

Manufactured by

Designed by

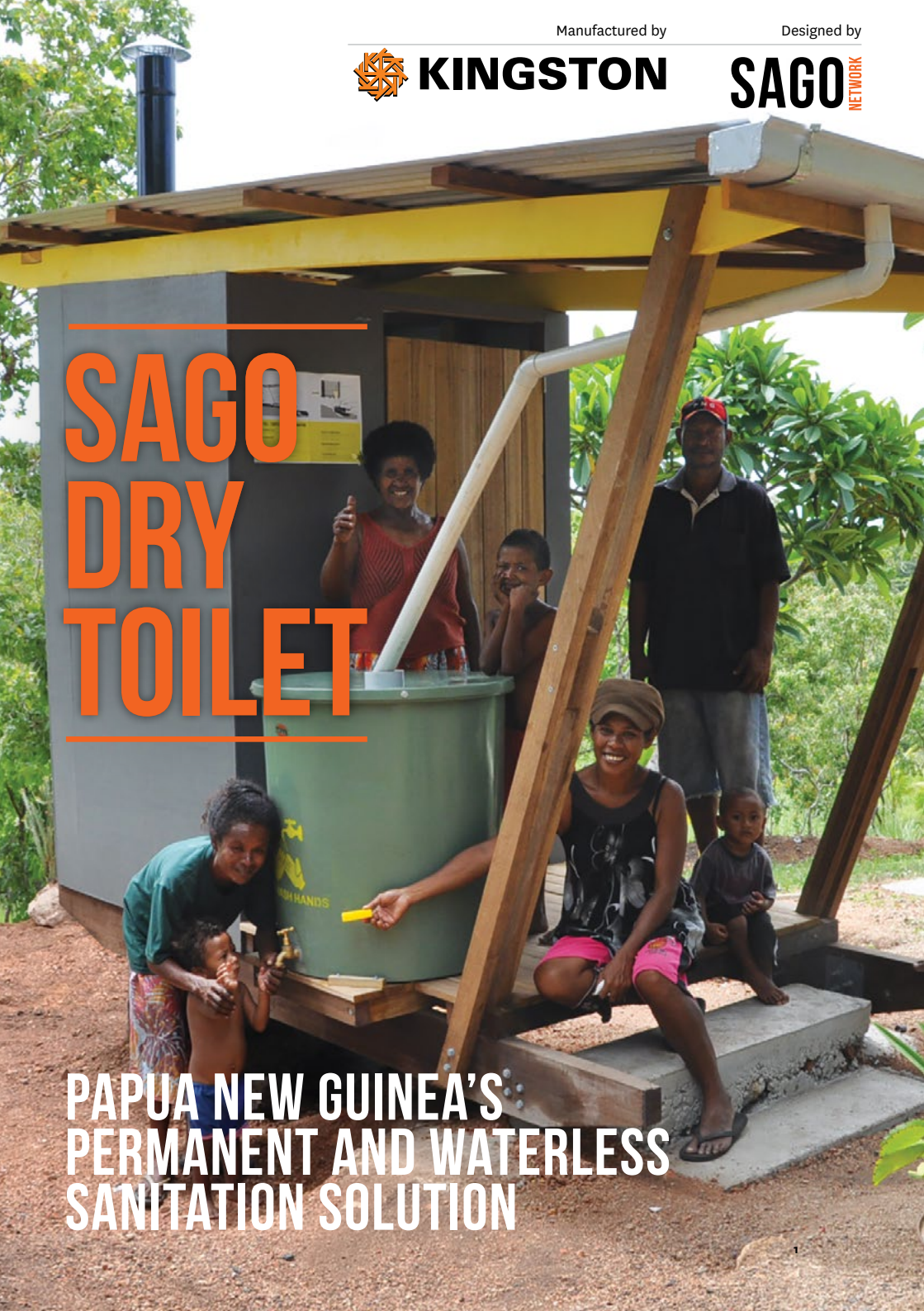


KINGSTON

SAGO
NETWORK

SAGO DRY TOILET

**PAPUA NEW GUINEA'S
PERMANENT AND WATERLESS
SANITATION SOLUTION**





WHAT ARE THE BENEFITS ?

