EUROPEAN COMMISSION
DIRECTION GENERALE POUR L'AIDE HUMANITAIRE & LA PROTECTION CIVILE
Regional Support Office for East and Southern Africa (Nairobi)

RAPPORT DE MISSION

Subject: **Kenya WASH RSO Mission (WASH in camp, *Dadaab camps: Ifo 2, Dagaley, Hagadera*)**

Auteur: **Jerome BURLOT (WASH Adviser/RSO Nairobi)**

Date: **Du 06 au 09 November 2015**

Main partners and visited sites list:

Dadaab (accompanied by Jean Marc Jouineau ECHO TA Somali refugees):

- UNHCR: Osman Ahmed (WASH officer)
- CARE: Thomas Marori (WASH Coordinator) and his team, Rod Volway (Area Manager),
- KRC: Philippe Oditi (WASH Coordinator) and his team
- NRC: Patrick Okello (WASH Manager), John Macharia (WASH Coordinator) and his team

Appendices list:

- 1: Energy economic analyzes report, 2014. UNHCR
- 2: WASH strategy 2013-2016 Dadaab
- 3: Log profile borehole
- 4: Drainage project lay out

Table of Content

[1] International Federation of the Red Crescent and Red Cross society

1. EXECUTIVE SUMMARY

During the mission only 3 among the 5 camps of Dadaab have been visited. The visit of Ifo2 in particular was very fast and did not allow us to get a relevant picture of what is going on in terms of sanitation and hygiene promotion.

The WASH situation in Dadaab is close to correct in general. The water access is globally in the standard. Within the sanitation sub sector, the latrine coverage still need to be slightly improve but the problem remains the lifespan of the structure and the capacity for the users of latrine to manage the facilities on themselves since the pit is filled up. The solid waste component since partners stopped to pay the communities people to clean the environment of their habitat is somehow the most of concern and especially with the plastic bags spread all over the camp (with already some animals eating it and dying).

A lot of improvements have been made in terms of standardization of equipment, water table and solar installation monitoring or water metering. The most significant improvement has been made in cost reduction of the operation and community approach/contribution.

The main cost reduction came from the save made on fuel and the reduction of incentive payment/workers.

The save on fuel came is mainly due to:

1. The solarization of BH[2]
2. The reduction of water pumping (water access was far over the standard)
3. The measure taken to avoid fuel diversion

The save for the whole Dadaab on fuel is about almost 495 000 USD per year, which is quite significant.

The save from reduction of incentive payment came mainly from:

1. Stopping of incentive payment for environmental cleaner
2. Reduction of hygiene promoter
3. Reduction of the amount of incentive in general

The total save only for the 3 camps visited on incentive is about 162 000 USD/year.

Given the significant amount of save, and given that Dadaab exist for more than 20 years, we can be a bit wandering was those improvement on cost efficiency of the operation haven't been progressively made before. The strategy of cost reduction begins mainly in 2013-2014, then to catch up the time waste it has been a bit brutally implemented, considering the habits taken by the targeted population.

Despite of those highly appreciable improvements there are still issues to handle and need of fine tuning. The main issues highlighted by the visit were:

[2] Borehole

- Improvement of the chlorination system in order to ensure regulation of the clorination rate by the flow of water on the pipe as the flow rate when using solar energy to pump will varies along the day and the year.
- Improvement in cost efficiency to size solar panel needs
- Implementation of a system to ensure regular and efficient cleaning of the solar panel
- Improve internal monitoring in general and documentation (history of breakdown…)
- Improve the solid waste issues (plastic bags spread all over the camps)
- Improve harmonization in terms of incentive and quantity of incentive workers per camps
- Improve the strategic vision and capacity building for latrine management to ensure self-reliance of the population at some stage. Improve supervision and capacity building in particular on the decommissioning and reuse of materials.
- Improve in general the hygiene promotion approach, to be more practical, participatory and targeted.

The partners demonstrate different level of performance. ***Kenyan Red Cross being the weakest partners*** with for instance as specific issues related to:

