 100% of work completion***

After a period of **30** days, a monitoring visit has to be organized on site to assess: the construction of the intake, laying pipe line (main pipe) from the intake to the reservoir tank, the main pipe line installed the pipeline steel crossing the canal, the cables across the river, the air valve, the sediment valve, the tank reducing the pressure of water in the pipe.

After 30 days, construction can continue with: the reservoirs tank and distribute pipe line from the reservoir tank to the village, the public taps or individual connections with water meter at each household

RECOMMENDATIONS

Construction work is a major work that requires good cooperation and communication between all stakeholders involved. If issues or problems are faced, the village and the officer shall feel confident to share them as soon as possible to the WASH expert in order to find solutions immediately.

On site explanations are essential

Good place for mixing the concrete to build the intake

Working in raining season require using plastic sheets to cover the materials especially cement

Lean concrete for foundation of the reservoir tank. It is necessary and has to be done before the main structure of the reservoir tank is built.

Good wood forming and good concreting of the reservoir tank

Good and strong wood forming in safe conditions before concreting the reservoir tank

Good reinforcement by concreting the box to protect the air valve.

Good concreting the box to protect the sediment valve.

Good digging pipe line for laying the main PE from the intake to the reservoir tank, depth about 50Cm to 70 Cm

2.11. 50 % and 100 % SUPERVISION (STEP 11)

DEFINITION:
Inspection of construction work aims at monitoring the progress of the work, inspect the quality of work and how to solve problems that can occur during the construction. 50% and 100% inspection are very important stages: at 50%, inspection aims at making sure that the construction is done accordingly to the plans (at 50%) and adapt it if necessary; at 100% the supervision aims at making sure that the system is functional before the hand over to the community.

WHAT TO DO

1. ***Reporting***

The Nam Saat technician appointed at the village shall report to the District Health Office and project office the situation of the implementation. The report shall be signed by the chief of the village.
If the construction of the intake and the laying of the pipeline (main pipe) is completed, **50%** of the construction progress must be inspected

If the construction of the intake system is completed at all points as planned, **100%** of the construction must be inspected.

2. ***Organizing a visit***

After receiving the report, the District Health Office and the project office organize a visit with the relevant district offices (DAFO, DONROE, …). Inspections are required to inspect all water system points from the intake, to the pipe line from the intake to the reservoir, the reservoir, the distribution pipe line, public taps and the installation of a water meter in each household.

3. ***Recommendations and orientations for next steps***

Suggestions can be made to improve the system. This shall be recorded and signed, as well as support documents on the completion of the plan.

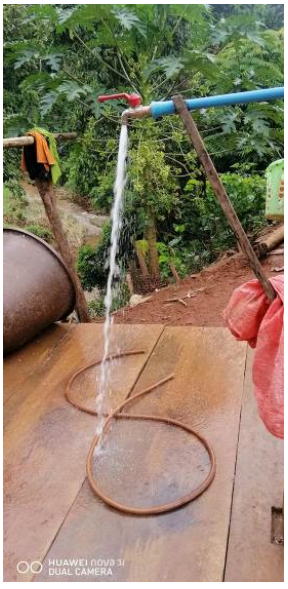
RECOMMENDATIONS
Any activity of construction must have a inspection process to ensure that the good quality of the work. The project owner and the development partner are in charge of regular monitoring and inspection.

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 38: 50% Water supply system construction checklist
Annex 39: 100% Water supply system construction checklist

Monitoring water supply system construction by District officers is also a source of motivation for the village. Construction site is also important (here we see wood for forming, cement bag and nails with in wood during forming)

Kaemkor is a Akha village in BounNeau district that has been resettled to a lower location in order to get access to water, thanks to SCALING support.



Pictures above from left to right:

1. **The water meter screen is in good conditions and clean , we can read the number easily.**
2. **The water meter shall be protected and not too close from the water (this is not a good example)**
3. **It is recommended that the area shall be quite large to collect water from the tap**

Final inspection of the water supply system in Bounsang village, Bounneau district, Phongsaly Province by the committees of relevant offices and SCALING project team

Monitoring inspection in Sida village, Namtha district, Luang Namtha Province; by the district, provincial Nam Saat and SCALING project team

Final inspection of the water supply system in Kaemkor village, Bounneau district, Phongsaly Province by the committees of relevant offices and SCALING project teams.