PNG'S WATERLESS AND PERMANENT TOILET

1 DESIGNED FOR PNG AND MADE IN PNG

A sanitation solution designed for rural communities and coastal villages throughout PNG, especially those affected by flood-prone or high water table environments.

A product made in PNG supporting local jobs through local manufacturing.

A solution firmly aimed at improving community health through quality design.

2 WATERLESS SOLUTION

No water is required to process the waste.

All rain water collected can be used for handwashing.

Toilet tanks are fully sealed, sit above ground and do not allow rainwater or ground water to reach waste material, eliminating risk of water contamination.

3 PERMANENT SOLUTION

High quality manufacturing uses plastics that ensure a lifespan of at least 15 years.

Core components have been industrially designed to ensure good functionality now and into the future.

4 NO SMELL AND NO FLIES

No smell due to a ventilation system that uses both wind and convection to draw smells up and out above the toilet. Good seals keep flies and insects out.

Output is a dry sand-like fertiliser that is largely free of smells and can be used productively on fruit trees or flowering plants.

5 EASY TO USE

4 simple steps for daily use with graphical reminders built into the toilet's core components.

Minimal maintenance on a 6-monthly basis for emptying of dry fertiliser from the dehydrated tank.

6 EASY TO TRANSPORT

All core components of the Sago Dry Toilet are delivered as a packaged kit of parts with the dual tanks and all components designed to be stacked.

One packaged Sago Dry Toilet is easily transported in the back of a small truck or within a banana boat as a compact package.

7 SAFE FOR PEOPLE

Each toilet has dual dehydration tanks with rotation every 6 months making cross-contamination impossible between the fresh waste in one tank and the dry fertiliser in the other tank.

Output is a dry sand-like fertiliser that hardly smells and can be buried or used under fruit trees or flowering plants. Use of fertiliser directly on root crops should be avoided.

8 SAFE FOR THE ENVIRONMENT

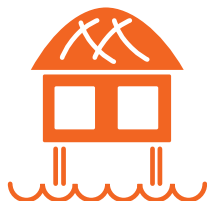
Designed to isolate waste from people until transformed into fertiliser and is safe to be returned to the environment.

Perfect for high water table environments with no contamination of the water table or well water sources.

WHO IS IT FOR ?

PNG'S VILLAGES, SCHOOLS AND AID POSTS

HIGH WATER TABLE ENVIRONMENTS ACROSS PNG



The Sago Dry Toilet has been specifically designed as a solution to PNG's high water table environments and has applications from:

- Villages,
- Aid posts, and;
- Eco-retreats.

EXTENDED FAMILIES — UP TO 15 ADULTS



The Sago Dry Toilet has been designed for:

- Small families with as few as 4 people, and;
- Large extended families up to a maximum of 15 adults.

SCHOOL STUDENTS — UP TO 25 KIDS



The Sago Dry Toilet has also been designed to function well for up to 25 students per toilet.

This aligns with PNG's National Water, Sanitation & Hygiene Policy 2015–2030 which recommends a toilet to student ratio of 1:25.

AID POSTS, ECO-RETREATS AND SUBURBAN HOMES



The Sago Dry Toilet is also just as suitable for use in aid posts, eco-retreats and suburban homes who are looking for a permanent, off-grid, waterless toilet solution.

LIMITATIONS OF OTHER SYSTEMS ?

LEARNING FROM EXPERIENCE



SEA TOILETS ARE NOT A SOLUTION

Defecation in or over the sea results in high faecal coliform counts along coastlines which results in:

- Faeces washes on shore creating **faecal-oral transmission** via direct contact or via flies become a vector to human food.
- Children play in the water and boats are moored meaning kids and adults come into **direct contact** with human waste.
- Fish are cleaned in sea water and become **contaminated food**.



VIP PIT TOILETS CAN BE LIMITED

High water tables limit the effectiveness of ventilated improved pit toilets due to the following:

- Limited pit depth means toilets fill quickly and require **regular relocation and excavation** of new toilet facilities which becomes both a significant physical effort and a constant spatial issue.
- Risk of **ground water contamination** if a toilet exists within the zone of influence of any ground water source such as a water well or water pump.