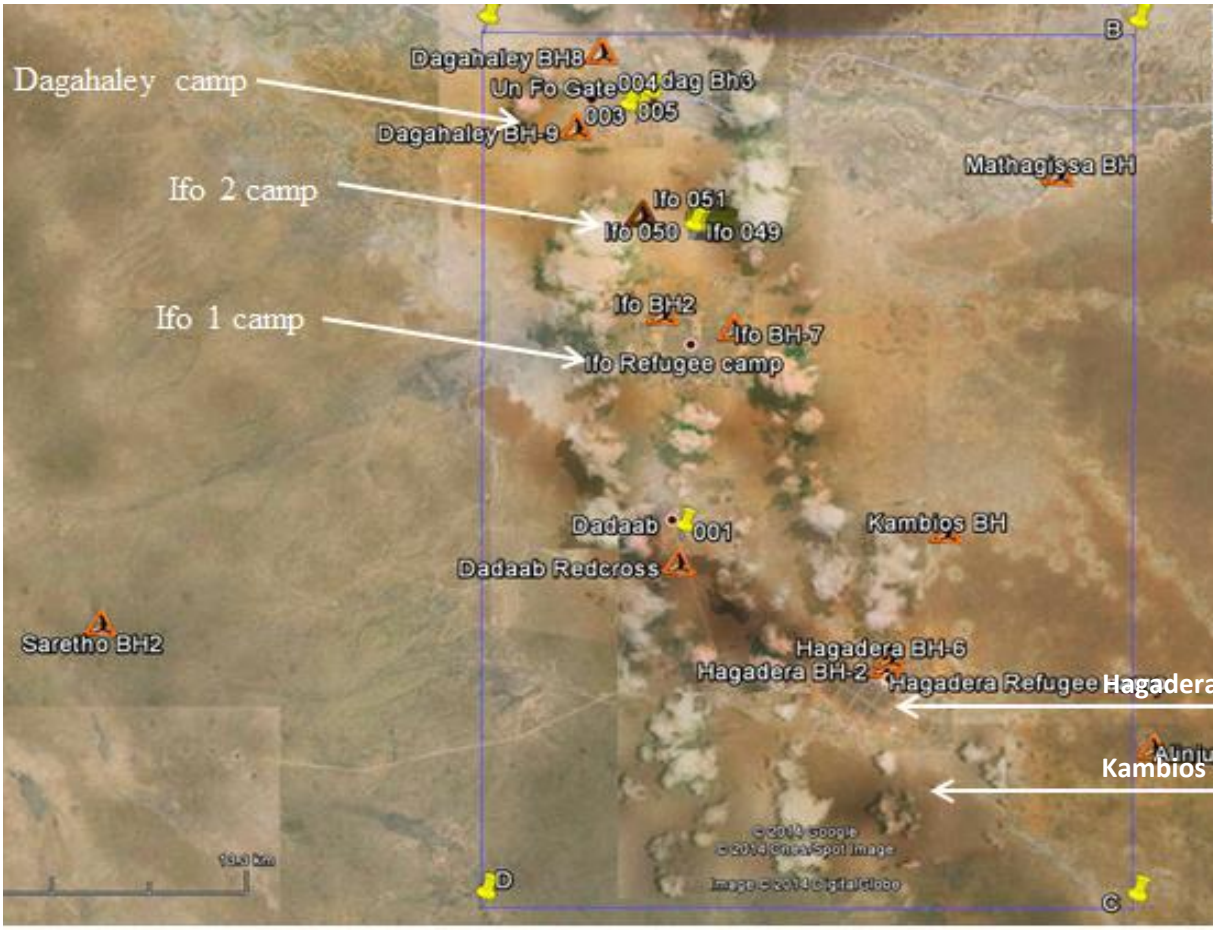
- The way the operate solar system and valorized the solar energy (for the time being they are wasting at least 2 to 3hrs per day of solar energy by using generator)
- The schedule of the water point opening which are far to match standard, as water point are only open for 3hrs per day when others partners ensure 6 to 7 hours of opening time.

Based on the monitoring and the documents received NRC and CARE are performing well, although they still need a lot of fine tuning and specific improvement. ***NRC being the best performing partners in general*** and in particular in terms of strategic vision, technical knowledge and control on what they do, cost efficiency…

2. BACKGROUND:

2,1, General WASH situation

2.1.1. General overview:



ıoramic view of the study area around Dadaab and Fafi Refugee camps

The level of ***WASH service in general can be considered are quite correct in Dadaab***, tough there is still need to improve and at least hold the same rate of user per latrine and especially improve the solid waste management issue. The access to WASH services for institution such as school or health center was a serious gap last year the situation has significantly improved.

Water: There are ***30 boreholes*** that serve Dadaab Refugee Camps (DRC). All these boreholes are located in Merti ground water system. The depth of aquifer penetration and discharge, vary between 150m to 180m and 25 to 60m^3/hour, respectively. 17 of these boreholes function on diesel powered generators, and ***12 are PV Solar powered***, among them only one is stand-alone solar, the others being ***hybrid system combining solar and fuel***.

The total water **storage capacity is 6,050m^3 in 46 tanks**, conveyed through pipeline network of 314km and distributed via 900 tap stands, with over 4230 outlets or nozzles (***average of 85pp/water point***), scattered around the 5 camps. On average, the daily water production in September from 29 operation

