



Unblocking Innovation:
Launching the HIF's Surface Water Drainage Challenge
5th April 2016

Part 2: Ideas and Feedback

The Challenge



The [Surface Water Drainage in Emergencies Challenge](#) is looking for proposals in two categories:

1. **Knowledge Awareness Challenge:** Develop tools and guidance to support field practitioners decide between existing drainage options in an emergency.
2. **Drainage Solutions Challenge:** Develop new or adapt existing products, components and processes that could improve surface water drainage in an emergency.

The HIF are looking to fund up to **five projects** that address either of the two challenge areas within the Surface Water Drainage Challenge.

Funding between £20,000 and £150,000 will be made available for each project to realise its ambitions. Projects can be at any stage of the innovation process – initial scoping, development, testing or scale.

For more information, visit the Challenge page: <http://www.elrha.org/hif/funding/water-sanitation-hygiene-wash/challenges/surface-water-drainage-emergencies/>

and read the Challenge Statement: http://www.elrha.org/wp-content/uploads/2016/02/HIF_SWD-Challenge-Impact-Criteria.pdf

HIF humanitarian innovation fund

Surface Water Drainage in Emergencies Challenge

Improve field practitioners' awareness of existing solutions to prevent or reduce surface water pooling in emergencies and support the development of innovative approaches.

The Problem

Effective surface water drainage is critical in safeguarding the health and surroundings of refugees or internally displaced persons in emergencies. Stagnant water can support the development of vector-borne diseases such as malaria, cholera or dengue, as well as worm infections, hepatitis E, or typhoid. Poor surface water drainage can also pose accessibility problems, making it difficult for people to move around, but also for vehicles to make their way through a camp and provide essential water and sanitation services.

Surface water pooling can be the result of natural causes such as rain, storms or overflowing rivers, but also man-made causes such as poor wastewater drainage or spills around water collection points like tap stands or water tanks. Providing effective surface water drainage around a camp site in an emergency can be challenging because of limited funds, tools, materials, time, available knowledge and expertise.

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Generating Ideas

The second part of the SWD Challenge Launch event was focused on generating and sharing diverse ideas to improve drainage, making new connections, and exploring potential project concepts.

Participants and members of the HIF's [WASH Technical Working Group](#) acting as mentors provided feedback on the ideas developed on the day.

To recap the first part of the day please see – **Part 1: Overview of the Launch.**



Idea Generation and Development



The Idea Generation and Development process had the following structure:

- **Breaking down the Challenge:** Attendees broke down the two challenge areas by rewriting aspects of them as specific ‘How To...’ challenges.
- **Ideation:** Based on the ‘How To...’ challenges, each table came up with 3-5 proposal ideas.
- **Voting:** Each participant had 6 votes to cast on their favourite ideas (3 votes x Knowledge Access Challenge ideas; and 3 votes x Drainage Solutions Challenge ideas). The ideas with the highest number of votes were taken through to the Idea Development phase.
- **Feedback:** Participants went around the room providing feedback in the form of Strengths, Concerns, Builds and Tips to the selected ideas.
- **Proposal 0.1:** In groups, participants developed the selected ideas into first versions of Proposals to be submitted for the Challenge.
- **Mentor feedback:** Participants presented the ideas and received feedback from mentors.

Breaking down the Challenge

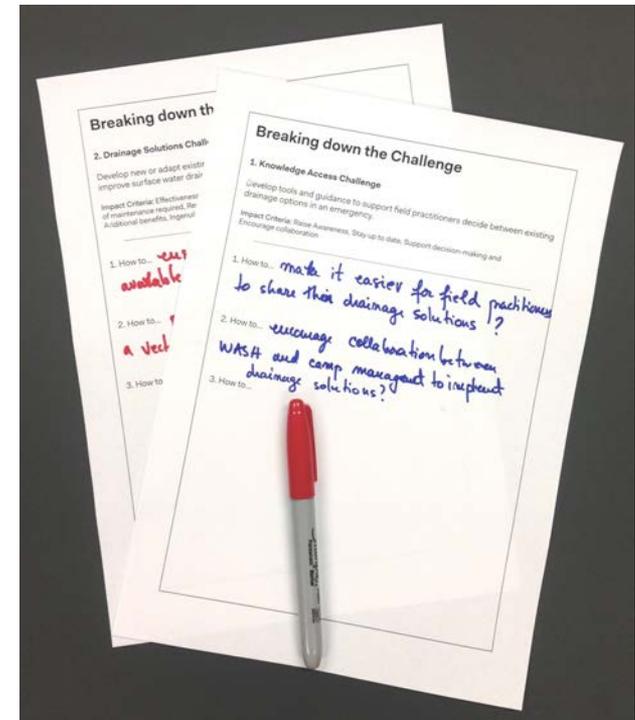


Because the topic of SWD in emergencies is an often overlooked one, the two Challenge areas were written in an open way to allow for a greater variety of ideas and solutions.

To make thinking about solutions easier, we asked participants to break down the challenges into specific 'How To...' Challenges.

These were then used as stimulus to generate different proposal ideas throughout the day.

'How To..' challenges were generated for each of the two Challenge areas.





Breaking down the Challenge

Knowledge Access Challenge: curated How to's

How to...

- Create a framework with considerations needed for camp planning?
- Link global good practice with local contextual knowledge?
- Identify knowledge and expertise in camps and empower people to deliver local solutions?
- Communicate in a common language?
- Balance immediate needs with long term requirements (i.e. design, funding, growth)?
- Make decisions on which information is critical and how to transmit it?
- Recognise that SWD experts are needed and bring them to the site in time?
- Decide who has responsibility for SWD within humanitarian organisations?
- Provide more integrated solutions where surface water is utilised?
- Provide better economic assessment to drive flood management investment?
- Curate knowledge bases so that they strike the right balance between openness and reliability?



Breaking down the Challenge

Drainage Solutions Challenge: curated How to's

How to...

- Provide drainage on black cotton soil?
- Build a grease trap for a tap stand?
- Transfer technology from the first world to camp design?
- Connect agriculture with drainage in a safe and effective way?
- Use rainwater harvesting in emergencies?
- Assess and collate information on what materials are available within a camp environment?
- Make apps for use on site in an emergency with quick access to data?
- Use tech for flood forecasting?
- Predict the minimum lifespan for a camp?
- Keep tapstands dry, clean and accessible?
- Improve the ability to retrofit drainage solutions in a camp?

Ideation



Based on the ‘How To...’ challenges and insights gathered throughout the day, participants were asked to come up with around 3-5 proposal ideas per team.

Below are the ideas which received the highest number of votes on the day. The remaining suggested ideas are included in the Appendices (**Appendix 1** - Knowledge Access Challenge ideas, **Appendix 2** - Drainage Solutions ideas).

We are making these ideas open to everyone to use as inspiration, to borrow insights and suggestions, and to develop and iterate on. The ultimate goal is to encourage the development of strong Challenge proposals that the HIF can fund.