Final inspection of the water system of Phongsaek village, Phongsaly district, Phongsaly Province by the committees of relevant offices and SCALING project teams

2.12. HAND OVER TO COMMUNITY (STEP 12)

DEFINITION:
The handover is the official confirmation of the completion of the water supply system construction, and the transfer of ownership to the community as user and owner. The handover aims to give the full responsibility of the system to the community (management, maintenance, water protection, protection the environment of the water source).

HOW TO DO
Participants: the community (all) ; Deputy District Governor, the relevant district office representatives (DHO, DAFO, LWU, DONROE, …) and the representatives of the project

Agenda of the ceremony:

1. **Introduction speeches:** chief of the village, District Governor, DHO and project representatives

2. **Presentation of the water supply system,** by the technician in charge of the supervision: summary of the construction process, details on the construction of the system (construction period, costs for the community and the project, the total number of beneficiaries, good points and constraints faced during the construction).

3. **Recommendations**
   By the project representative: after presenting the activities and the purpose of the project, he/she can provide recommendations to the village and the Government counterparts on the management and the use of the water supply system and the water source protection in the future

   The Vice district governor or representative of the District Administration: can provide guidance to the village to manage and use the water supply system, and the importance of hygiene (use of clean water and latrines by every family in the village).

RECOMMENDATIONS
The handover ceremony is very important: it is a good opportunity for the District Administration and stakeholders to understand the problems faced by communities in remote areas and that refer to the Government responsibilities (protection of environment and pollution, …). It is also important for the community to understand their ownership of the water supply system and confirm to all their responsibilities. Participation of women of the community is very important as they play a key role related to water use in the communities (fetching, main house works, …)

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 40 : hand over document to the community

2.13. MONITORING AFTER 6-MONTHS USE (STEP 13)

DEFINITION:
Monitoring and evaluation of community water safety plan corresponds to the assessment of the use of the water supply system after **6** months of use. It aims at identifying what the communities are not be able to implement regarding the initial water safety plan.

WHAT TO DO

1. ***Evaluation of the water safety plan***

The District Health Office and the relevant district offices have the responsibility to evaluate the water safety plan after the handover.
The district team, the village authorities and the village water safety planning committee shall survey the water supply system from the water source area to the intake, the water pipe line, the reservoir tank, the water pipe line in the village, the water use and the village environment. At each point of the assessment, the team must record information using the form.

2. Feedback and recommendations to the village

The team and the village authorities discuss on the problems identified and plan a second round of water safety to find solutions.
The next day, a meeting with all villagers can be organized to share the findings and the recommendations.

RECOMMENDATIONS
Monitoring and evaluating after the handover is important and needs to be done at least 6 months after use. The district health office and the relevant district offices should give priority and encourage communities to increase their ownership gradually, but this is a long process that require to support the communities

LINK TO USEFUL FORMS AND DOCUMENTS

Annex 41: Evaluation form for community water safety planning

3. SOCIO-ORGANIZATION SUPPORT TO THE WATER MANAGEMENT COMMITTEE

3.1. What is a water management committee?

A water management committee is composed of 8 people selected within the community, it is in charge of the water safety plan, the management and the maintenance of the water supply system of the village.

The committee must ensure that:

- the community has regular access to water and an adequate water supply,
- water is accessible for all
- water is safe for health
- the water source is protected
- the water supply system is protected, maintained
- water bills are paid by all, based on household consumption

The committee is composed of: 1 chairman, 1 deputy, 1 accountant, 1 person in charge of finance, 1 person in charge of consultation, 1 person in charge of safety and 2 technicians. Each position is related to responsibilities, at least 2 shall be women to ensure women's representation. The figure and table below present in details the organization and the responsibilities.

Group of users are set up in the village (between 10 to 15 households) for an easy management of the water use and the supply system.