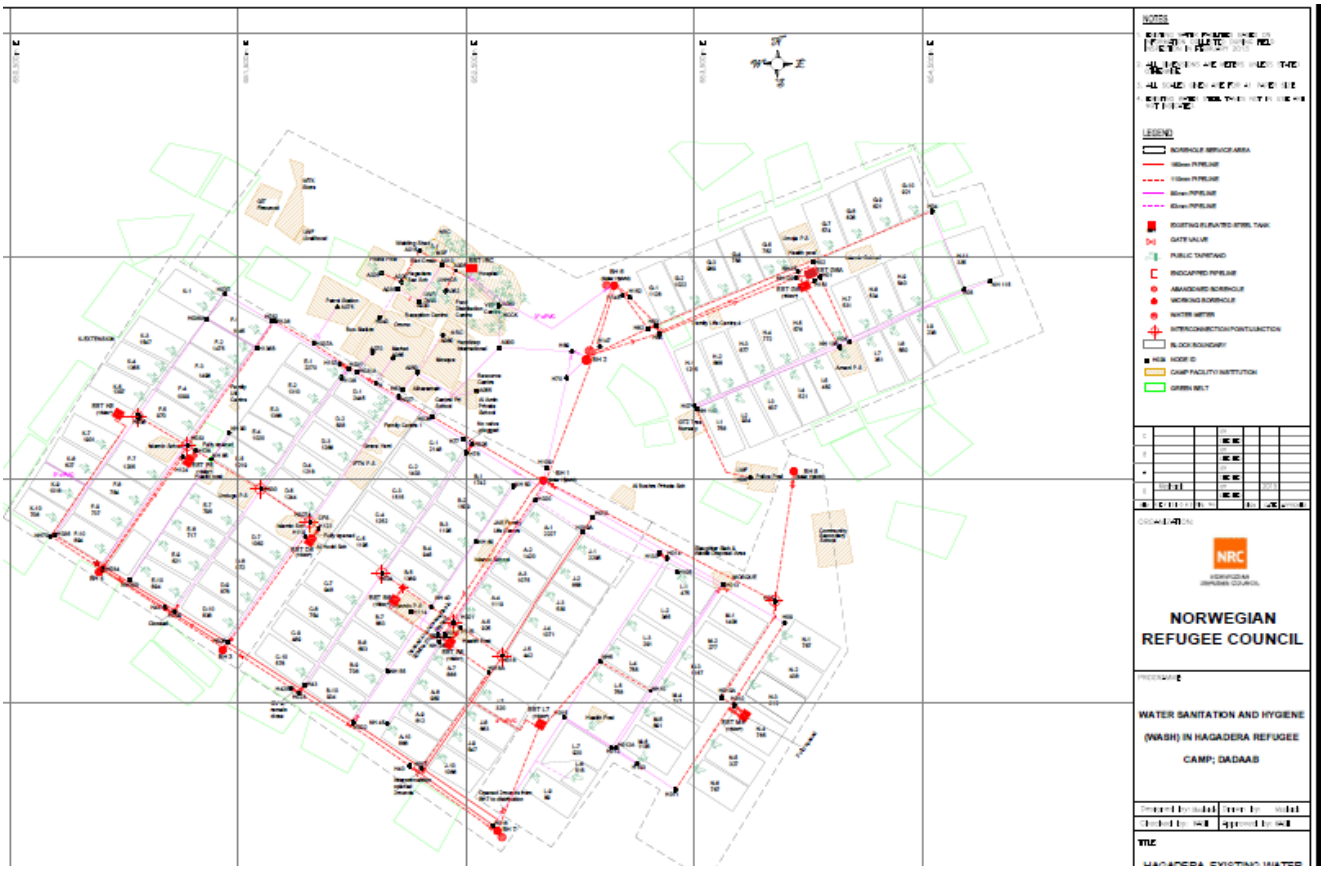
boreholes was 10,404,387 litres, with about 8,427,553 litres supplied to a ***refugee population of 349,481*** in the five Dadaab camps. This translated to an average daily per capita water allocation of 24.1 litres, minus 15% of water loss in the distribution network: ***20,5 L/pp/day***.

Latrine: Latrine coverage across the Dadaab refugee camps remained 46,447 means a rate of 7,5 pp/latrine stance, which is very close to the HH latrine needs. There is still a gap of about 35% to reach everywhere the rate of HH latrine meaning 5pp/latrine stance. Althouigh, even if partners CARE and NRC are following it in there zone, it was not possible to know at global level how much latrine pit is going to be filled up and thus need of decommission in the next 3 months. NRC is facing challenges especially in Kambioso because of loss ground and shallow bed rock. They are testing more adapted design such as ECOSAN to deal with this situation…

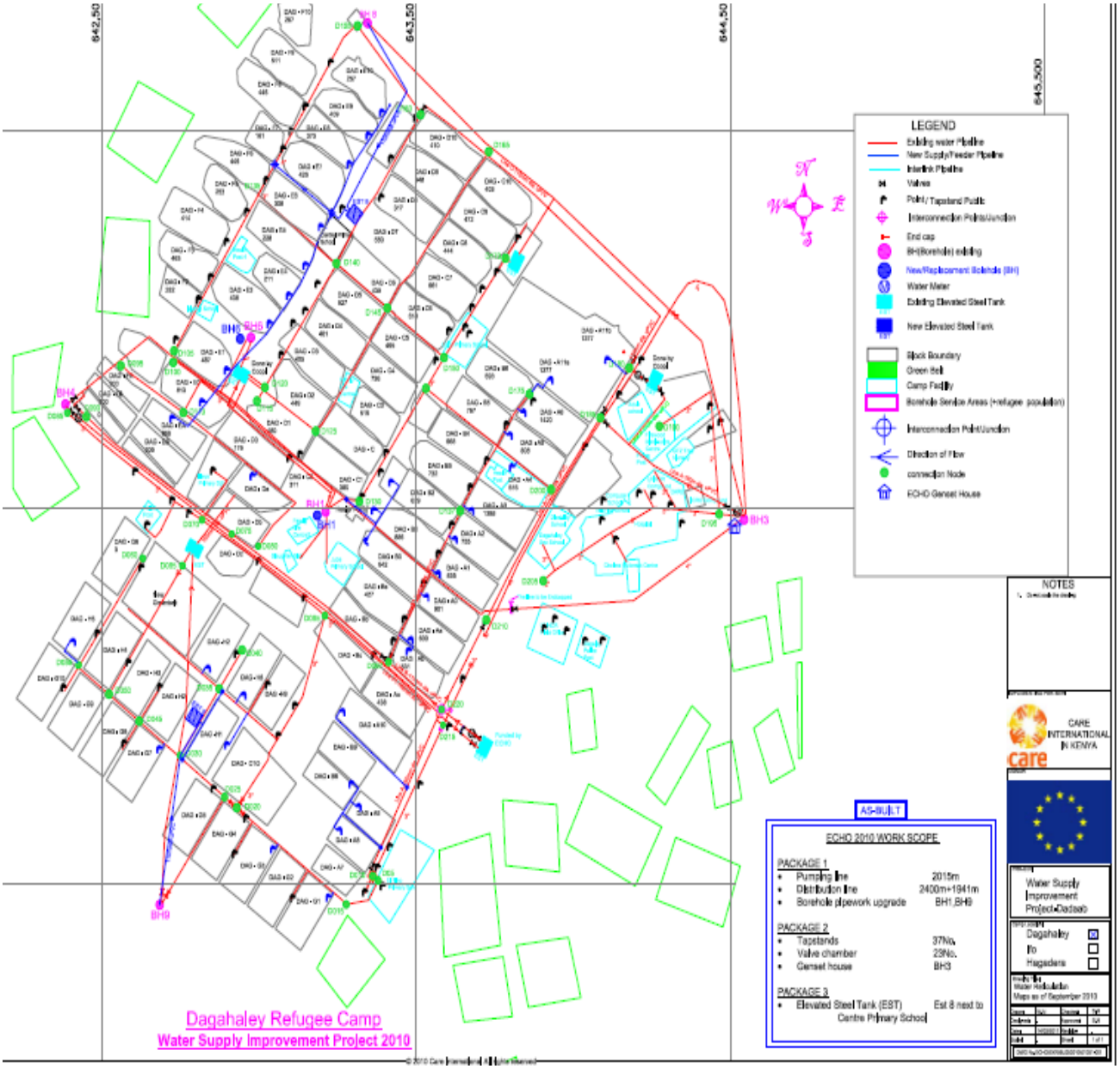
Solid waste: since September the partners stopped to pay hygiene promoter to clean the camp, thus today partners are facing a serious challenges with high degradation of the environment of the camps in particular due to plastic bags. There are two dump sites for the 5 camps and one is equipped with a recycling plant for hard plastic.