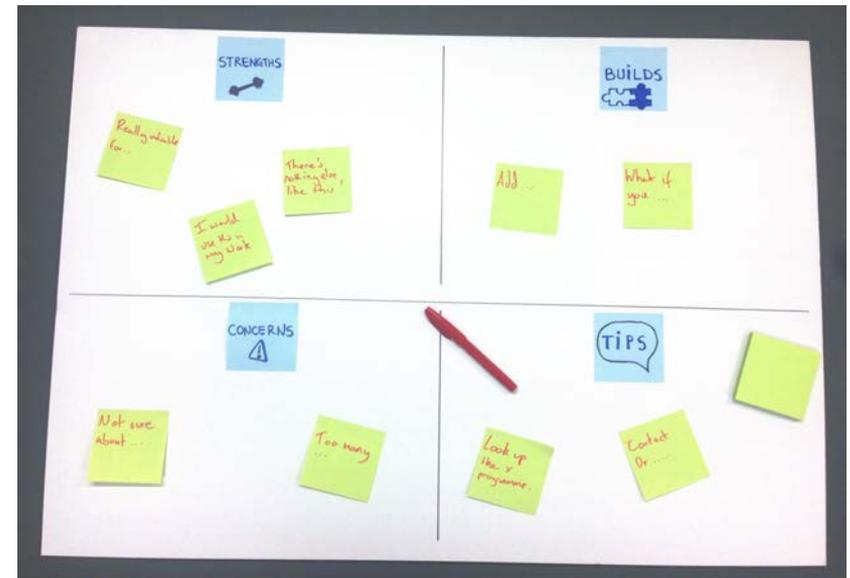
Top Ideas and Feedback



The following slides include the ideas that received the largest number of votes on the day, together with participants' feedback on them.

Feedback on these ideas was given under the following four categories:

- **Strengths:** Things that are good about the idea.
- **Concerns:** Things that may cause the idea to not work well or as intended.
- **Builds:** Suggestions for additions to the idea that could give added benefits.
- **Tips:** Suggestions of people, places, resources and concepts that could help to refine the idea.



Top Ideas and Feedback



- 'Vegetation Impact' (clustered ideas)
- 'Grease Trap' (clustered ideas)
- 'Decentralised Water Management'
- 'Water Viz'
- 'DrainMap'
- 'Off the Roof'
- 'Open Source Drainage Master Plan'

'Vegetation Impact' Clustered Ideas

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
 (What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)
 Low-cost solution for preventing erosion
 eg. bananas bamboo vegetation
 Place roots

Draw it:

Name it: Banana-plant erosion reduction

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
 (What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)
 Use vegetation to improve environment
 - prevent erosion
 - improve soil
 • infiltration
 • compaction.
 • use local plants/trees with desired effect.
 • species with progressive impact.
 • include education & P

Draw it:

Name it: Vegetation Impact

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
 (What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)
 How to reduce the impact of surface water flooding by using natural vegetation to improve infiltration and reduce soil compaction

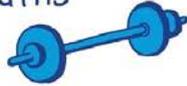
Draw it:

Name it: Vegetated Infiltration (VI)

There were three ideas that focused on using plants to tackle issues related to surface water drainage, such as water pooling and erosion. These ideas were clustered together, and feedback given on their shared concepts. The feedback was used to develop the '**Vegetation Impact**' proposal on the day.

'Vegetation Impact' – Group Feedback

STRENGTHS



- Environmental gains
- Low cost
- Environmentally friendly
- Improved living environment
- Potentially providing livelihood to IDPs
- Proven technology with best practice knowledge available in many places
- Limited treatment required

BUILDS



- Demonstrate the value of the area for agriculture
- Combined with community building to encourage community ownership

CONCERNS



- Maintenance demands
- Implementation time
- Potential to provide environment for disease vectors (banana plants)
- Requires knowledge and care to select appropriate plants for the environment and context
- Trees may be cut down for fire

TIPS



- Link to food production
- Consult ecology/ tree/ plant experts

'Grease Trap' Clustered Ideas

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
 (What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

How to build a self maintaining grease trap... to reduce clogging of drainage field.

Can we re-use the fat.

Draw it:

Name it: **GREASE LIGHTNING.**

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
 (What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

① low chamber main tank
 ② low level connected between two chambers
 ③ outflow from the primary chamber into grease trap chamber
 ④ outflow from chamber ② into the clean out or reuse?
 ⑤ extend grease trap chamber ③ for side

Draw it:

Ideation sheet. Some might go together

Name it: *low cost easy maintain grease trap*

inspection and clean-out. AIR. GREASE. SOLIDS.

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

GREASE TRAP

Describe it:
 (What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

grease trap /
 → combination of physical and chemical method
 → Add particulate system and surfactant interfacial properties

Draw it:

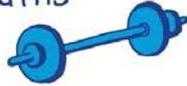
DEAD END
DIAPHRAGM
CROSS FLOW

Name it: **Grease Management Through Biosurfactant**

There were three ideas focussing on developing low cost, simple to maintain grease traps for drainage systems in emergency settings. These ideas were clustered and received feedback from the group, but were not developed further on the day.

'Grease Trap' – Group Feedback

STRENGTHS



- Examples of this already exist
- Has a lot of potential

BUILDS



- Combine with prevention and reduction initiatives
- Assess existing practices
- Could have traps that are collected every 30 days

CONCERNS



- There is no such thing as zero maintenance upkeep
- There will be some cost in emptying traps, and maintenance. Who will pay?

TIPS



- The design should be adaptable to different scales
- Consult manufacturers for expert input

'Decentralised Water Management'

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

capture rain water & grey water
at local scale, store in storage
filter & store it

- using low cost filtration systems
- using local material.
 - ↳ using membrane?
 - ↳ using coil?

Draw it:

Power source
Solar wind
grey water
rain
filter
pumps
soakaway underground tank
use for?
• irrigation
• washing clothes
• general wash of hockey barrels

10 made by chris/da
Disaster DAS

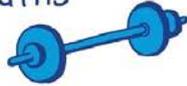
Name it: Decentralised Water Management (Rain, Storm, grey)

'Decentralised water management'

This is an idea that proposes using low cost rainwater and greywater collection and filtering at a local scale to provide water for WASH, irrigation and washing clothes. This idea received feedback from the group, but was not developed further on the day.

'Decentralised Water Management' – Group Feedback

STRENGTHS



- Sustainable idea as it uses a natural process
- Lots of available best practice knowledge
- Low cost
- Adaptable

BUILDS



- Get guidance from spatial planning

CONCERNS



- Needs to be integrated in the planning stage
- Many disparate stakeholders, and difficult to encourage user buy-in
- May have long setup time
- Need to consider how to move water in flat land, or how to store water safely



TIPS

- [CIRIA](#) have experience of these sorts of projects in the UK

'Water Viz'

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Visualization App for
Smart phones / iPads
To show Water Flows &
Water Redirection.

For: NGO - Engineers & Planners.

How it works: Using historical &
current weather data, precipitation,
wind speeds, humidity, apps can
be used to visualize / simulate
rise / drop in water.

Name it: Water-Viz

Draw it:

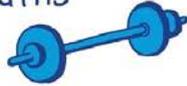
Set device showing Rise / drop water levels on given areas where camps will or can exist.

Expected water depths

'Water Viz' is an idea for an app that takes historical and current weather data to show water flows and water redirection. This idea was taken forward and developed into the 'Water Viz' proposal on the day.