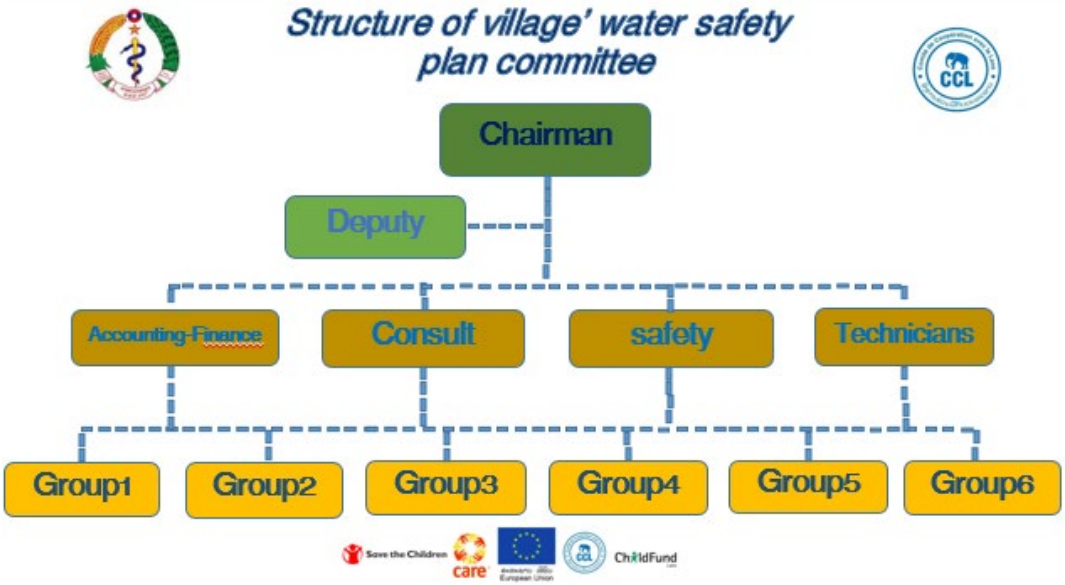


Figure 7: water management committee organization chart

Roles and responsibilities

CHAIRMAN	Coordination and consultation with the community and the Health District Office (Nam Saat) and relevant offices of the district.
	Find sources of funds for the Water Safety Plan Fund.
	Report regularly to Nam Saat on issues and situation of the water safety plan
	Disseminate the rules on the management and the use of the water supply system to the people to know and understand.
	Organize a meeting to discuss and solve problems and outstanding issues and present the financial situation (income/expenditures/balance) of the fund to the community every month
	Approve the use of funds to repair and expand the water supply system in the village if necessary
DEPUTY	Assist the chief of the committee in the implementation of the water safety plan
	Monitor and inspect regularly the water supply system
	In charge of the technical aspects in case the water supply system in the village has to be repaired
	Supervise the finances
	Report to the leader if issues are identified
CONSULTANT	Support and promote the participation of the village for the construction, the implementation of the water safety plan
ACCOUNTANT/FINANCE	Receive the monthly payment from the head of the water user unit or head of groups
	Make a list of income and expenditures on a monthly basis.
	Proceed to payments based on payment order (PO) of the head.
	Report on finance to the chief every month
SECURITY	Take the lead in preventing accidents that may occur during the construction and after the completion of the construction of the water supply system and the toilets in the village
	Raise awareness in the community about safety
	Put safety signs at the construction site
	provide guidance to the villagers make fence around any construction site
	Organize daily inspection of safety on site during the construction

WATER SUPPLY SYSTEM "TECHNICIANS"	Monitor and inspect the water supply system of village on a regular basis.
	Clean the intake, reservoir, and pipeline of the water supply system in the village
	Coordinate with the groups of the water user groups and the community to maintain the water supply system according to the use and the water safety plan
	Estimate the costs for repairs, small repairs and maintenance of tools.
	Report to the chief
WATER USER GROUP HEAD	Ensure a smooth and appropriate use of water by the users
	Mobilize the members who use the water within the group to participate in maintenance activities, minor repairs and major repairs as requested by the village technician
	Collect funds from members who use water within the group and give to the accountant every month
	Report to the leader regularly

3.2. SELECTION OF THE WATER MANAGEMENT COMMITTEE MEMBERS4

The water management committee members are selected by the villagers, in a participative approach. The candidates are selected based on the 10 following criteria:

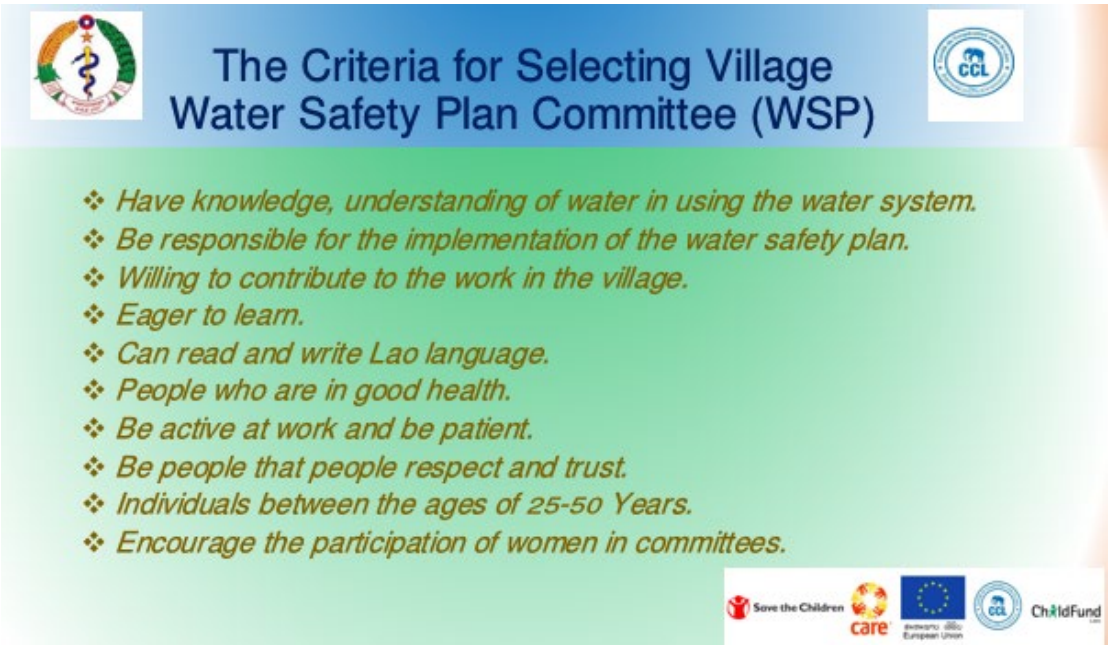


Figure 8: 10 criteria for the selection of water management committee

3.3. MAINTENANCE

Maintenance shall be done every year at least. The table below summarizes the type of repairs

Major Repairs	Common Repairs
Intake broken due to heavy raining or flooding	Pipe line broken
Pipe line broken due to landslide	Socket, tee broken
Reservoir tank broken due to landslide near the base of reservoir tank	Gate valve, nipple and union broken
Air valve broken	Water taps broken
	Air pipe at reservoir tank broken

What to do in case of heavy repairs ?

Major Repairs	Checklist	Recommendations	Remark:
Intake broken due to heavy rains and floods	- Assess the overall damage situation - Assess at any point of the intake - Take photos of all sides and different damaged points - Measure the length, width, and height of the damages	- The village water committee shall prepare a proposal to District health office or Nam Saat to assess the damages and estimate the costs to repair or to build new intake.	District Nam Saat shall support
Pipe line broken due to landslide	- Assess the landslide area during repair - Can the pipeline be used or should be changed? - Take photos of landslides on all sides - Measure the length of the pipe that can be repaired according to the number of joints and the size of the pipe required.	- The village water committee can process by itself to order the materials and to repair	
Reservoir tank broken due to landslide near the base of the reservoir tank	- Assess the overall damage situation - Assess the damages that occurred at any point of the intake - Take photos of all sides and different damaged points - Measure the length, width, and height of the damages	- The village water committee shall prepare a proposal to District health office or Nam Saat to assess the damages and estimate the costs to repair or to build a new reservoir tank.	District Nam Saat shall support
Air valve broken	- Can it be repaired? - If not, it needs to buy a new one.	- The village water committee can process by itself to order the materials and to repair	

Here is an example of planning of maintenance during 12 years

-

No	Description	Year											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Cleaning and repairs of fences around the reservoir tank	■			■				■				■
2	Cleaning drainage and environment of village	■	■	■	■	■	■	■	■	■	■	■	■
3	Cleaning along water pipeline, repair access and soil backfilling above the pipeline				■						■		
4	Cleaning intake and cleaning materials of filters at the intake and the reservoir tank		■				■		■			■	
5	Check water meter	■	■	■	■	■	■	■	■	■	■	■	■