Hygiene promotion: the number of hygiene promoter is about 168 for the 5 camps today within almost half of them are only for Ifo2 which is one of the smallest camp. Very few awareness posters have been implemented within the camps.

2.1.2. Hagadera (NRC):



2.1.3. Dagaley (CARE):



2.1.4. Ifo2 (KRC):

2.2. Improvement of the humanitarian operations in Dadaab – cost efficiency

Since last year and 2013, a lot of improvements have been made in Dadaab in the WASH sector. The improvement have been made in water metering, water table monitoring, standardization of the main equipment, but especially regarding the cost effectiveness of the action led by our partners and the community approach.

In the meantime, it is a bit weird that those types of improvement occurred only concretely since last year in a camp like Dadaab which has more than 20 years existence.

The reduction of dependency from the humanitarian relief defers from one sub sector to another and from one camp to another but the main save has been made on:

- ⇒ The consumption of fuel and fight counter fuel diversion
- ⇒ The reduction of water production who use to much over the standard
- ⇒ The incentive payment
- ⇒ At different level: The unit cost of latrine (mainly due to technical solution found to increase the lifespan of the latrine)

Save on the consumption of fuel:

- *Save made by reduction of water production:*

In July 2014, the rate of water per capita and per day was about 29,4L, it has been brought to 22L which could be even estimate as a bit less than 20L/cp/day if you consider 15% of water loss on the network (today apart for CARE, the rest of the partners consider only 1% of loss) but still excluding the water provide to institution. As result, 391L of fuel is safe per day, meaning 11 730L and 140 760L for the year.

- *Save made by implementation of hybrid water pump energy supply using fuel and solar:*

Among the 17 solarized BH, only one is stand-alone solar. The resort to solar energy for water pumping has a great impact on the fuel consumption and the cost of the water supply in general. The saves made on fuel consumption by using solar energy as much as possible is between 30-40% for the hybrid system according the stage of the year with an average at 37% of the total fuel consumption when only using genset. This percentage has been brought to 30% to take into account the various interruption of service due to various reasons... The result of using hybrid system is a save of 1157L of fuel per day, so 422 305L/year, translate in money about 430 000USD/year.

The global save on fuel made since 2013 are presented here below:

	2013	***2014***	***2015***	***Total save***
Fuel consumption	1 177 908L/year	1 100 300L/year	677 955L/year	
Save		77 608	422 305	479 913 L
Equivalent in USD		80 000	430 000	**495 000 USD**

So, about half millions of USD has been saved in fuel since 2013. That's a very good result but in the meantime that bring the question: why it has not been started before given the lifespan of the camp.

Save on the incentive payment:

KRC in Ifo2:

The number of incentive worker is 162pp for a total amount of 14 796 000 KES/year or 150 000 USD/year. The KRC in Ifo2 have a population of about 52 000pp. Actually, this is very weird as despite of the common endorsed strategy among partners seeking to reduce the level of incentive and NRC and CARE made substantial efforts, ***since 2014 the KRC increase the number of hygiene promoter from 50 to 70 and when they did not have any environmental cleaners and they have now more than 20 of them***. CARE and NRC do not have any more such capacity. In the meantime, KRC is the partners giving the highest incentive (KRC give 8000KES/month when NRC give 6800KES/month and CARE give 5125KES/month).

CARE in Dagaley (about 94 000pp):

	2014	***2015***	***Save per year***
Number of workers	202	111	92
Amount of incentive/year	17 303 736 KES	10 088 586 KES	7 215 1441 KES
Equivalent in USD	169 644	98 907	**70 737 USD**

The main reduction of workers was done on the hygiene promoter and the cleaner.

NRC in Hagadera (about 108 000pp):

	2014	***2015***	***Save per year***
Number of workers	285	142	143
Amount of incentive/year	22 039 680 KES	12 750 000 KES	9 289 680 KES
Equivalent in USD	216 075	125 000	**91 075 USD**

The main reduction of workers was done on the hygiene promoter and the cleaner.

So just for two camps, we got a save of 161 892 USD/year.