'Water Viz' – Group Feedback

STRENGTHS



- Provide Rapid assessment
- Could improve understanding of flooding
- Would be easy and quick to update data and advice

BUILDS



- Could add in augmented reality features
- Could integrate with existing APIs
- Should also have an offline application
- Also include elevation, soil and topology data

CONCERNS



- Maintain quality of information and ensure that data is verified
- Internet access may not allow real time data
- Make sure that the data is used in a reliable and appropriate way



TIPS

- Try developing paper based solutions first, or trialing a framework for decision making
- Users could also help to populate data sets

'DrainMap'

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Decision tool

↳ INPUTS - soil, r. fall, \$, materials etc ...

↓ (process of participation w. communities / project manager)

OUTPUTS - drainage channels.

sizing, cost, lifespan costs & maintenance

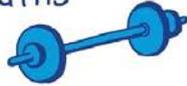
Draw it:

Name it: **DRAINMAP**

'**DrainMap**' is an idea that uses soil, rainfall, materials and other data to produce a map that indicates appropriate locations for drainage channels. This idea received feedback from the group, and was developed into the '**Flood Hazard Map**' proposal on the day.

'DrainMap' – Group Feedback

STRENGTHS



- Allows for early and appropriate refugee or IDP camp selection
- Could prevent common mistakes

BUILDS



- Could link with materials and supply chain management
- Could create a multi-criteria weighting matrix

CONCERNS



- It may be difficult to get good enough topographical data
- Must not rely too heavily on the outputs, users will need to think about their particular sites and contexts
- The input data must be standardised in some way

TIPS



- Be careful to validate
- Identify users carefully, need a certain level of skill

'Off the Roof'

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Use rainwater for useful purposes eg.

- handwashing water ON LATRINE ROOFS
- drinking water (AFTER SOME TREATMENT) FROM SHELTER ROOFS (systematic, scaling) in the spec

Draw it:



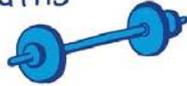
Name it: ~~Rainwater Aurora~~ **Off the Roof**

12

'Off the Roof' is an idea to use rainwater harvested from roofs for hand washing, showering and drinking (after treatment). The idea received feedback from the group and was developed into the 'Off the Roof' proposal on the day.

'Off the Roof' – Group Feedback

STRENGTHS



- There are existing technologies that could be used to build this
- Low cost, integrated water management
- Could allow more people to have functioning, flushing latrines
- Integration with hand washing

BUILDS



- Incorporate gutter design
- Roofs designed specifically for rainfall capture
- Use a 3D printer to create hand washing units

CONCERNS



- What happens to water if storage capacity is exceeded
- Infrequent rainfall leading to limited impact
- Need to have reliable rainfall data

TIPS



- Use water for plant irrigation
- Use closed tanks to prevent disease vectors

'Open Source Drainage Master Planning'

Ideation Sheet

1. Knowledge Access Challenge 2. Drainage Solutions Challenge

Describe it:
(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- organisations ~~responsible~~ (ie government, civil societies, NGOs) responsible for implementing drainage ^{surface water} projects / flood risk reduction projects upload master plan to a Open Source platform
- ~~Be~~ ^{asked} Experts / communities / governments ~~identified~~ to provide feedback on the master plan.
- ~~Be~~ ^{asked} Advocacy tools for governments / empower communities by developing local / sustainable solutions.

Draw it:

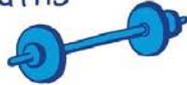
OPEN SOURCE DRAINAGE MASTER PLANNING

Name it: OPEN SOURCE DRAINAGE MASTER PLANNING

'Open Source Drainage Master Planning' is an idea that allows organisations responsible for camp planning to receive feedback and suggestions from drainage experts. This idea received feedback from the group and was developed into the 'Rapid Topographical Decision Support Tool' proposal on the day.

'Open Source Drainage Master Planning' – Group Feedback

STRENGTHS



- Open source allows feedback from a variety of experts
- Allows for better decision making and more coordinated response to emergency situations
- Allows for a fast response

BUILDS



- Explore existing open source tools so that time is not wasted reinventing
- Have 'Q and A' as a central feature
- Consider allowing the use estimates that are good enough rather than known inputs
- Consider how collaboration will function

CONCERNS



- Data availability and connectivity issues
- May not be site specific enough, or provide advice that is tailored for higher income countries
- Validating the data source
- Is there a sustainable business model
- May be in conflict with local ownership

TIPS



- Read "[Urban sanitation](#)" by Tayler, Parkinson , Colin
- Could use community basemaps, similar to [Openstreetmap](#)

Proposal 0.1

After the Ideation and Feedback round, participants self-selected around ideas and began developing them into first draft proposals.

To familiarise participants with the application process and the kind of information they will be expected to provide when submitting a proposal, we created the **'Proposal 0.1' sheet**.

The questions on this sheet were a slightly simplified version of the questions on the Application form for the Challenge. Applicants will be expected to fill this out when submitting an Expression of Interest.

You can now download the full [Application Form](#) for the Challenge from the [HIF website](#).

The image shows a 'Proposal 0.1' sheet, a form for submitting a proposal, with various sections filled out using sticky notes. The sheet is titled 'Proposal 0.1' and is divided into three main sections: IDEA, INNOVATION PROCESS, and PROJECT MANAGEMENT. The IDEA section includes 1. Challenge, 2. Solution, and 3. Impact. The INNOVATION PROCESS section includes 4. User-participation, 5. Learning and adapting, 6. Building evidence, and 7. Uptake and scale. The PROJECT MANAGEMENT section includes 8. Risk mitigation, 9. Workplan, and 10. Timeline. The sheet is pinned to a dark surface with several colorful sticky notes and a red pen.

Section	Sub-section	Question	Answer (from sticky notes)
IDEA	1. Challenge	What is the challenge?	Water quality around Lake Chad to water nearby sites. Lake of fresh water.
	2. Solution	What is your proposed solution?	Training programme for locals to do decision making that guide villages towards sustainable practices.
	3. Impact	Why is this an exciting? What is the potential impact of this?	• Simple • cheap • added community benefits
INNOVATION PROCESS	4. User-participation	Who will use this solution? How will you work with them? How will you ensure you gain their support?	Locals. Of local farmers to start best practices.
	5. Learning and adapting	How soon can you start testing this idea out? What do you need to know? How will you ensure you gain their support?	Right now! Talk to the field with locals.
	6. Building evidence	How will you know if your solution is working? What do you need to know? How will you ensure you gain their support?	Crop Yields. Feedback - how community water use.
	7. Uptake and scale	If this solution is successful how will this encourage others to adopt it? How will you ensure you gain their support?	PROUDLY by going around in the village.
PROJECT MANAGEMENT	8. Risk mitigation	What are the risks of this proposal? How will you ensure you gain their support?	People might not be good in convincing water. We will convince the community to get to work!
	9. Workplan	What time and budget does this proposal require?	2 years. £50k.
	10. Timeline	What is the timeline for your proposal? How will you ensure you gain their support?	Change projects. Educators. DEBONNUS. UNESCO.

Proposal 0.1

- 'Vegetation Impact'
- 'Flood Hazard Map'
- 'Off the Roof'
- 'Rapid Topographical Decision Support Tool'
- 'Think First'
- 'Water Viz'

'Vegetation Impact' Proposal 0.1



Proposal 0.1

IDEA

VEGETATION IMPACT

1. Challenge

What is the humanitarian problem you are trying to solve?