3.4. FINANCE MANAGEMENT

Maintenance shall be done every year at least. The costs to repair the water supply system depends on the type of system used. We can consider as reference:

- Gravity fed water system: 1 million to 1.5 million kip per year
- A system with a pump: 3 to 6 million kip per year
- A system with solar energy 5 to 10 million kip per year

Heavy maintenance can be expensive (up to 5 000 000 kip). To ensure that there is enough money to cover the main costs, it is recommended to **collect 350 000 kip / month** to ensure that there is enough funds. Some other expenditures may also be needed (transportation costs to go in town to buy some materials for maintenance, …). The accountant plays a very important role to ensure in advance that funds can cover the expenditures. In case of very heavy repairs, the chief of the village shall discuss with Nam Saat and may have to ask to the community a special contribution.

The table below shows an example of budget (monthly , yearly and 5 years)

No	Description	Unit	Amount (LAK)	Total (LAK)	Grand total (LAK)
I	**Every month**				
1.	Spare part (Socket, Tee…)	3	80 000	240 000	240 000
Every month : 110 000 kip are saved to cover the "yearly" expenditures *(350 000 collected – 240 000 spent)* At the end of the year : 1 320 000 kip are saved .					
II	**Every year**				
1.	Spare part (Socket, Tee…)	9	80 000	720,000	820 000
2.	Transportation costs of the committee	2	50 000	100 000	
Every year : 1 320 000 -820 000 = 500 000 kip are saved in the fund Every 5 years, the fund has : 5 *500 000 kip = 2 500 000 kip to cover the 5-years cost					
III	**Every 5 years**				
1.	Spare part	24	80 000	1 920 000	2 120 000
2.	Transportation costs of the committee	2	50 000	100 000	

There is little money left in case of other small expenditures needed. It may depend also on the unit cost of materials. In this case, if prices increase, the committee has to increase the amount collected every month.

In case of water meter established at household level:

In this case, the household has to pay based on the quantity of water consumed in one month. This means that the price / m^3 is less expensive in villages where the population is big than in small communities. For example:

- A village with 350 people uses in average 630 m^3. The rate recommended is : 350,000/630 = 555 or 550 kip / m^3
- A village with 550 people uses in average 990 m^3. The rate recommended is : 350,000/990 = 350 or 355 kip / m^3

In case of water public water taps:
In this case, the collection of the money per month is based on the number of people in the village; in order to get 350 000 kip per month.

350 people in the village	350 000 / 350 =	1 000 kip paid / person / month
600 people in the village	350 000 / 600 =	580 kip / person/month

3.5. LESSONS LEARNT AND CASE STUDY

Water safety planning and the creation of water management committees is a recent approach in Lao PDR : The Water Supply and Sanitation Center (Nam Saat center) has developed guidelines for the implementation of water safety plans for all systems and officially launched them throughout the country in 2011.

Since 2011, the implementation of water safety plan is still limited and further progress shall be done to ensure the sustainability of the supply systems. The main issues observed that limit the progress of water safety plans are:

- the construction of water supply systems doesn't meet the standards, they are not compatible with the development of community-level water safety plans
- lack of local policies and strategies to protect the water sources: many issues affect the construction of community water supply systems and are still not solved (land use around water sources for farming activities, pesticides and chemicals use, deforestation …)
- lack of clear local policies that address the community' water safety plan and the importance of community-based water safety planning activities
- implementation of water safety planning is still not well understood as well as by trainers (from Government counterparts) and the communities. Skills on socio-organization related to water management is very limited among Nam Saat staff
- water safety planning relies on a participative approach with a high level of ownership of the water supply system by the community

Organizing a training on water safety planning and to support the water management committee needs skills and experiences on different topics (water system construction, community health promotion, community mobilization, …). Approaches shall be pedagogic, participative and adapted to adults. **A multisector team** is recommended to gather all the skills and experiences to make it successful.

How to ensure the sustainability of the water management committee?