To conclude this section, UNHCR has also developed a partnership with the Neuchatel University and within this framework a detailed survey is going to be conducted through the partnership about the dynamic of the aquifer use to supply Dadaab in water, the Merti aquifer. The Merti aquifer seems to be very rich as some pumping time can reach 21hours with a recovery time of 30minutes. Old manual water table monitoring performed by CARE since the 90"s shows no depletion of the groundwater table. Nevertheless it still need to be more carry out to better know the dynamic of the aquifer and the capacity to exploit it.

3. CAPACITY OF THE PARTNERS:

3.1. UNHCR:

The local WASH officer seems to be proficient in his job and committed, though he seems to be more attracted to the technical aspect of the work and might need to get more involved in the follow up of the more software components and community approach and in developing the long term vision for especially the sanitation/hygiene promotion components.

He is Somali so can communicate with everybody (good point) and he is very aware about the context as he is from the area. He should also be more present on the field with the partners for joint monitoring specific or general.

3.2. KENYAN RED CROSS:

The Kenyan Red Cross is for sure the weakest WASH partners in Dadaab. The staff and especially the program manager was technically very approximate, confused in the discussion and made wrong statement and analyze about some of the problem highlighted (*e.g.: they face a pressure problem on one of the pipeline and his analyze is to say that the pipe have been buried to deep, which cannot be the reasons; after discussion two grounds for that issue could come to leaks: which could be due to wrong glue application and to under sizing of the pipe*). ***Whereas all others partners provide us with some documentation when visiting the field, the KRC brought nothing.***

During the visit many technical exchange with the KRC staff demonstrate a lack of proficiency and control in understanding technically the equipment's and then in operating the system (see issues highlighted in the section main findings). Some of the data provide by the monitoring device are also use inadequately (e.g.: power output to optimize solar use vs fuel system). As result, no optimization of the use of solar system and inappropriate water access at water point.

At some point of the visit bilateral exchange of some of the staff under his supervision show that some of the staff have some relevant knowledge of the hydraulic system they operate and maintain and about plumber work.

The monitoring of the solar system is apparently done mainly by UNHCR as the Red Cross staff seems a bit confused to explain the different type of data collected, the way to exploit and analyze and what could be the output from this monitoring. The general level of monitoring of the whole WASH activities seems to be quite low. Nobody had is pool tester.

The staff in charge of hygiene promotion is not very creative and need a drastic improvement in analyzing and monitoring the problem of the camp and make the activities more practical and then more efficient. This activity as often seems to be affected by a lack of interest from the partners.

The sanitation component is pretty harmonized among the partners. Apart the school latrine, this sub sector hasn't been monitored during the visit by lack of time.

Note: the involvement of IFRC in the action led by the KRC has not been monitored (no representative from the federation on site).

In the meantime, monitoring the KRC we have to take into account that whether they don't have the same capacity as international big NGO such as NRC and CARE, at least they are part of the national humanitarian capacity and then can offer more sustainability to investment made by us in the country. However, it seems that IFCR should improve its supervision and implement adequate efficient capacity building activities.

3.3. CARE:

The CARE team during the visit show some lack of interacting with the community and monitoring. None of the CARE staff with us during the visit could speak Somali and then interact with the people to understand problem or changing of equipment set up made by initiative of the community. The water quality staff in charge had no pool tester when visiting water point. In addition, apparently the decommissioning of latrine is done by the users (good) but without supervision of a CARE staff (it is the first time they do it) and without technical briefing about way to do it and way to protect themselves. Thus, the latrine pit of some of the latrine visited was already totally filled up; the level of feces reaching the ground level which will undermined a safe decommissioning of the pit (should have been done when

still there is 50cm from the ground surface level). At some point, this shows a lack in identification of the local capacity and then the way to build it.

The problem is they try to promote more community contribution which is highly appreciable; the problem is that to do so you need to have a clear idea about the local capacity and what is reasonable to ask and to improve progressively the capacity along the time to increase the level of contribution. In the meantime, as the ***community led approach is paradoxally pretty new for such old camp***, **there is need to reduce involvement from the partners in implementation of the activities but then the partners should improve its level of monitoring/supervision/technical assistance to avoid collapsing of the system** or others undesirable damages, time for the community to get confident in managing a new task/activity.

In the same state of mind, there is also need to have a strategic vision on that to see how facilities could be managed in time by the communities, and then it seems that there is a gap on that for CARE staff especially regarding the management of the latrine pit when filled up.

Most of the operating set up of the water supply system seems to be globally acceptable within the context.

In general, the technical level was close to acceptable to operate/implement and maintain the WASH services. Nevertheless, some of adjustment made in the setup of the system had no sense and staffs in charge were not able to explain clearly the reasons of the adjustment (chlorine and way to start up the pump, delivery of construction materials for latrine…).

The hygiene promotion try to be a bit dynamic with still the staff in charge need more proficiency and better analyze of the issues to ensure creative and practical approach and then efficiency.

3.4. NRC:

The NRC seems to be the staff with the best proficiency and control on what they do on the ground. They are also quite active in trying/testing innovation (latrine type, management of latrine pit…).They try to have a strategic vision, by thinking forward for instance about current and future as much as possible self-management of the latrine facilities by the communities, testing design that appropriate for specific environment encounter in their area of intervention. They also have a good capacity for water quality monitoring and daily monitoring of water table level and solar system.

Despite of that, they also encounter a problem of monitoring of their daily activities and in exploitation of some of the data they collect. They need to fine-tuned their action and involvement.

For instance:

- the free residual chlorine measure at water point was far too high from acceptable range (FRC[3]=2,5mg/L at water tap)

[3] Free Residual Chlorine

- using of expired reagent to perform water testing
- workers dealing with the machine to process the machine waste were wearing their protection equipment

Their volume of work is pretty high and they try to be active in every field, sometime maybe over their realistic capacity.

