HUMANITARIAN INNOVATION FUND

Final Report

- Please try not to exceed 5 pages (Arial, 12pts) excluding attachments –

Reference Number	HIF/L/2012-3/118
Organisation Name	Université Laval

Project Title	The “Oxfam Origami” Inclined Plate Settler
Location	Quebec City (Canada) and Pune (India)
Start Date	September 2012
Duration	18 months + 8 month NCE
Total Funding Requested	£ 107,341

Partner(s)	Oxfam GB
Total Funding	£ 144,655 (£ 37,314 in contributions – 25%)

Innovation Stage	Development
Type of Innovation	Product/process
One sentence description of the innovation	A novel water treatment kit will improve water supply whilst increasing its cost-effectiveness by a factor of 20.
Project Impact Summary	This innovation addresses the inadequacies of current water treatment technologies, which are not aligned with humanitarian objectives; resulting in expensive and sometimes ineffective relief. The Oxfam Origami will provide a fit-for-purpose water treatment technology improving the level of service provided in a cost-effective manner.

Reporting Period	Q6 Final report
Total Spent	£ 107,341

ACTIVITIES CARRIED OUT

Describe all the activities carried out.

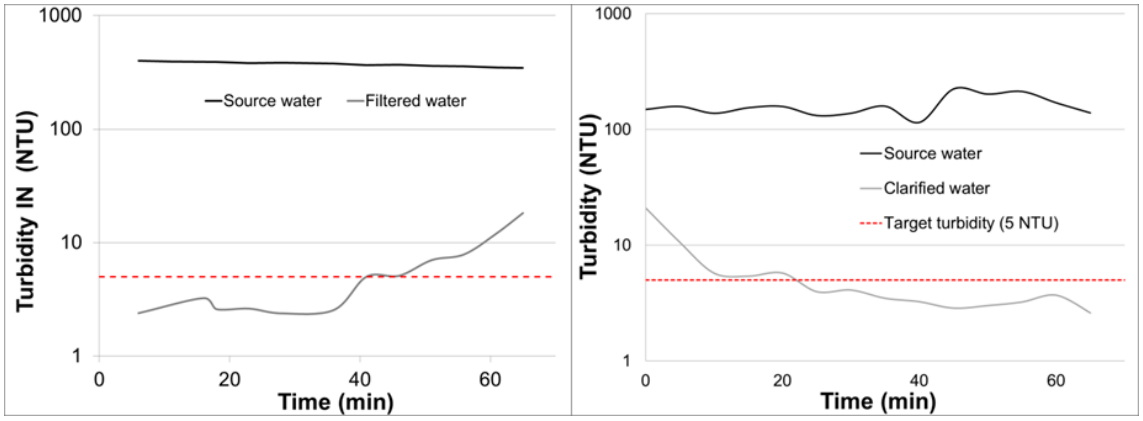
- Extensive testing of a small-scale prototype at ULaval to optimise the design of the inclined plate settler;
- Design of final product;
- Manufacturing of final version of the inclined plate settler in Pune (India);
- Dissemination activities.

ACHIEVEMENTS

Describe all the results achieved through the activities indicated above and indicate if the project achieved the objective set out.

The inclined plate settler was proposed as a fit-for-purpose system that could attain drinking water quality recommendations as defined by the Sphere Project. Furthermore, the system was designed so as to guarantee a continuous production of drinking water even when source water quality deteriorated. This factor (i.e. high levels of raw water turbidity) typically severely limits the performance of current systems; which was one of the limitations that this innovation sought to overcome.

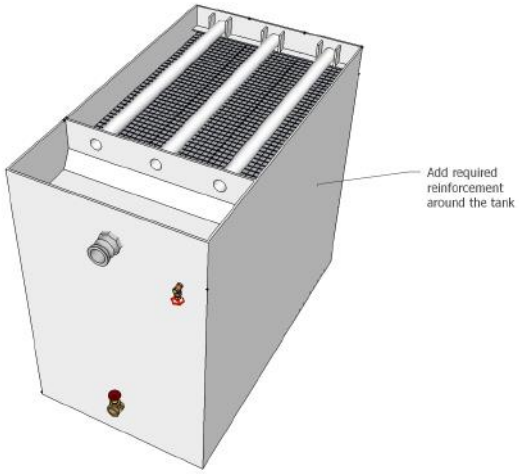
Evidence of the inclined plate settler system's relative success can be evidenced from the figures below. To the left is a typical performance profile of the system's treatment capacity. One can notice that relatively high source water turbidities can, within a few minutes of operation, be reduced to below 5 NTU, which is the target recommendation of the Sphere Project.