WET COMPOSTING TOILETS ARE PROBLEMATIC IN PNG

- The **composting process is slow** in tropical environments and waste remains very damp.
- Single tank system results in **easy cross-contamination** between fresh waste and composed waste.
- Urine and leachate sits in the base of the tank as a **heavily contaminated liquid** unable to be safely disposed of with harmful faecal coliform pathogens released into ground water.
- When removing the matter the **output is often sloppy, wet and smelly**, creating high risk of human contact and spread of disease.



SEPTIC TOILETS ARE HAZARDOUS IN HIGH WATER

- Flooding or heavy ground water can cause septic systems to **overflow**, resulting in overland water flow becoming contaminated, disease becoming water-borne and spreading **sickness** rapidly.
- Increases the risk of **ground water contamination**, a particular issue if the toilet sits within the zone of influence of any ground water source such as a well or bore pump.
- Maintenance of septic systems requires a **regular pump-out** to a truck which requires road access and is costly, resulting in many village septic systems being poorly maintained.

HOW DO YOU USE IT ?

4 EASY STEPS



SIT DOWN TO POO AND PEE
TO DIVERT URINE AND KEEP THE TANK DRY

1

**POO
PEE
PAPER
ASH
ONLY**

**PLACE POO, PEE, PAPER AND
ASH ONLY DOWN THE TOILET**
TO KEEP THE TOILET FUNCTIONING WELL

2



ONE POO = ONE SCOOP OF ASH
TO BALANCE THE TANK ENVIRONMENT

3



**ALWAYS CLOSE THE
LID AFTER USE**
TO KEEP FLIES OUT AND SMELLS IN

4



WASH HANDS AFTER USE
TO KILL GERMS AND STAY HEALTHY

HOW DOES IT WORK ?

DEHYDRATION INTO DRY FERTILISER

URINE DIVERTED AND SOLID WASTE CAPTURED

Users of the Sago Dry Toilet sit directly on the toilet pedestal which forms an adult seat while children have the option of using the integrated, smaller kids' seat.

Urine is caught by a small funnel within the toilet pedestal called a Urine Diverter and solid waste drops directly into the Dehydration Tank below.

Urine is relatively safe and free of harmful pathogens and is disposed of into the soil via a small filtration pit. Solid waste, however, drops into the tank below to be stored, ventilated and dehydrated.

ASH ADDED AND CHEMICAL LEVELS BALANCED

After each toilet use, a scoop of ash is ideally added down the toilet. Ash has a high pH level, is high in calcium and assists the solid waste to break down over time by helping to maintain a good balance within the dehydration tanks.

Each time the toilet is used the user is reminded of the 4 steps to using the toilet by graphics built into the Sago Dry Toilet:

1. 'POO, PEE, PAPER, ASH ONLY'
2. 'ONE USE, ONE ASH'
3. 'CLOSE LID WHEN DONE'
4. 'WASH HANDS TO FINISH'

DUAL TANKS AND CONSTANT DEHYDRATION

The Sago Dry Toilet uses two large tanks to store, ventilate and dehydrate waste on a 6 month rotational system:

- During the first 6 month period, the first chamber is used.
- Two large wind-powered vents and convection-driven ducts constantly draw air into the tanks and expel smells out high above the toilet in a process that dehydrates the waste and transforms it into dry fertiliser.
- At the 6 month mark, the first chamber is decommissioned and the second chamber is activated, simply by moving a Pedestal Cap.
- During the second 6 month period, the second chamber is used as the toilet and the waste in the first chamber dehydrates, reduces in volume and transforms.

FERTILISER EMPTIED AND CYCLE REPEATS

At the end of the cycle at the 12 month mark and a full year after commissioning the toilet, responsible family or community members simply open the Dehydration Tank hatch and remove the fertiliser from the first chamber with a shovel. The waste will have reduced in volume and transformed into dry sand-like fertiliser as it dehydrated over the 12 months.

The fertiliser is safe to be used at the base of fruit trees or flowering plants or can be buried but, to be absolutely safe, it isn't recommended to put fertiliser directly on edible root crops.