They had a good input with the activity of solid waste recycling (started by CARE), finding contract for the cooperative to sale the raw materials produced from plastic waste (not working so far for plastic bag) and providing equipment. The fact is during the visit we noticed that:

- the running cost of the waste recycling activities were not known by the member of the cooperative,
- they are not able to estimate the benefit they can make and plan it in time based on assumptions on the market and the camps capacity to provide the raw materials
- they don't have idea about what to do with the benefit

The core of the action is acceptable but there is substantial need of fine tuning in most of the WASH field.

4. MAIN FINDINGS:

All the water supply is made in semi gravity, meaning that water is pumped up to elevated storage tank (the environment is pretty flat) and then distributed in gravity from the tank.

4.1. Kenyan Red Cross, Ifo 2:

Water:

During our visit to the solarized BH, no pumping was effective whereas it was at 2pm. The manual switch was not on solar, which create a concern about the availability of the water at least this specific day, as generator should have been stopped since 8 or 9am. The level of the storage tank has not been observed to check whether it is due to low consumption or wrong operating of the system, anyway the KRC staff could give an explanation and were not able to do so.

In addition, let say one of the main issues highlighted during the visit is that: apparently even in normal set up, ***the KRC do not use solar energy for more than 4hrs instead of 6 or more likely*** 7hrs as others partner (NRC use solar for 8hrs/day). Furthermore, the ***data from BH3 in October***, which is not the worst month in terms of irradiation, show even worst use of solar with an average of **3,65 hrs/day and 60m3/day instead of the 120m3/day mentioned by KRC staff**; 112 hrs of pumping with solar for the month and production of 2154m3 for the October month at BH3)

This type of problem is unacceptable as it undermine the cost efficiency of the investment and waste money.

Even if we consider that only half of the water quantity pumped by generator is pumped by solar during this remaining time, the additional safe could be about 7300L of diesel per year meaning over 8000USD/year and per borehole. ***If they operate the 6 solarized BH in the same way***, they ***waste about 50 000USD/year***.

The KRC staff mentioned that they safe 40% of the fuel cost using solar which is more than NRC and CARE who mentioned a more likely value of varying from 30 to 40% according the stage of the year.

The KRC staff mentioned that for Ifo 2, using solar energy for pumping water they safe about 260L orf fuel per day, meaning 94 900L/year for the whole Ifo2 camp. So, divided per 6 solarized systems it means about 18 000USD/BH, when the initial investment to implement such "hybrid" system is about 95 000USD (with pump, generator and installed PV array, support structure and all electrical component...). ***This will give a breakeven rough estimation*** (fuel cost being the main parameter in terms of cost comparison between solar and fossil energy) ***at 5 years, when the KRC announced 3,5 years during the visit.***

The others main problem is coming from the opening schedule of the water point. Actually, the ***water points of the KRC are open from 8 to 10am and from 12 to 1pm, meaning 3hrs/day which is out of all standard,*** moreover the schedule do not match the habits of people and the peak time at water point which usually before 8am and after 4pm.

The others partners operating in Dadaab camps have a normal schedule from 7-11am and from 3 to 6pm.

A team of refugees have been briefed and is in charge to repair small breakage or leaks on the network paid by the partners.

Others issues have been highlighted by the visit:

- ⇒ The chlorine injection is made with a dosing pump connected to the pipeline supplying the storage tank. ***There is problem with regulation of chlorine dosing pump when pumping with solar***. Actually, pumping with solar the flow rate vary along the daylight and thus as the quantity of water pumped is different, the quantity of chlorine injected is the same and base on the maximum, despite it should be regulated by the flow.
- ⇒ There are some ***questioning about the way that the solar panel have been dimensioned in a way that for the same pump motor power 30kW in several sites we found 57kW of solar panel capacity (meaning a losses factor of 0,52) whereas in another site managed by CARE the 30kW water pump is supplied in energy by 38kW of solar panel (meaning a losses factor of 0,8).*** To

simplify, the literature gives correction factor for losses between 0,6 to 0,95 according the type of installation (0,6 being installation with high irradiation variation along the year, type of inverter, AC or DC equipment, batteries set, and long length of cable…). Given the environmental context and the type of system considered (little length of cable, no batteries…), the correction factor should not be the most pessimistic, but more on the upper average let say, meaning about 0,7-0,8 range. So, in anyway the first design is oversized. ***The efficiency and cost effectiveness of both installations should be monitored based on the performance in power output and water production along a year, to determine the most appropriate correction factor.***

  - Between the two designs there is a difference of 97 panels meaning roughly about 30 000USD/per oversized system.

⇒ The ***solar panels are not clean*** and there is no ladder to inspect the solar panel located on a high steel structure. The partners together with UNHCR are already trying to find a solution.

⇒ ***No history of breakdown and service is recorded***; no record of chlorine consumption, no technical folder is present at each BH location. No documentation have been provided on the field.

⇒ Problem of pressure on one pipeline and at few water point

⇒ Problem of internal monitoring

⇒ The ***FRC monitoring*** should be controlled as KRC mentioned 230 test performed at HH level and 150 test at water taps level which ***seems unrealistic*** and in any way not needed.

⇒ Dosing pump is working with a batteries set

Sanitation:

The short time of the visit did not allow us to monitor the sanitation component of the project. The latrine strategy is apparently harmonized with the others partners. ***It seems that KRC is doing the decommissioning of the latrine paying a team/cooperative from the refugees with limited supervision/control and technical assistance from KRC staff.***

The only latrine visited were the one at school and if they are globally acceptable; there is still some need of improvement. The outdoor slab was already cracking, the drop hole of the latrine to big (this primary school) and not cover.