Two main factors will ensure that the water management committee will carry out its work:

- ***level of ownership and commitment of the members***: committee members have to be strengthened and supported to understand the purpose of the village water safety plan and ensure that the community can implement the plan;
- ***high and continuous support of the relevant Government departments:*** relevant offices of the District must continuously monitor the implementation of the village water safety plan and strengthen the community to feel as owner of the plan

4. WATER METER AT HOUSEHOLD LEVEL : A SOLUTION TO SAVE WATER ?

4.1. WHAT IS A WATER METER?

A water meter is a system installed at household level to measure the consumption of water by the household.

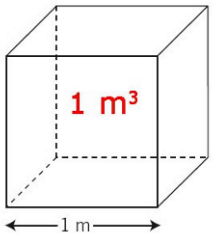
The water meter is installed closed to the tap of the household. It is recommended to cover it all the time to protect the system from rain, sun, hot temperatures

Check point if water meter is working or not

Number of m^3 : quantity of water used

X0.01 is the scale of rotation if it rotates a round or 0 to 10 it will make the X0.1 rotates 1 unit

X0.1 is the scale of rotation if it rotates a round or 0 to 10 it will make the number of m^3 rotates 1 unit



To remind :
1 m^3 = 1 000 L of water

4.2. TECHNICAL STEPS FOR WATER METER INSTALLATION

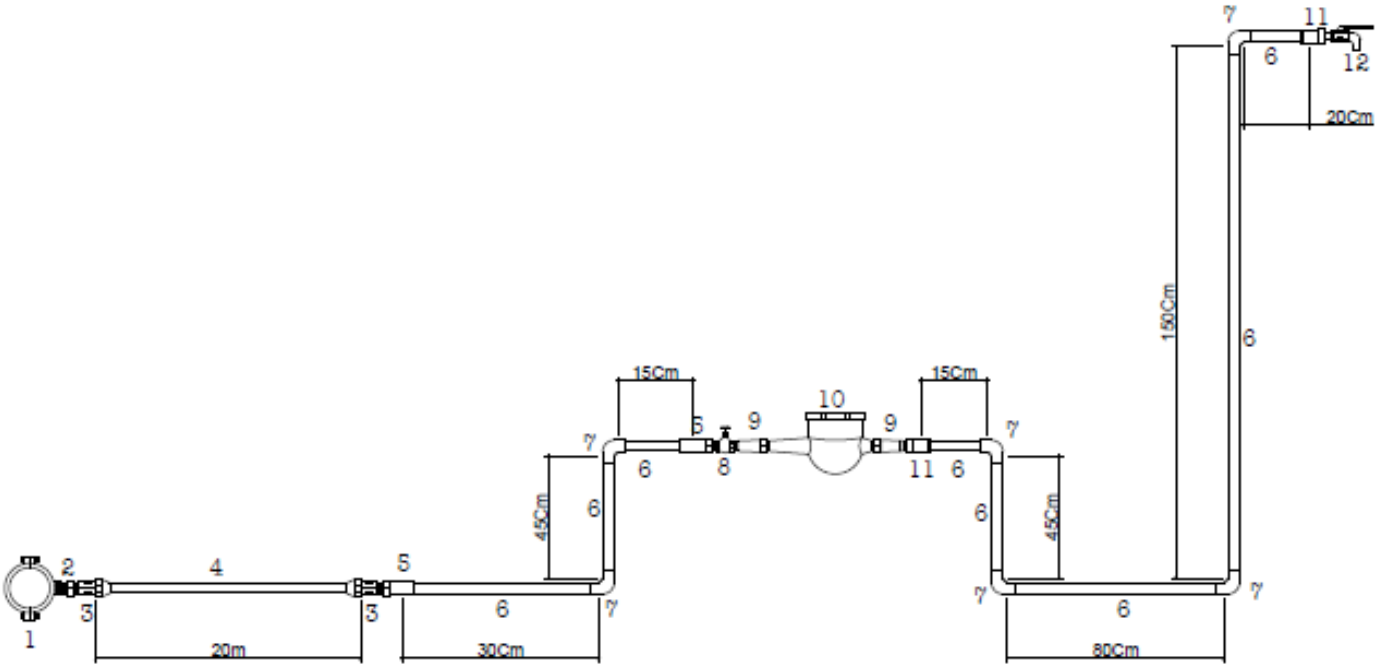
No	Materials	Unit	Amount
1	PE FMT tee reduce 32mm-1/2"	PCS	1
2	PVC Nipple f 1/2"	PCS	1
3	FMT socket reduce f 20mm-18mm	PCS	2
4	PE f 20mm	ml	15
5	PVC MT socket f 1/2"	PCS	2
6	PVC pipe f 1/2", L=4m	Line	1
7	PVC Elow 90	PCS	6
8	Gate Valve f 1/2" (SANWA)	PCS	1
9	Copper socket reduce FMT and MT f 18mm-18mm	PCS	2
10	Steel Water meter 1/2" (SANWA)	Suit	1
11	PVC FT socket f 1/2"	PCS	2
12	Water tap (SANWA) f 1/2"	PCS	1