- reduce erosion
- improve infiltration
- reduce compaction

2. Solution

What is your proposed solution?

To utilise a variety of local plants & trees that have progressive and complementary impact.

(- must have financial, social benefits
- Education components to buy it, uptake, ownership)

3. Impact

Why is this so exciting?

What is the potential impact of this innovation?

Environm. friendly
livelihood, living conditions,
biofuel, long term → most com.

INNOVATION PROCESS

4. User-participation

Who will use this solution?

Who will benefit from it? *general public*

How will these people be involved in developing and testing?

community / displaced
with support from
external partners
local government,
agencies

5. Learning and adapting

How soon can you start testing this idea out?

What is the most basic version of the solution you can test with users?

How will you adapt your original idea as you gain new information?

straight away

6. Building evidence

How will you know if your solution works (refer to Impact criteria)?

What will you need to measure success? How will data be collected (key metrics, methods)?

• been done before
(in certain contexts)
↳ urban settings
↳ Campsites

7. Uptake and scale

If this solution is successful how will you encourage others to adopt it?

Who might implement and pay for this innovation at scale?

UNHCR
long term
funding partners
WWF

PROJECT MANAGEMENT

8. Risk Mitigation

What might go wrong during this project?

How do you plan to monitor and guard against these risks?

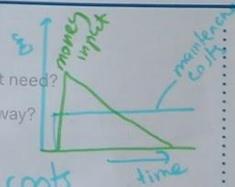
- ↳ maintenance
- ↳ wrong selection
- ↳ vector risks

9. Workplan

What time and budget does this project need?

What are the key milestones along the way?

ongoing funds
for maintenance costs



10. Team

What skills and expertise do you need in your team?

Which organisations will you need to partner with?

ECO - stuff

'Vegetation Impact' Proposal 0.1 – Feedback



Proposal

'Vegetation Impact' uses context appropriate plants grown alongside drainage infrastructure to reduce surface water pooling and damage to soil. The plants can also have secondary functions such as foods, or as biofuels and can encourage greater ownership of public space.

Feedback

- Positive feedback, easy to anticipate an impact, even if this is likely to be in the long-term.
- Find plants that work in any type of soil.
- The plants must be chosen carefully and be context specific (use local plants), but be wary of the potential for invasive species. A mixture of plants is more likely to be successful.
- It doesn't have to be a market garden, it could just be a fast growing plant to address the drainage issue.
- Daniel Smith (Daniel.Smith@rhdhv.com) knows a company in Wales that does something similar and could offer support.
- Consider the risk of trees being chopped off for firewood.

Interested in collaborating on this project

Paul Culleton: paulculleton@epg-ltd.co.uk

Tom Young: tom.young@stri.co.uk

Samad: samad.arshad@cambridgedevelopment.org

'Flood Hazard Map' Proposal 0.1

Proposal 0.1

FLOOD Hazard Map

IDEA

1. Challenge

What is the humanitarian problem you are trying to solve?

- Identification of flood risk areas
- A road flood design

- How to allow non-proprietary to use tools

2. Solution

What is your proposed solution?

- (Modelling Tools / Data)
- Flood hazard maps

3. Impact

Why is this so exciting?

What is the potential impact of this innovation?

- Multiple uses at risk
- Multiple users of SW tools
- Openly Data
- High level overview
- User

INNOVATION PRO...

4. User-participation

Who will use this solution?

Who will benefit from it?

How will these people be involved in developing and testing?

- Local knowledge / expertise
- local data collection
- Review - validation (some users)

5. Learning and adapting

How soon can you start testing this idea out?

What is the most basic version of the solution you can test with users?

How will you adapt your original idea as you gain new information?

- Training workshops - vision of approval + studies
- A dash models based on new data input - on site team - no hydrology / updates
- Validation fundamentals

6. Building evidence

How will you know if your solution works (refer to Impact criteria)?

What will you need to measure success? How will data be collected (key metrics, methods)?

- Local intel / knowledge
- Suitable users

7. Uptake and scale

If this solution is successful how will you encourage others to adopt it?

Who might implement and pay for this innovation at scale?

- Transfer solution
- Transferable modelling
- Some address change data

PROJECT MANAGEMENT

8. Risk Mitigation

What might go wrong during this project?

How do you plan to monitor and guard against these risks?

- No model robustness
- Hydrological input data
- Modeller's programme - training
- Budget for data analysis
- Transport costs

9. Workplan

What time and budget does this project need?

What are the key milestones along the way?

- 4-5 Weeks for site model
- Milestones:
 1. Data collection
 2. Data analysis
 3. Data processing
 4. Validation
 5. Data updates

10. Team

What skills and expertise do you need in your team?

Which organisations will you need to partner with?

- Modeller
- Planner
- Hydrologist

'Flood Hazard Map' Proposal 0.1 – Feedback



Proposal

'Flood Hazard Map' uses modelling tools to identify areas of flood risk in prospective camp sites so that good drainage decisions can be made. It will also incorporate local knowledge and training sessions to increase user buy-in and improve the specificity of the map.

Feedback

- Rainfall data is easy to get, but what about surface runoff or soil infiltration capacity?
- The ability to explain this information visually would be a strong advantage and make communication and collaboration easier.
- This visual approach could become a way of transferring information to a different sector.

Interested in collaborating on this project

Diganta Das: d.b.das@lboro.ac.uk (offered help with channel flow and soil infiltration rates)

'Off the Roof' Proposal 0.1

Proposal 0.1

Off the Roof

IDEA

1. Challenge

What is the humanitarian problem you are trying to solve?

- REDUCE WASTE WATER
- REDUCE HANDWASHING
- ENHANCE STWEL
- REDUCE WATER TRANSPORT
- IMPROVE HEALTH

2. Solution

What is your proposed solution?

- USE RAINWATER FROM SHOWER/LATRINE ROOFS TO FOR IMPROVED HYGIENE
- BETTER COLLECTION A SMALL (HOUSEHOLD) TANK

3. Impact

Why is this so exciting?

What is the potential?

Run-off rates are reduced

- HOLISTIC
- FLEXIBLE
- IMPROVE HEALTH

- FEMALE PRIVACY

INNOVATION PROCESS

4. User-participation

Who will use this solution?

Who will benefit from it?

How will these people be involved in developing and testing?

- HOUSEHOLDS / USER FOCUSED
- DEVELOPING DESIGN / PROTOTYPING

LOCAL MADE OR KIT (context dependent)

5. Learning and adapting

How soon can you start testing this idea out?

What is the most basic version of the solution you can test with users?

How will you adapt your original idea in new information?

KIT with integrated gutter + container

6. Building evidence

How will you know if your solution works (refer to Impact criteria)?

What will you need to measure success? How will data be collected (key metrics, methods)?

HEALTH improved. ↳ dignity FHM/users

7. Uptake and scale

If this solution is successful how will you encourage others to adopt it?

Who might implement and pay for this innovation at scale?

MICRO-SCALE

PROJECT MANAGEMENT

8. Risk Mitigation

What might go wrong during this project?

How do you plan to monitor and guard against these risks?

- AGENCY - POPULATION NOT INTERESTED
- AVIAN FLU
- SYSTEM WILL ONLY WORK DURING RAINY SEASON -> DRAINAGE SYSTEM

9. Workplan

What time and budget does this project need?

