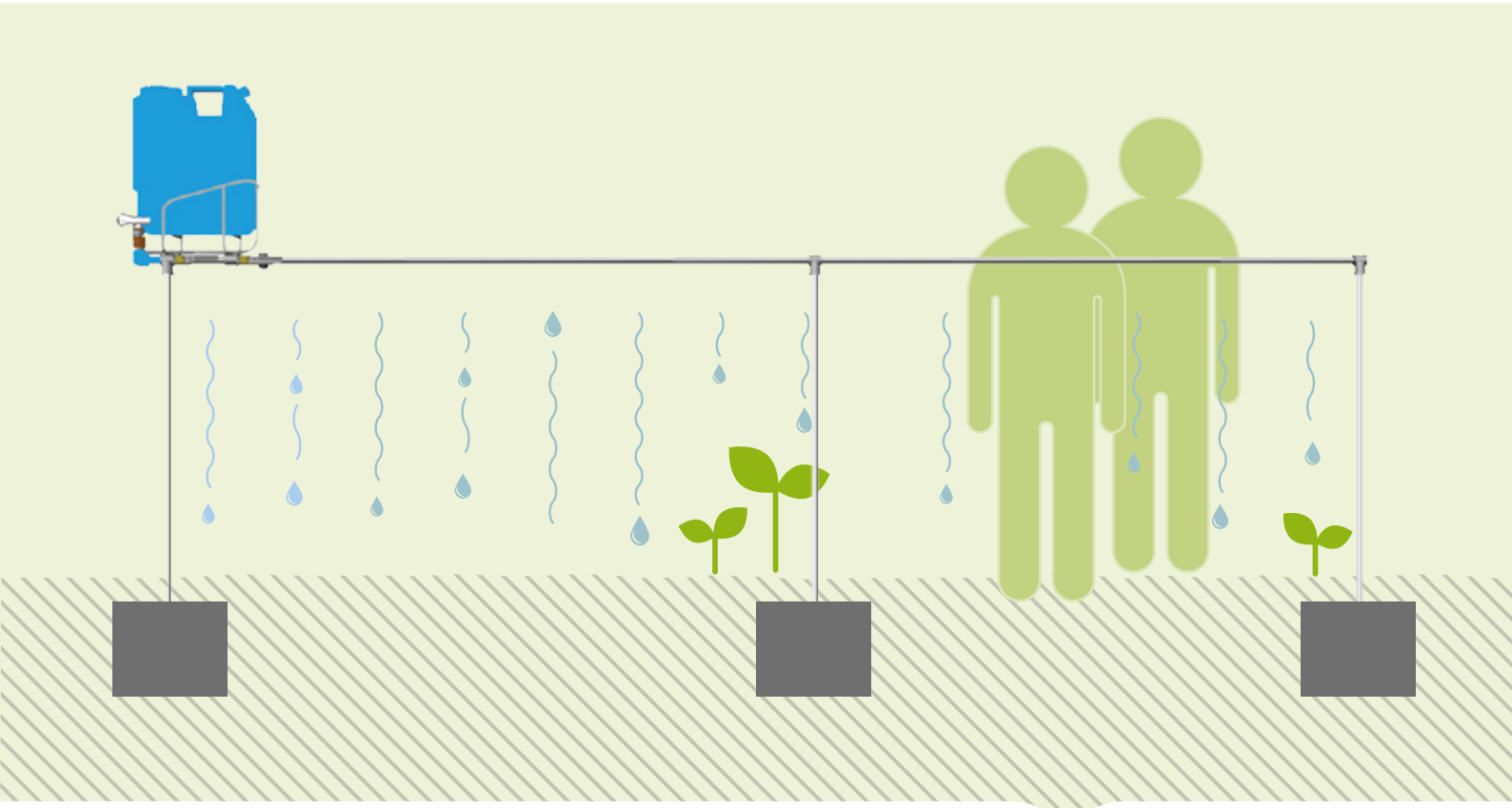


PRODUCER'S GUIDE

Prefabricated Group Washing Facility

Design, Production, Packaging and Delivery

FIT FOR SCHOOL

Table of Content

Introduction

Education and health go hand in hand. Children need to be healthy to be fit for school. Sadly, too many children in the Philippines are afflicted by everyday ailments that impact largely on their physical and mental development and limit them from getting the most from their education.