List of spare part for installing water meter

Installing Water Meter

1. Cut PVC pipe ½" along the length into 30 cm, 45cm, 150 cm, 15 cm, 45 cm, 80 cm, 150 cm and 20 cm pieces.
2. Make a small hole with the distribute PE32 pipe by a drilling machine.
3. Install the spare part following the Figure 9

Figure 9 : figure of water meter installation



4.3. WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF WATER METER AT HOUSEHOLD LEVEL?

Installing a water meter at household level needs s to install water connection at each household and water bills paid every month by the households based on their consumption. This system has the following advantages / disadvantages:

Advantages	Disadvantages
• **Equality** between households for payment: water bill is based on actual volume of water they use. • It gives a "value" and "a cost" to water. People are indirectly encouraged to **save water**, with positive impacts on environment and sustainability especially where water access is limited • **Community management and higher ownership**: funds are collected by the water management committee for the maintenance. Water management committee plays a higher role when water meters are installed, community's ownership of the water supply system is higher. It also creates high level of commitment of each household in order to maintain their water pipe, water meter and taps • **Higher privacy for households**: it is more private and more convenient for households to get water from individual water taps for cooking, washing, bathing, cleaning, flushing their toilet, etc. instead of a village tap shared by several houses. • **Prevention of abuses (women and children):** it reduces women and children's labor to fetch water from a public water tap and from water source that is far away from home. Risks of harassment are reduced especially for young children, adolescents and women if they can take a bath at their house (and not in the middle of the village, using collective taps without privacy).	• **Costs**: each household has to invest to get a water meter installed at its place (300 000 Kip or 30 USD for 1 household in average) It can be a challenge for the poorest. In some cases, the project and the Government counterparts may support the poorest households. • **Time**: installation of a water meter at each household makes the construction longer (10-15 days for a village with 150 households for instance) • **Capacity building and support**: it requires to train the water management committee on the maintenance and fund collection. They will need more technical support from relevant stakeholders • **Community commitment and risks of conflict**: water bills have to be done regularly, managed and fund collected. This requires a collective and common agreement on the fee and the commitment to pay the bill on time by each household. The village development team and the village authorities are key to ensure that there is no conflict or disagreement to pay.

And what are the advantages / disadvantages of a public tap?

Advantages	Disadvantages
• **Cost**: less expensive than installing water meter at household • **Easy and well-known techniques**: Less technical supports are required for the construction • **Social impact**: a collective infrastructure participates to the social life in the village (talking and meeting when water is fetched …)	• **Higher risks of damages and broke down**: public water taps are often broken because many people share the same taps • **Time consuming for fetching water**: people have to wait a long time to fetch water from the public tap especially in the morning or evening • **Risks of harassment, low privacy:** privacy is not possible when taking a bath at the public water taps. Women and children can suffer from direct or indirect harassments and abuses • **Lower maintenance**: using a public installation, the level of ownership and the commitment to maintain and repair it may be lower

4.4. RECOMMENDATIONS ON WATER METER

Installing water meters at household level is still a new practice in Lao PDR. The following table summarizes some recommendations SCALING implementation.

	Recommendations
Initial feasibility assessment	- The WASH officer must assess the conditions of the village and the interest of the community first - The WASH officer has to discuss clearly with the community and explain the meaning of monthly consumption and monthly fees - Indirectly, during the initial feasibility study, the WASH officer shall assess the level of leadership of the chief of the village
During the construction and installation of the water meters	- The WASH officer should consider the area to install the water meter (safety, suitable and convenience to be used) - The water meter should not be close to the tap and shall be covered
After installation	- District Nam Saat officer should train on how to read the meter, how to calculate the cubic meters - Evaluation the village water safety plan shall be done