What are the key milestones along the way?

- COULD BE TRIED ON SMALL SCALE IMMEDIATELY

10. Team

What skills and expertise do you need in your team?

Which organisations will you need to partner with?

- plastic moulding
- 3D printing

'Off the Roof' Proposal 0.1 – Feedback



Proposal

'Off the roof' uses rainwater collected from shower and latrine roofs for hand washing and showering. It will reduce wastewater, increase hygiene through facilitating hand washing and showering, and reduce the need for importing water.

Feedback

- Great initiative and great project, but further evidence is needed to demonstrate that it can lead to significant reductions in surface water pooling (e.g. to what extent does it reduce water accumulation rate?)
- Keep it as simple as possible and don't try to solve all problems at once.
- Linking rainwater harvesting and hand washing is innovative; it also has potential to work as you only need a small amount of water for hand washing.
- This approach also means that you no longer have to bring water in the camp (or you significantly reduce the amount brought in).
- Suggestion - include the solution as part of the construction of a tent.

Interested in collaborating on this project

Martin Lambley: martin.lambley@wavin.com

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Neil Robinson-Welsh: Neill@storm-water.co.uk

'Rapid Topographical Decision Support Tool' Proposal 0.1

Proposal 0.1 Rapid Topographical Decision Support Tool



IDEA

1. Challenge

What is the humanitarian problem you are trying to solve?

Locating drainage channels in relation to local topography

2. Solution

What is your proposed solution?

Quick, detailed site mapping before site construction

3. Impact

Why is this so exciting?

What is the potential impact of this innovation?

Map would be useful for a high number of people

INNOVATION

4. User-participation

Who will use this solution?

Who will benefit from it?

How will these people be involved in developing and testing?

Camp planners
WASH

5. Learning and adapting

How soon can you start testing this idea out?

What is the most basic version of the solution you can test with users?

How will you adapt your original idea as you gain new information?

ASAP

6. Building evidence

How will you know if your solution works (refer to Impact criteria)?

What will you need to measure success? How will data be collected (key metrics, methods)?

Decrease in standing water
Effective Drains

7. Uptake and scale

If this solution is successful how will you encourage others to adopt it?

Who might implement and pay for this innovation at scale?

Case Study
Photobits

PROJECT MANAGEMENT

8. Risk Mitigation

What might go wrong during this project?

How do you plan to monitor and guard against these risks?

Flooding
Not accurate enough

9. Workplan

What time and budget does this project need?

What are the key milestones along the way?

£50K

10. Team

What skills and expertise do you need in your team?

Which organisations will you need to partner with?

MAP action
GIS beds
Ground Mapping Team

'Rapid Topographical Decision Support Tool' Proposal 0.1 – Feedback



Proposal

'Rapid Topographical Decision Support Tool' creates quick, detailed camp site maps before construction to allow the ideal location of drainage channels to be identified. This may be done through the use of drones, Geographic Information Systems or ground mapping teams.

Feedback

- Be cautious when using the phrase 'decision support'; some may see it as disempowering.
- The solution may give you 'good enough' data for drainage, but in some cases (e.g. flat land) this may not be detailed or accurate enough.
- Could be cheaper than existing methods of using drones or survey teams.
- Civil engineers, for example those constructing highways, may have technologies or tools that could be adapted.
- The format of the tool needs to be appropriate for the users and their level of skills and technical knowledge.

'Think First' Proposal 0.1



Proposal 0.1 - THINK FIRST

IDEA

1. Challenge

What is the humanitarian problem you are trying to solve?

PROVISION OF A HIGH LEVEL FRAMEWORK OR PHILOSOPHY FOR CONSIDERING SURFACE WATER MANAGEMENT. FOR FINANCIAL INVESTMENT REVIEW OR APPROVALS/COMPARISONS

ASSES SURFACE OF CONDITIONS FOR THE SITE

INNOVATION PROCESS

2. Solution

What is your proposed solution?

USE ESTABLISHED FRAMEWORK APPROACHES USED IN UK WA, SA FOR THE DESIGN AND PLANNING OF DRAINAGE AND TEST APPROACHES IN A HUMANITARIAN CONTEXT

3. Impact

Why is this so exciting?

What is the potential impact of this innovation?

REDUCES RISKS TO HEALTH SAVES MONEY. PRE-TEST CAN HELP DELIVER MULTIPLE BENEFITS

4. User-participation

Who will use this solution?

WASH CAMP PLANNERS/ WASH TECHNIQUES
HOW TO INFORMING DECISION MAKERS
ORGANISATIONAL (BEAN CANNERS OF COST EFFICIENCY) ETC

5. Learning and adapting

How soon can you start testing this idea out?

What is the most basic version of the solution you can test with users?

How will you adapt your original idea as you gain new information?

CHECK IT AGAINST EXISTING CAMPS
FIND APPROPRIATE STAKEHOLDERS TO PEER REVIEW
LOOK AT COSTS FOR DESIGN VS RECONSTRUCTION TO FIX PROBLEMS

6. Building evidence

How will you know if your solution works (refer to Impact criteria)?

What will you need to measure success? How will data be collected (key metrics, methods)?

OBTAIN FEEDBACK FROM USERS.
FEEDBACK WILL RELATE TO PROBLEMS

7. Uptake and scale

If this solution is successful how will you encourage others to adopt it?

Who might implement and pay for this innovation at scale?

SHOW HOW THE IMPACTS ARE BEING FELT
ENSURE USE BY AGENCIES, UNICEF

PROJECT MANAGEMENT

8. Risk Mitigation

What might go wrong during this project?

How do you plan to monitor and guard against it?

DIFFICULTY ACCESS
COST / IMPACT INFO FROM EXISTING CAMPS TO AID MODELLING

USE PRIVATE SECTOR SUSTAINABILITY & COST BENEFIT ANALYSIS TO PROCESS AVAILABLE DATA

9. Workplan

What time and budget does this project need?

What are the key milestones along the way?

10. Team

What skills and expertise do you need in your team?

Which organisations will you need to partner with?

PLANNERS, ENGINEERS, BEANS MANUFACTURERS,
UNICEF

'Think First' Proposal 0.1 – Feedback



Proposal

'Think First' is a high level framework for considering surface water management in emergency camp planning. It uses known drainage techniques and considerations to aid camp planners in making decisions about camp site construction, and to ensure that drainage is considered in the process.

Feedback

- Giving people the opportunity to ask the right questions, rather than giving them answers is empowering. However, this assumes that users will already have a lot of knowledge in order to know what questions to ask.
- Check and see if the knowledge needed to build the tool is already available.
- Similar to the '[Where there is no doctor](#)' handbook, this tool could become something like a guidelines for 'Where there is no hydrologist'.
- The solution could be part of a bigger picture, could be more holistic than just drainage.
- It would be great if this could become a standardised tool that agencies use and promote.

Interested in collaborating on this project

Paul Shaffer: paul.shaffer@ciria.org

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Neil Robinson-Welsh: Neill@storm-water.co.uk

Paul Culleton: paulculleton@epg-ltd.co.uk

'Water Viz' Proposal 0.1

Proposal 0.1

Planners
influence decision makers

IDEA "WATER-VIZ"

~~1. Introduction~~ 2. Solution

What is the humanitarian problem you are trying to solve?