However, many of these diseases and ailments are preventable. There are simple, scientifically proven interventions that greatly limit their occurrence and transmission. The key is good hygiene.

In the Philippines, GIZ is providing technical assistance to the Department of Education in the Autonomous Region in Muslim Mindanao (DepEd ARMM) to improve WASH in Schools. GIZ's support forms Component 2 of the Australian Embassy's Basic Education Assistance to Muslim Mindanao (BEAM ARMM) program. As part of this component, GIZ support DepEd ARMM to implement their flagship School Health program, the Essential Health Care Program (EHCP). This program focuses on three simple interventions: daily group handwashing with soap, daily group toothbrushing with fluoride toothpaste and bi-annual deworming.

However, healthy habits cannot be formed without the necessary corresponding infrastructure. These school-based group hygiene activities cannot be implemented on a daily basis without functional group washing facilities.

The Prefabricated Group Washing Facility for Schools

Schools across ARMM have constructed their own group washing facilities. Simple affordable materials, like used plastic bottles, can be used to make tippy taps, for example, which can make handwashing facilities accessible for all. However, when building more durable structures, many schools struggle to ensure the functionality of their facilities over time. In some cases, schools may lack the technical expertise or financial resources to repair and properly maintain more complex systems.

Based on these observations, GIZ's Fit for School program designed a simple group washing facility which would minimize some of the issues mentioned above. In particular the system:

- is accessible and designed for a group of children
- assures sustainable functionality
- has a 'self-contained' water source
- is low-cost
- reduces water consumption to a minimum
- allows for school community involvement

As school communities often have limited access to funding, prefabricated units are an ideal solution as they provide schools with higher quality facilities for a lower cost.

1 Design

→ Description

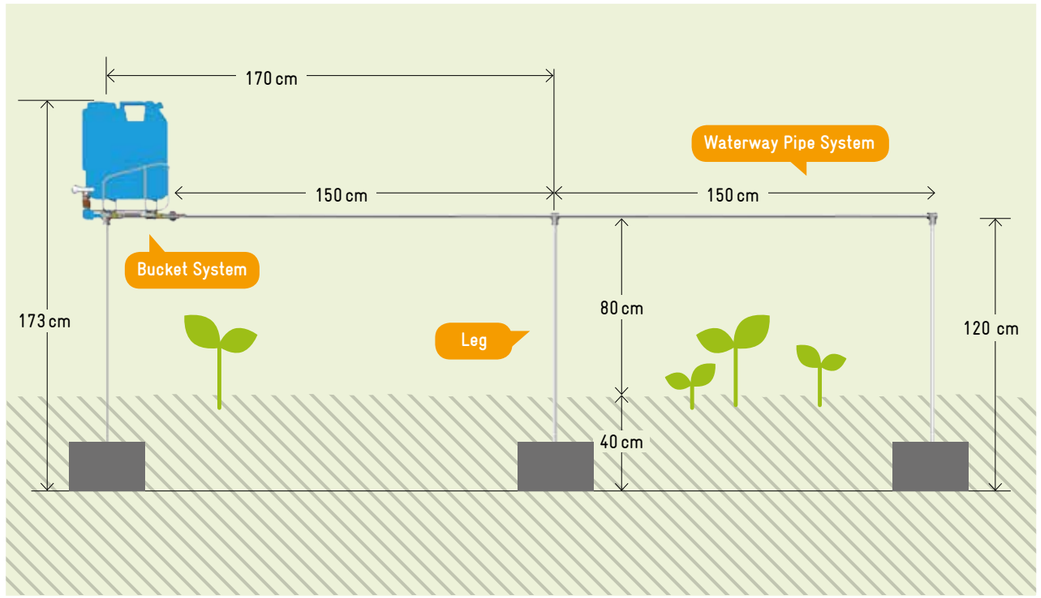
The prefabricated group washing facility is a structure made of galvanized iron water pipes. Water flows into the pipes from an elevated bucket and is released through 11 boreholes with a 1.5 mm diameter, which were drilled into the pipes. These small openings keep water consumption low.