At the same 12 month mark, the second chamber is decommissioned and the first chamber is reactivated, continuing on a 6 monthly rotation, recommended to be every January and July for easy monitoring.

HOW DO YOU MAINTAIN IT ?

SIMPLE CHECKS AND MAINTENANCE

1

REGULAR MAINTENANCE

The Sago Dry Toilet only requires a small amount of regular maintenance but it is NOT a 'set and forget' system.

It is therefore recommended for families, schools, aid posts and eco-retreats where a responsible person is willing to take care of the facility in the following manner.

2

MONTHLY CHECKS

Each Sago Dry Toilet comes with a graphical list of monthly checks to ensure the toilet is properly used and functions well.

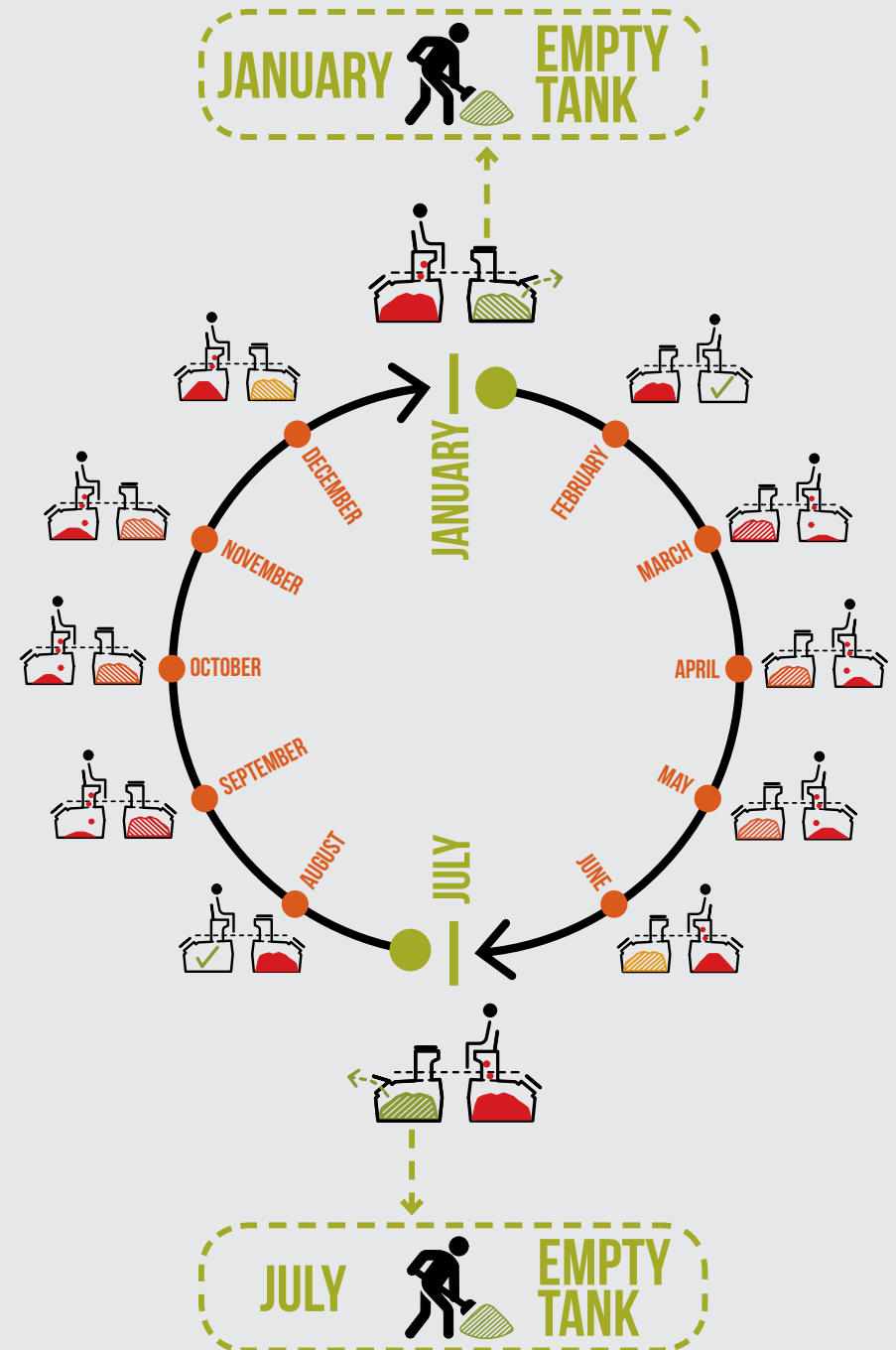
For instance, a regular check should confirm that diapers or sanitary pads aren't being disposed of into the tank.