Surface water visualisation using integrated suite of technologies (e.g. DRONES/LIDAR, GIS, APPS, etc.)



~~2. Solution~~ 1. Challenge

What is your proposed solution?

Lack of appropriate surface water management and information paucity out in the field.

3. Impact

Why is this so exciting?

What is the potential impact of this innovation?

Rapid solution implementation due to easier access to info./data from various sources (e.g. topography, soil types, hydrology, hydrosystems).

INNOVATION PROCESS

4. User-participation

Who will use this solution?

Who will benefit from it?

How will these people be involved in developing and testing?

Field based Engineers, Wat/San Practitioners.
- They will be used to field test technical solns.

5. Learning and adapting

How soon can you start testing this idea out?

What is the most basic version of the solution you can test with users?

How will you adapt your original idea as you gain new information?

ASAP. Web based user interface / off-line system for field testing
Layers library will be developed - Link to FLOODMAP?

6. Building evidence

How will you know if your solution works (refer to Impact criteria)?

What will you need to measure success? How will data be collected (key metrics, methods)?

If the visualisation techniques influence decision makers in site planning activities.

7. Uptake and scale

If this solution is successful how will you encourage others to adopt it?

Who might implement and pay for this innovation at scale?

Create a web site to showcase field studies, and follow-on responses to system outputs. Open Access/open source. INGOs? would be involved.

PROJECT MANAGEMENT

8. Risk Mitigation

What might go wrong during this project?

How do you plan to monitor and guard against these risks?

Bringing together various experts on DRONES/LIDAR, GIS, APPS, etc.

9. Workplan

What time and budget does this project need?

What are the key milestones along the way?

£50k approx. for augmented reality 3D version.
£20k for 2D version.
12 to 18 months including case/field studies.

10. Team

What skills and expertise do you need in your team?

Which organisations will you need to partner with?

DRONES/LIDAR EXPERT. GIS system Experts.
APPS EXPERT.
R&D Experts. Wat/San Engineers & Planners.
Field Practitioners.



'Water Viz' Proposal 0.1 – Feedback

Proposal

'Water Viz' is an app that allows visualisation of surface water drainage issues by integrating information from a suite of technologies including LIDAR, drones and GIS. This will allow people to make sense of a wide range of information types, and avoid issues of language barriers by focussing primarily on visual information.

Feedback

- The idea of communicating information visually is very appealing in terms of bypassing language and expertise barriers.
- Consider who the users will be, and how to present the information in an accessible format.
- The app will need to have a basic simplifying interface. It should be able to translate ground information into actionable information for operators with limited technical expertise.
- The app will require very large amounts of data.
- To address the challenge of having to process a large amount of data, the app could initially rely on already processed information. Developments in artificial neural networks could provide a solution, but they may take a long time to develop into robust alternatives.

Appendix 1

The following slides include all the remaining ideas that were proposed on the day for the **Knowledge Access Challenge**.

- 'Prepare for refugee movements'
- 'Camp evolution'
- 'Costing for beginners'
- 'Holistic training for humanitarians'
- 'WASH Labs'
- 'Lightbulb – Collection of best practice'
- 'Mind the Knowledge Gap'
- 'Skill sharing without borders'
- 'WASH Town Hall'
- 'Flood Risk Reduction Network'

Ideation Sheet

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

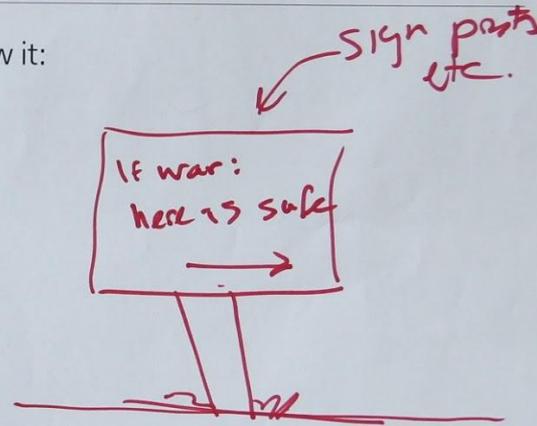
Community Education
AND INCENTIVES
before displacement happens.

'Just in case'

subtly direct to the right location
of "spontaneous
settlement".

DISASTER RISK REDUCTION

Draw it:



Name it: Prepare for refugee movements "Nudging the movement."

Ideation Sheet



1. Knowledge Access Challenge

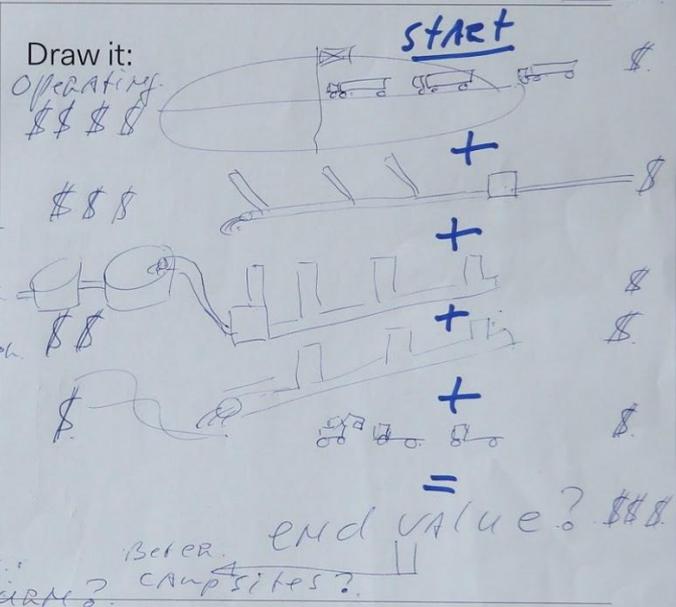
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- **space?** **emergency** **Needs?** for instance
- evolution **phase 1** drinking water network.
- 2 sewage network
- 3 drainage network
- 4 facilities.
- 5 Q & W.
- sustainable AND efficient.
- **Situations:** **Better.** **camp sites?**
- **WHAT will be left if refugees return?**

Draw it:



Name it:

• **CAMP evolution**
 (Added value: CAMP → other street)

Ideation Sheet

6

1. Knowledge Access Challenge

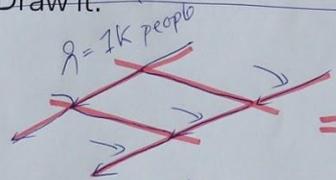
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- QUANTITATIVE SURVIVING TOOLS TO HELP COST DRAINAGE SOLUTIONS QUICKLY
- SCENARIO-BASED TO ENABLE DIFFERENT ESTIMATES QUICKLY

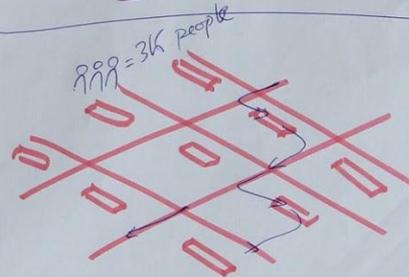
Draw it: PLAN



COST

= \$

888 = 3K people



= \$\$\$

Name it: COSTING FOR BEGINNERS.