The prefabricated facility allows for easy packaging for delivery to schools. The installation time at schools is less than one hour and does not require expensive tools or skilled labor. Finally, although the facility is fully functional by itself, it deliberately allows room for customized enhancements by the school community.

The facility accommodates up to 22 children at 11 boreholes and allows for individual hand-washing. The water consumption is 115 ml per child per handwashing.

The facility is designed to have a detachable bucket for safekeeping purposes during no classes and long school breaks.

Group Washing Facility Side View with Total Dimensions and Components



CAD Drawings

Figure 1 // Parts of the bucket component:

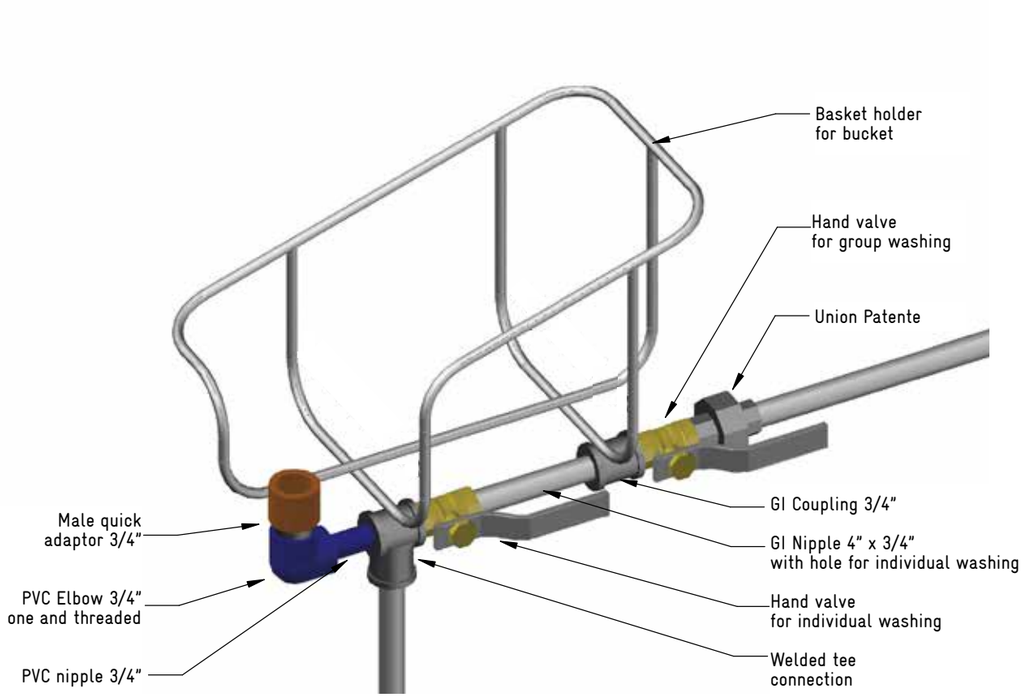
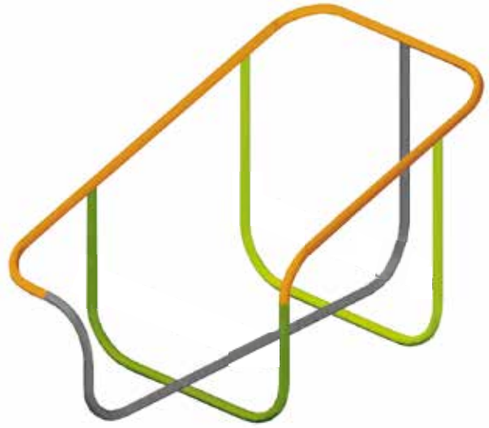
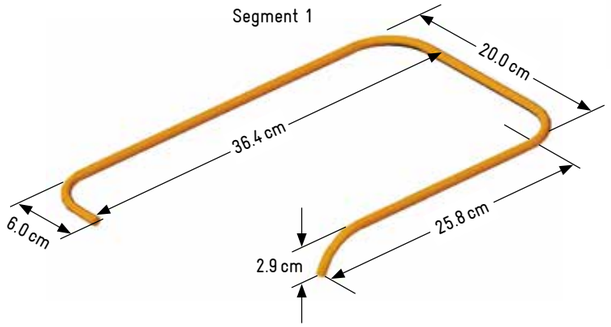
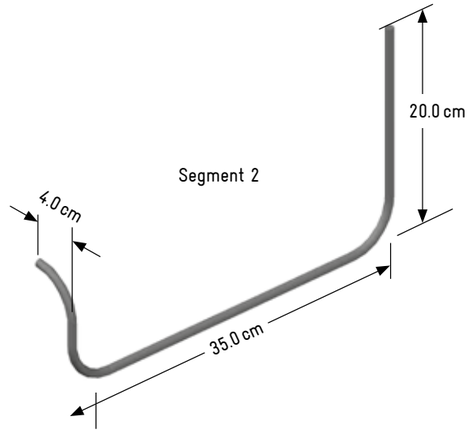
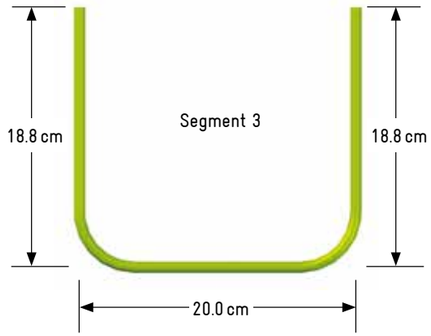