3

SIX-MONTHLY MAINTENANCE

If the toilet is used properly, maintenance only once every 6 months is required.

Every January and July the Sago Dry Toilet rotates between its two tanks with one tank needing to be opened and emptied. During the 6 month shut-down period waste in the dormant tank is dehydrated, reduces in volume by about 50% and becomes a dry, sand-like fertiliser with little smell and no resemblance to human waste. This fertiliser is shoveled out of the tank via the hatch and is to be disposed of or used on gardens.





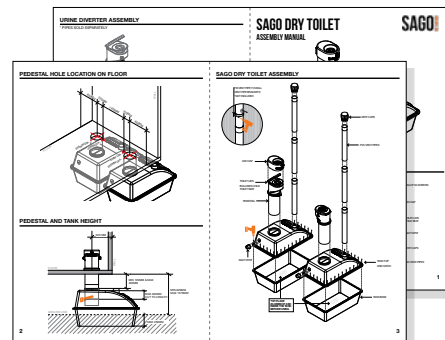
01 Urine Diverting Pedestal



02 Pedestal Cap & 03 Urine Diverting Pipework

04 Dehydration Tanks & 05 Ventilation Pipework & Ventilators

06 Assembly Manual



SAGO DRY TOILET DETAILS

SAGO DRY TOILET INCLUSIONS

The Sago Dry Toilet includes the following Core Components suitable for 1 x toilet system:

- 01 Urine Diverting Pedestals with integrated hinging kids' seats x 2.
- 02 Pedestal Cap to lock inactive pedestal and receive ash bucket x 1.
- 03 Urine Diverting Pipework with various junctions and pipe x 5.8m.
- 04 Dehydration Tanks with hinging hatches x 2.
- 05 Ventilation Pipework inc pipes and ventilators x 2.
- 06 Assembly Manual, Usage Poster and Maintenance Posters x 3.

* The Liklik Haus is not included but the options for constructing this are adjacent.

ASSEMBLING THE CORE COMPONENTS

The Sago Dry Toilet is a plastic kit of Core Components that can be easily assembled with the assistance of the included Sago Dry Toilet Assembly Manual which are easy, graphical instructions in English & Tok Pisin.

HOW TO BUY THE SAGO DRY TOILET

The Sago Dry Toilet is available via three avenues:

- Sago Network
- KK Kingston Stores
- Hardware Distributors across PNG

Contact Sago Network or KKKingston via the details overleaf for sales or hardware distributors.

LIKLIK HAUS OPTIONS

TIMBER FRAMING OPTION

If communities have carpentry skills, the **most cost effective and capacity-building** way of constructing the 'liklik haus' or toilet cubicle is using timber framing.

The design can be:

- Your own unique design, or;
- Sago Network can provide free of charge an open-source timber design and material order list to assist.

PRE-FABRICATED STEEL OPTION

The **most convenient and efficient** way of constructing the 'liklik haus' or toilet cubicle and uses light-gauge prefabricated steel framing for floor, wall and roof elements.

The prefab steel liklik haus is manufactured in Port Moresby and can be ordered via Sago Network. Communities or installers can then simply bolt together and assemble the liklik haus in the field.

CUSTOM DESIGNS

Certain projects require custom designs and for certain projects Sago Network's in-house design team can assist with:

- Multi-toilet block designs for schools
- Specific designs for aid post facilities
- Custom designs for flood-prone areas

Contact Sago Network via the details overleaf for more information on any of the above options for the Liklik Haus.

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