The ***solid waste management seems to be a serious issue*** as well. The camp is almost cover with plastic bags. Actually, the partners report that they face a lot of difficulties with that aspect since they were supposed to stop paying people to clean last September. The KRC is still paying 5000KES/month camp cleaner despite the strategy for the camp endorsed by all partners, but still the situation is of concern.

The changes have been announced in advanced to the population but it is hard to change the mindset of people who are used to get money to clean their own latrine… ***Whether it could have been more progressive, the effort is highly appreciable but now partners have to interact with the community and be creative to improve this situation using the local capacity.***

The latrine coverage should be improved.

Hygiene promotion:

Not monitored as well because of lack of time. We can say according the discussion that the approach is quite standard and based on method such as PHAST and CHAST, with as main activities door by door visit. The messages are holistic and standard and not targeted. The relevancy of door by door visit after so many years of the same activities can clearly be put in question. People for sure loss interest in that after so many years hearing the same messages…

There is a need to be more participatory, more targeted and practical as well as creative and dynamic.

There is 79 hygiene promoters this year paid 8000KES/month. The quantities of hygiene promoter have been reduced since last year.

No awareness posters were noticeable in the camp.

There is a serious problem of harmonization with others partners, as KRC paid the hygiene promoter 8000KES/month when CARE pay 5125KES/month and have 79 of them for a camp population estimate at 51 000 pp when CARE have 20 hygiene promoter and deal in Dagaley with a population of about 90 000 pp and NRC 35 hygiene promoter for a population of 109 000pp and they are paid 6800 KES/month.

Camp/partner	***Population***	***Nb of hygiene promoter***	***Incentive in KES per Hygiene promoter and per month***
Ifo2 / KRC-IFRC	52 000	79	8000
Dagaley / CARE	90 000	20	5125
Hagadera / NRC	108 000	35	6800

4.2. CARE, Dagaley:

Water:

The level of technical ***knowledge regarding the hydraulic system is quite acceptable***. Among the 7 BH functional at Dagaley camp, 2 are solarized. 2 of the BH location do not have backup generator but CARE own a mobile generator fix on a trolley in case. The safe on fuel for those two solarized BH is about 30%.

Despite design of others solarized system the CARE visited BH equipped with 30kW pump was supply by 38kW of solar panel

when others same type of pump at others BH location are supply with 57kW. Should be investigate to ensure that the benefit in terms of performance of the system matching the demands of the population is relevant compare to the substantial additional investment compare to the 38kW solar asset.


Chlorination injection

CARE as NRC face a lot of fuel diversion problem and to remedy to that they implement a cage which disable access to fuel tank and enable the operator to switch on or switch off the generator.

The opening schedules of the water point are correct and harmonized with NRC.

CARE is monitoring the water table.

At the solarized BH the pumping with solar energy last 6 hrs and same pumping time with generator. ***The recovery time for those two BH is 30 min. which is very fast and the sign of a very rich aquifer compare to the flow rate and pumping time of the BH.***

When the network is mainly made of PVC pipe, CARE is now renewing broken pipeline by HDPE pipe which is much more convenient and sustainable in such context.

Every day the FRC is tested at the closest and furthest taps stand which is proper. Every Saturday 6HH per BH are visited to check the FRC, this could be slightly improved to ensure better representativity.

The care taker at water point level is paid by the community.

The main issues highlighted by the visit related to water are:

- ✓ Problem with chlorine dosing as mentioned for the KRC
- ✓ No cleaning of solar panel
- ✓ ***Problem with corrosion of the rising pipe***, which means that the water might be aggressive and water test should be performed to better understand the water quality, notably iron and mangan, as well as alkalinity of water should be tested. Rising pipe could be replaced by HDPE pipe to minimize the corrosion problem.
- ✓ Procedure of pump start up

<u>*Sanitation:*</u>

The latrine design is pretty the same as others partners. Nevertheless, some slab used are made of fiber cement and others dom slab in concrete. The pit depth change also as in Dagaley CARE can easily dig down to about 5m (0,9m diameter) and then the ***lifespan of the pit are estimate at 3-4 years minimum*** which is very positive and ease the management of the activity as well as the cost.

As for others partners the beneficiaries dig their own pit and then they can collect the slab at the production center, since they have set up the slab they normally get the wood pole and iron sheet to build the shelter.

During our visit, one of family visited had a pit done with slab on the top but they were waiting for the shelter for the last 6 months. CARE explain that they run out of construction materials, as some abandoned slab have been used by people and then it changes their estimation which was based on the number of slab to produce. In the meantime, given the level of delay this situation reveals a problem in terms of organization and follow up/monitoring of the activity.

As already mentioned within capacity of the partners section, the strategy of CARE in terms of management of latrine pit decommissioning and community contribution should be reviewed. Actually, CARE consider that the latrine user should do the decommissioning (which is ok since they know to do it in a safe way which take some time and need to build their capacity).

The problem is that CARE staff is not supervising at least the first time users have to do the decommissioning and apparently no technical briefing has been delivered as well. Actually, during the visit one of latrine pit visited was full until the ground surface level which undermines a lot achievement of a safe decommissioning. ***Normally, the decommissioning should be completed when there is still at least 50cm between the ground surface and the level of feces in the pit to enable appropriate backfilling.*** Lime should also been poor into the pit before backfilling.