To the left you have the typical performance of a pressure filtration unit commonly used in emergencies. As you can see, in comparable turbid (i.e. cloudy) source waters, the filtered water quality quickly deteriorates. This would normally mean the unit needs to be taken out of service to be backwashed (i.e. cleaned) before being put back online. Whereas, to the left we have a typical performance curve of the inclined plate settler we developed. As you can see, the water quality may start off a bit worse, but with time it improves and is stable. In this case the inclined plate settler can be run for several hours before needing

to be serviced. In fact, during our tests we have run it for several days and we did not have to service it. The robustness and stability of the treated water quality are characteristics one should look for in an emergency water treatment system.

Below is a picture (left) of the final system still requiring the final touches, which have not yet been done at the time of writing. Anyhow, the image to the right depicts what the final system should look like.



METHODOLOGY

Describe how the methodology used was or wasn't appropriate to carry out the activities or achieve the objectives set out.

We believe that the adopted methodology was appropriate. By including the Sphere Project water supply recommendations as treatment targets for the inclined plate settler, it was rather straightforward to collect evidence of the system's performance. These parameters were all relatively well-defined by conventional (non-emergency) water treatment; which facilitated its measurements.

MAJOR OBSTACLES

Describe all the obstacles faced during the implementation of the project and how they affected the planned activities and results. Indicate what steps have been taken to address these obstacles. Indicate whether amendments to the planned activities and objectives have been made.

Initially, we had hoped to do the largest part of the required testing in India. However, we found that the fine tuning that was warranted to optimise the system had to be done in Canada. Although we had already planned for some aspects of the work to be done in Canada, it was the well-controlled test conditions and better instrumentation available at the Université Laval that was a

decisive factor to this. Although this was not a major change in the experimental approach, we believe it paid dividends as the final design was optimised in a way that would not be possible in India.

We have had to do some significant changes in our original design that seem to have paid off. That is, we originally set off to develop the inclined plate settler as a collapsible unit. Our initial testing revealed difficulty to attain adequate water quality (as defined by the Sphere Project). This was mainly due to the hydraulic inefficiency due to the non-straight settler walls. Incidentally, we were in touch with Spanish Action Against Hunger, who as we learnt, were also developing a similar type of technology. However, the difficulty in attaining adequate water quality was also shared by them. In light of this and in discussions with our humanitarian project partners, it was decided to slightly modify our original plan. The reasoning was to not compromise the treatment system efficiency, as the collapsibility would only render advantages with regards to the system's transportability. In most cases, this is not a relatively major logistical hurdle; particularly considering that once installed, such systems are rarely displaced. Thus, the decision was made to further develop the system as a rigid one.

BENEFICIARIES/HUMANITARIAN INTERVENTIONS IMPACTED

Indicate the beneficiaries as well as the humanitarian interventions that have benefited from the project.

No beneficiaries have directly benefited from the innovation as of yet. We have not yet managed to deploy the inclined plate settler in an emergency situation. We had hoped to test the first prototype in the Typhoon Haiyan response, but logistical constraints did not permit so. However, we're planning for the system will be tested in such conditions during the diffusion stage. Also, it is worth mentioning that most of the testing we conducted in India was done in simulated field conditions in which we could vary the water quality. So, we expect our positive results to be reproduced when the inclined plate settler gets field tested.

PARTNERSHIPS AND COLLABORATION

Describe the partnership arrangements and how these may have changed during the course of the project.

There were no major changes to the partnership arrangement during the project. However, one of our original industrial partners (Aquaplus – Pune, India) did undergo a change. Aquaplus has changed its name to Easol. This modification is mainly due to a change in the company's partnership. However, this did not result in a change of business model, nor interest in the project.

DISSEMINATION

Indicate the steps taken to disseminate project findings/outputs to outside stakeholders.

Outcomes of the project were disseminated in several fora with different audiences. Both international and regional conferences were targeted. Results were presented internationally at the WEDC conferences in Nakuru (2013) and Hanoi (2014), as well as in the IWA Development Conference in Nairobi (2013). Regionally, dissemination was done at the Canadian Association of Water Quality Conference in Kingston (2013), as well as during the American Water Works Association Water Quality and Technology Conference in Toronto (2012). These conferences were attended mainly by practitioners and academics. In addition to this, in 2013 project results were presented at the Interagency Meeting attended by Oxfam.

It is also worth noting that our project won the International Water Association's Project Innovation Award-Development 2013.

TRANSFERABILITY

Please indicate if there is any potential to replicate the project and how.

Innovation scale-up will depend on its use by relief agencies. To date, there has been an expressed interest from Oxfam and the IFRC. We are seeking to apply for a diffusion grant to aid in the uptake by demonstrating the system's performance in the field in an emergency situation.

Since the inception of the project we have been working closely with our industrial partner to ensure the continuity of the project. A ULaval we have been behind most of the design of the system. We would like to continue our work with our industrial partner and handover the "knowhow" behind the project so that they can have more ownership of the project.