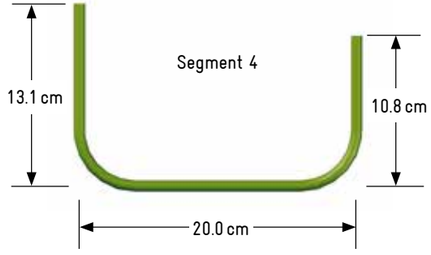
Figure 3 // Basket segment dimensions in cm:











2 Production

- Requirements
- Checklist
- Fabrication of Components
- Quality Check

Requirements

Workshop

To produce a large number of facilities you need space for production and a safe storage area. In addition, you need a specific set of tools.

Labor

The skills required to fabricate the facility are welding and plumbing skills. The workers have a certificate with one of the skills required to ensure good quality of workmanship.

In order to produce an average of 80 to 100 facilities a week you need a team of 8 welders and 7 plumber supervised by 1 to 2 managers.

Material

Purchasing the right amount and good quality material for the production of the facilities is essential. Many producers of plumbing items have brandings on their goods, which makes it easy to control the origin (Standards include: ISO 49, BS 143 and 1256, BS EN 10242). Quality control upon delivery of material is crucial and will determine the final quality and functionality of the facility. You must monitor the delivered materials by the supplier by counting and checking if the specifications of the supplied materials are followed.

Tools Required

The following are only exemplary photos of Tools:			
	1x vertical drill press, able to hold 1.5 mm bit		1x electric arc welding machine
	3x manual or 1x electric pipe threader		2x mount vise or bench vise
	10x pipe wrench		1x electric grinder
	1x cutting machine with 14" diameter cutter (not needed when electric pipe threader is used)		1x level bar (used to level the pipes during the drilling)
			1x bending table

Production area: 20 m^2 minimum
Storage of finished facility: 20 m^2

Materials Needed for one Group Washing Facility

Item		Materials per Facilty
	Galvanized pipe 3/4" (GI) Sch. 40	660 cm
	Double nipple 3/4 x 4"	1 pc
	GI close nipple 3/4"	3 pcs
	GI coupling 3/4"	7 pcs
	Corrugated round bar 8mm	300 cm
	Ball valve (3/4" female)	2 pcs
	Union patente 3/4"	1 pc
	GI plug (3/4" male)	1 pc
	Teflon tape 3/4"	4 pcs
	PVC blue 90 one end threaded elbow 3/4"	1 pc
	PVC 1/2" threaded coupling	1 pc
	PVC nipple 3/4" x 2"	1 pc
	PVC plug 3/4"	1 pc
	Plain stainless washer (1/2 diameter hole)	2 pcs
	Garden craft hose connector 1/2" tap adaptor (inside thread)	2 pcs
	Garden craft hose connector 3/4" male thread quick adaptor	1 pc
	Water tank (5 gallons)	1 pc
	Red oxide primer	200 ml (1/4 Liter)
	Ease flow angle stop valve 1/2" x 1/2"	1 pc
	Welding rods 6013	1/4 kg
	PVC cement	1/10 can

Checklist

To help you ensure that your production process meets the standards to produce high quality facilities you can use this production checklist:

Pre-Production

Stock Management:

- ◯ Is enough stock available to produce required quantity?