Ideation Sheet

5

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

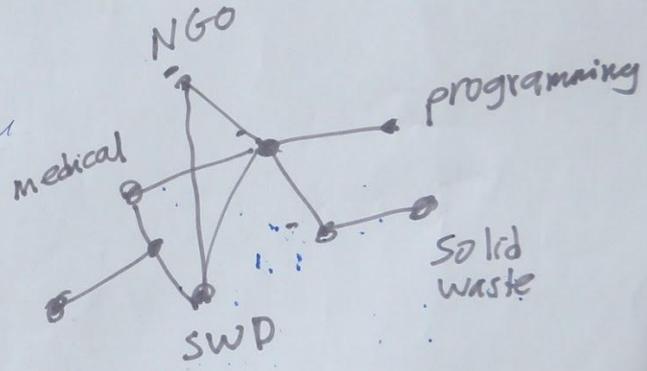
Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- The definition of the problem:*
- look for technical expertise on different, but limited topics - hydraulics
 - community involvement - solid waste management etc.
eg - throwing waste away
 - maintenance round their houses
 - Humanitarian agencies → knowledge of field practices
 - Understanding of cost issues

Institutional change
engineering + cultural, education
technical social economic

Draw it:



Name it: **Holistic training for humanitarians**

Ideation Sheet

5

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- Show homes - including Wash facilities ~~total population~~ • IDP's, ~~to~~ see ^{could} and test the Wash facilities that ~~could~~ be provided, and how it could benefit them.
- Community leaders we show ~~them~~ test homes ~~for~~ by Field Agents and we asked ~~the~~ about their desires and concerns concerning the WASH facilities.

Draw it:



Name it:

WASH Labs.

Ideation Sheet

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

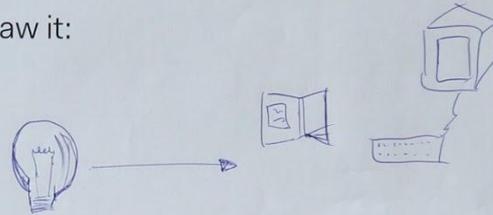
Application of knowledge from the UK and overseas in terms of practice, processes and products for sustainable drainage (SuDS)
Could be context specific in terms of application

It could be relevant for planning and design.

It will be focussed on the planning and design of low cost sustainable and adaptable solutions.

Output could be guidance, fact sheets, website, quasi decision support.

Draw it:



Name it:

Collection of 'best practice'
'LIGHT BUILD'

Identification of knowledge & expertise in camps
and empower them to deliver local solutions

Ideation Sheet

3 ● ●

1. Knowledge Access Challenge

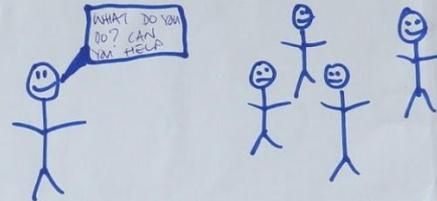
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- UNDERSTAND SKILLS, KNOWLEDGE, ABILITIES OF PEOPLE. OBTAIN REGISTER / SURVEY (POSSIBLE VIRTUALLY)
- UNDERSTAND REQUIRED SKILLS
- EXPLAIN TYPICAL TASKS / ACTIVITIES REQUIRED FOR SLD. (TRADES, SKILLS, E.g. FARMER). PHYSICAL, INTELLECTUAL
- COORDINATED APPROACH FOR EMPLOYMENT
 - PROMOTION OF INFO PACK (FOR INFO LAUNCH)
 - TRAINING FORMALISED WITH CERTIFICATION
- KNOWLEDGE TRANSFER / EXCHANGE SUPPLEMENTED BY EXTERNAL HELP

Draw it:



Name it:

DOING THE KNOWLEDGE, MIND THE KNOWLEDGE GAP

Ideation Sheet

3

1. Knowledge Access Challenge

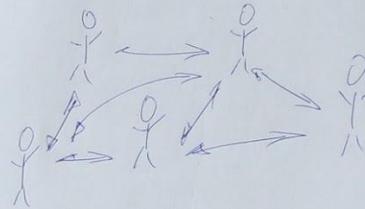
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- ① Stakeholder analysis
 - decision makers
 - internal / external
 - expertise + non-expertise
 - development + humanitarian
 - urban + rural
 - skills
- ② Share + network.
- ③ Supported decision-making

Draw it:



Name it: Skill sharing with borders.

Ideation Sheet

1. Knowledge Access Challenge

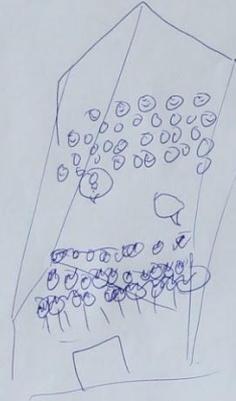
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Town hall events at campsites.
Before rainy season.
Allow discussion of planned drainage solutions.
Community is able to influence and bring into decisions on drainage.

Draw it:



Name it: WASH Town Hall.

Ideation Sheet

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

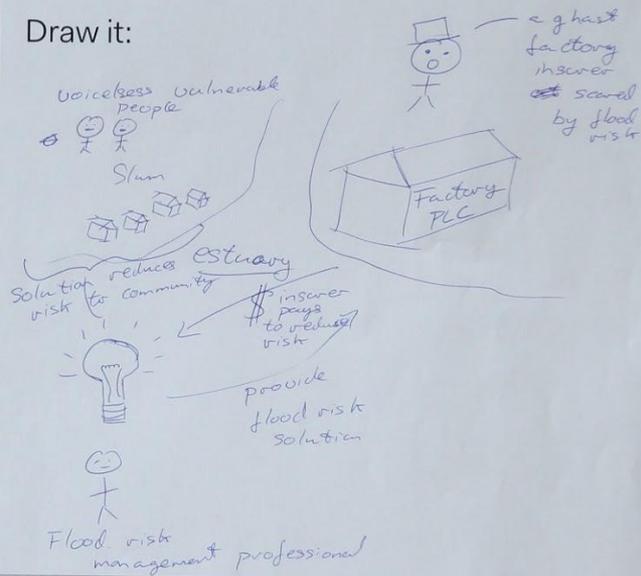
Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Network stakeholders with large financial stake in risk reduction (i.e. reinsurance companies, large business owners, & infrastructure asset owners)

with stakeholders that can deliver solutions to provide protection to vulnerable stakeholders

Draw it:



Name it: ~~at~~ Flood risk reduction network

Appendix 2

The following slides include all the remaining ideas that were proposed on the day for the **Drainage Solutions Challenge**.