Equipment:

- ◯ Is all required equipment available?
- ◯ Are the tools maintained?

Skills:

- ◯ Are all workers trained to fulfill their tasks?

Work Security:

- ◯ Do all workers wear adequate shoes, gloves and clothes?

Production

Process Flow:

- ◯ Is a clear process flow set up?

Responsibilities:

- ◯ Have responsibilities for each process step been clarified?

Fabrication of Components

Component 1 Waterway Pipe System

- Cut the pipes that would serve as waterway using the cut-off machine.
- Make two (2) cuts/pieces for the waterway with each having a length of 150 cm.

- Thread both sides of waterways using the pipe threader.

- In welding the two 3/4” couplings - form a “T” connection and make sure it is perfectly aligned before welding.
- Grind the welded part of the connection to give it a shine finish.
- Make three of these welded connections.

- Make a straight line along the 1.5 meter pipe.
- Mark location for drilling of holes along starting on one end spaced at: 20 cm, 30 cm, 30 cm, 30 cm and 30 cm. Use a marking pen.
- Connect a welded tee connection to one end of the pipe which is close to the 20 cm mark.

- Drill waterway pipe using a 1.50 mm diameter drill bit spaced at the specified distance. Use an electric drill press.
- During drilling, use a spirit level to ensure all holes made face one direction.

- Join the two waterways in the welded tee connection.

- Attach and fasten the male part of the union patente to the free end of the waterway that is not connected with welded tee connection and a GI plug to the other end in the welded tee connection.

Component 2 The Bucket Component

- Cut four (4) segments of corrugated round bar with the following lengths;
  1st segment = 87 cm
  2nd segment = 67 cm
  3rd segment = 57 cm
  4th segment = 40 cm

- Bend the corrugated round bar with their respective lengths in the figure shown. (Refer to the CAD drawing)

- Weld the first two segments to form the first part of the basket.

- Weld the 3rd and 4th segment to the first part of the basket. (Refer to the CAD drawing for dimensions)

- Assemble the lower part of the Bucket component following the illustration on the side. The series of connection from left to right are as follows: welded tee connection - close nipple - ball valve - 4” nipple - GI coupling - close nipple - ball valve - close nipple - union patente (female part).
- In connecting the parts, make sure there is always adequate teflon applied in the threads.
- Mark the center of the 4” nipple facing downward and drill the marked area with a 1.5 mm drill bit.

- Weld the bottom of the basket to the assembly done in the previous step.

- Make sure that the basket and the assembly will be connected in such a way the faucet of the bucket is aligned to the waterway.

- Connect a 3/4” x 3” PVC nipple to the open end of the welded tee connection.

- Apply PVC cement to the end of the nipple and mount the PVC elbow. Make sure the distance of the elbow from the welded tee connection should be between 1” to 1 1/2”.

- Connect the quick male adaptor to the threaded part of the elbow.

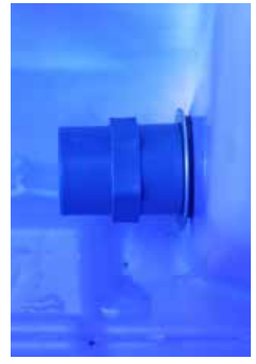
Replacing the Faucet of the Bucket

- Remove the original faucet of the bucket.

- In the original faucet. Extract the rubber washers found in the faucet.

- In the new faucet, attach one plain stainless washer and the rubber washer before mounting the new faucet to the bucket.

- Put another rubber washer and plain stainless washer in the new faucet which is inside the bucket and then tighten the new faucet with a PVC threaded coupling.



- Inside the bucket, put one 1/2 tap adaptor, 1 piece teflon and another 1/2 tap adaptor with plug attached on it for installation purposes.