- 'Reverse borehole'
- 'Valuable infrastructure for future use'
- 'Core-shell particulate for health management'
- 'Creata Tank'
- 'Rain water harvesting for temporary housing'
- 'Superpump'
- 'Evaporation Pans'

Ideation Sheet



1. Knowledge Access Challenge

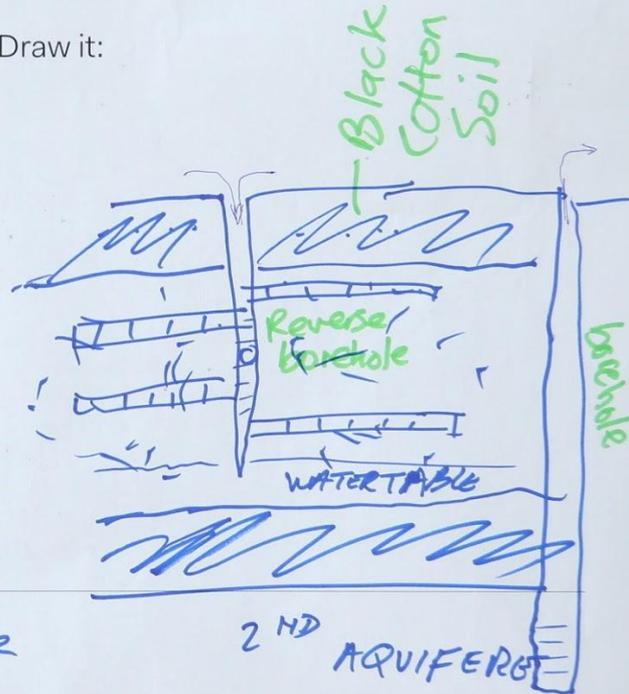
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Research for black cotton soil solution
is it viable?
has it been done?
what are costs? \$
how to avoid contamination

Draw it:



Name it: Reverse borehole

Ideation Sheet

1. Knowledge Access Challenge

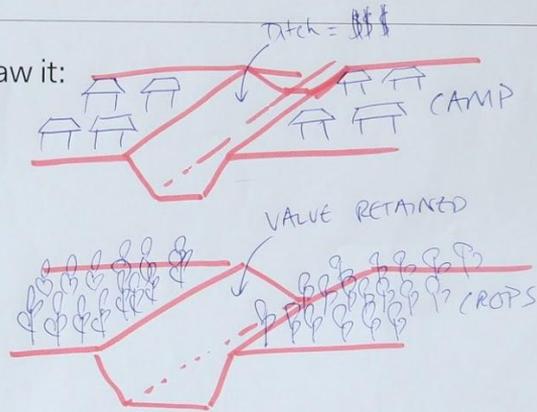
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- THINKING ABOUT HOW CAMP DRAINAGE INFRASTRUCTURE COULD BE RE-USED AFTER THE CAMP IS DISMANTLED
- DRAINAGE DITCHES COULD BECOME IRRIGATION CHANNELS,
- VALUE IS NOT LOST, GREATER INVESTMENT CAN BE JUSTIFIED

Draw it:



Name it: 'VALUABLE' INFRASTRUCTURE FOR FUTURE USE

Ideation Sheet

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

3

Describe it:

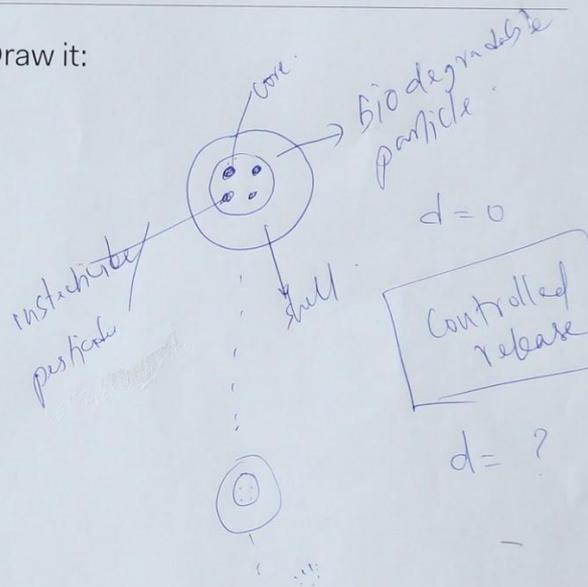
(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Encapsulating chemical/s to form particles for insecticide.

↳ controlled release of chemicals.

↳

Draw it:



Name it:

Core-shell particulate for health management

Ideation Sheet

3

1. Knowledge Access Challenge

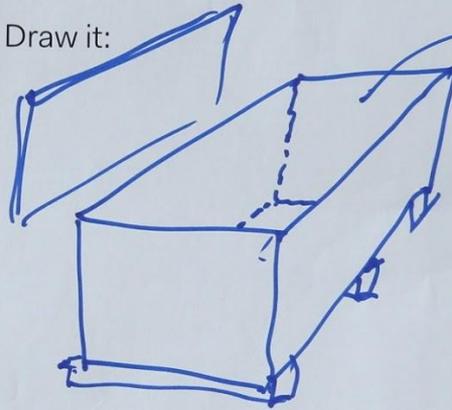
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Do not waste any material delivered to site. Utilise the crate as a tank in the Emergency phase.

Draw it:



either
internal
lining
or butyl

Name it:

C R A T A T A N K

Ideation Sheet

3

1. Knowledge Access Challenge

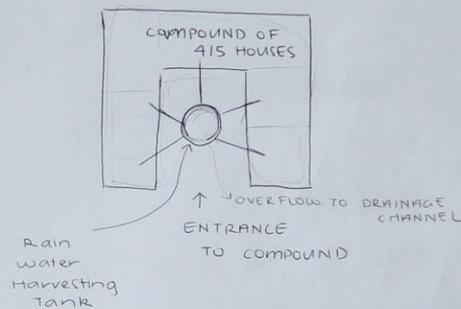
2. Drainage Solutions Challenge

Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

- use of rainwater that falls directly on the site for ^{non-drinkable} water supply.
- Standard design for emergency shelter that takes into account ~~rain~~ RWH possibilities
- Planners / ~~as~~ residents
- Reduce quantity of water discharging to surface water channels. / overflow for extreme rainfall events (ence ~~o~~ needs to be used in combination with other solutions)

Draw it:



Name it: RAINWATER HARVESTING ~~IN~~ FOR TEMPORARY HOUSING.

Ideation Sheet

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

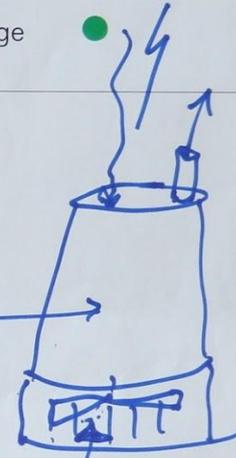
Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

Special pump development
with impeller choices
to deal with "rough,
solids/water mixes".

Draw it:

Submersible
pump.



Special impeller

Name it: Superpump.

Ideation Sheet

1. Knowledge Access Challenge

2. Drainage Solutions Challenge

2

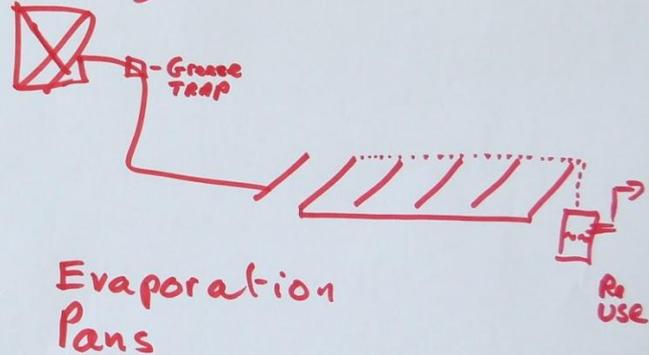
Describe it:

(What is it? How does it work? Who is it for? Where and when will it be used? What is its impact?)

→ Solar evaporation →
solar still → condense H₂O
for drinking

Draw it:

TAPSTAND



Name it: **Evaporation Pans**