Component 3 Posts/Legs

- Make three (3) cuts of pipes with a length of 120 cm

- Thread all three post on one end only.

Assembling of Components and Finishing

- Apply a coat of primer on the entire facility to protect it from rust but do not include the PVC parts and the hand valve in the bucket component.

- Connect the waterway pipe component to the bucket component in the union patente provided. Make sure that the direction of the hole for individual washing is the same as for the group washing.

Quality Check

You need to conduct a quality check for each produced facility to ensure its quality and functionality:

Assembled Facility

- **Teflon Tape:** Teflon Tape is on all threads of the water pipe system.
- **Bore Holes:** The bore holes are 1.5 mm thick. 22 bore holes (5 per 1.5 m pipe, 1 for individual handwashing) are straight-lined on the pipes.
- **Bucket Holder:** The bucket holder is assembled at a right angle and secured with locknuts.
- **Bucket:** The bucket is cut open and has a borehole for the connection the pipe system
- **Waterway Pipe:** The water pipe is assembled. Bore holes of both pipes are straight-lined to the ground.
- **Waterproof:** The water pipe elements (including inflow elements from the bucket) are waterproof. No leakage was detected.
- **Primer:** All GI parts are primer coated, the boreholes are open.

3

Packaging & Delivery

- Packaging
- Delivery
- Handover to School Stakeholders

Packaging

In order to deliver the facilities safely and efficiently, they need to be well packaged. The package for the facility must include always all items.

Package List for 1 Facility

- ○ 1 Waterway Pipe System
- ○ 3 Posts
- ○ 1 Bucket Holder System
- ○ 1 Bucket
- ○ 1 Teflon Tape, 1/2 Tap Adaptor, 1/2 Tap Adaptor with attached Plug
- ○ 1 User's Guide

In order for the facility to be stable, each of the 3 posts requires a concrete foundation: mix on part cement (min 10 kg), with two part of sand (20 kg) and three parts of gravel (30 kg).

For ideal and space gaining packaging, the legs and Bucket holder can be temporarily detached from the main pipe. Installation teams will reassemble the facilities on site. To optimize the space for delivery, here is a packaging solution of 5's.

Delivery

Depending on the amount of facilities to be delivered, different size trucks are required.

Transport 80 to 120 Facilities

To transport 80 to 120 facilities the truck above is most suitable.

Transport 120 to 220 Facilities

To transport 120 to 220 facilities the truck above is most suitable

Hand-over to School Stakeholders

During the delivery of facilities to the schools, it is crucial that a clear and detailed hand-over process to the school is conducted.

Assembly and installation of the facility can be facilitated by the User's Guide of the group washing facility, a manual published by Fit for School to guide school stakeholders in installing the facility.

You can request copies of this from GIZ – Fit for School. Please contact us:
GIZ Fit for School Programme
11th floor, PDCP Bank Centre,
Rufino corner Leviste Sts,
Salcedo Village, Makati City,
Philippines 1227
Telephone: +63 2 651-5172 to 78
www.fitforschool.international

Members of the School PTA

Annexes

Example

Delivery Form // Production of Group Washing Facilities

Liability Clause

The producer is responsible for the process and material liability*, this includes:

a) **Completeness of the Product:** All items are in the package
b) **Process Quality:** The product was produced in the defined way, especially the tight and solid preassembling of the bucket holder and the threads of the pipes.
c) **Material Quality:** The producer uses a defined quality of materials.
d) **Quality Check:** The producer conducts a test run to ensure the sealing of all conjunctions of the water pipe. If a)-d) are not executed the producer need to revise the failure directly at the workshop, also for already pre-fabricated facilities.

Comments

Delivery Check List

Packaging // This Package Includes:	Checked by Producer	Checked by User
1 Facility		
1 Water pipe systems, tested to be waterproof		
3 Posts		
1 Water bucket, including hole and opening lit		
1 Bucket holder system		
1 Role of teflon tape		
1/2 tap adaptor		
1/2 tap adaptor with attached plug		
1 User's guide		

Date of Delivery

Signature of Producer

Signature of Partner

* In general there is a difference in warranty claims for the producer or the distributer (agencies or contracted partners).

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