Others issues highlighted:

- ✓ ***Abandoned slabs have been noticed when passing through the camp*** site and partner was not able to tell us why is this situation, from where those slabs came and how much of them have been identified within the camp, and how much could be reused to safe some cost. Even at the airport a plastic slab (costly one, about 200USD) was abandoned on the ground. This issue shows a problem of monitoring and in interacting with community.
- ✓ Problem of plastic bag spread all round the camp. We can note that this problem was much less important than in others visited sites (Hagadera and Ifo2).
- ✓ The latrine coverage should be improved
- ✓ They don't know the percentage of latrine pit that will be filled up in the next month, 3 months or a year. This could help to plan in advanced budget and to better manage decommissioning and reuse of construction materials for the new latrine to be built, and then make the whole action more cost effective improving quality of the implementation in the meantime.
- ✓ No cover on the latrine drop hole
- ✓ Some of the latrine visited face problem with drainage

Hygiene promotion:

Same type of statement than for the Kenyan Red Cross, the approach is a bit better as more formalized/clear and dynamic. CARE proposes different type of activities along the week, but the main remains again doors by doors visit (see comments on that in KRC main findings section). Jerricane cleaning campaign re organized once per month and given the observation of jerricane made during the visit, should be more frequent. Some mass events are also organized but the partner was not clear about the type and frequency of those events.
Hygiene child club have been implemented at school level.

No awareness posters were noticeable in the camp.

20 hygiene promoters are paid 5125KES/month by CARE.

There is a global gap in interacting with people and promoting the local capacity.

4.3. NRC, Hagadera:

NRC took over the WASH sector from CARE in 2012.

Water:

NRC as KRC starts monitoring of the ground water table in September 2013. CARE which is the oldest partner presents on the ground starts some measurement in 90's.

As CARE in Dagaley, they have a team to repair generator and so on. And as the others partners they use a team/cooperative that they pay to do small reparation on the network.

In Hagadera, ***despite strong needs of fine tuning and consistent improvement on specific field, NRC seems to manage their action in a proper way*** with quite good knowledge about the facilities they operate and maintain and the service they provide as well as the challenge they face.

Hagadera network is about 69km and made of mainly PVC pipe some connection by socket and the smaller diameter by glue (under 2''). NRC interconnects all the water supply system they manage in Hagadera as a contingency measure on case of problem in one of the network. The interconnection valves are closed in a normal set up.

On the 7 BH of Hagadera, 3 of them have been solarized, the last has been commission in October 2015 (one in march 2015 and the first one in 2014) and funded by ECHO. The safe on fuel is estimate at 30 to 40% according the stage of the year.

At the BH6 we visited, the flow rate variation is between 280m3 to 190m3/day with solar energy, so a variation of 90m3 along the year. In BH6, there is ***5 hours pumping with generator and 8hrs pumping with solar, which is a very good valorization of the solar energy***.

NRC is also the most cost effective partner according UNHCR WASH Officer.

NRC as CARE is meeting once per month with WASH committee to get their feedback about problem and monitor the functionality/effectiveness of the WASH committee through the actions they led or facilitate during the month. As in other location it does not seems that WASH committee have a great added value. NRC is providing 500KES air time to the central WASH committee of the camp.

300 people are part of the WASH committee.

They are the only who provide us substantial documentation about what they do in the time given to all the partners to do so… They ***try to have a strategic vision***, testing solution at pilot scale level to improve the WASH situation and reduce the dependency from the humanitarian relief (solid waste recycling project, latrine design type according the type of ground trying to promote as much as possible replicable design, etc…

They improve the level of service provide to the school and health center as it was a clear gap highlighted by former monitoring.

Every time they intervene to replace some pipe on the network they replace the old PVC pipe by new HDPE pipe, which is much more appropriate and sustainable.

The care takers at water point level are paid by the community. The one interview mentioned that she can get 1800KES/month which might even be more sometime. As money is involved partners should try to better understand the system without interfering with the community dynamic.

However, as already mentioned there is still some room of improvement and need of fine tuning. The main issues highlighted by the visit were:

- ✓ Problem with chlorination regulation as already mentioned for other partners. The FRC has been measured at 2,5mg/L at one tap which is far from the norms. 10 water quality monitor are performing water test at water tap and HH level on 5 days per week, and about 30 Water point AND 30 hh are tested on daily basis (2/system).
- ✓ Problem of controlling the expiring date of chemical reagent as during our visit the person in charge of the labo was using reagent expired since September last year
- ✓ Sizing of some of the solar panel
- ✓ The efficiency of network is not appropriately taken into account when calculating the rate of water available per user and per day. The efficiency is considered at 1% when it should

more realistically be about 15 to 20%. The consumption of institution such as school or health center is considered to be about 17%.

- ✓ The water meter at BH6 was not working
- ✓ Dosing pump is working with a batteries set

Sanitation:

The sanitation component seems to correct as well. The few latrine visited were very clean and equipped with a cover which is pretty rare usually and then a good point.

Latrine pit with brick for lining

NRC is still paying a refugees cooperative to complete latrine pit decommissioning and they need to build the capacity of the users to do it in time, and in parallel improve in time the community contribution.

They have a ***rate of 1 latrine for 8 persons*** which is very good and close to HH latrine, but this is for the time being as many pit might get filled up in the coming months and then it will affects this rate.

NRC is also facing challenges in the latrine activities due to:

- bad seeping capacity of the ground
- loss ground
- shallow bed rock at some location of the camp.

They tried to find solution by using different type of latrine and adapt it to the context. Impact will have to be assessed. The depth of latrine pit cannot exceed 2 to 3,5m and then the lifespan of latrine pit is from 1 to 2 years.

They are also the most cost efficient and cost of the latrine stance. They used to build latrine for 140USD/stance and now they are paying about 260 USD but they increase about 2,5 time the lifespan of the latrine, so cost efficient at the end.

The solid waste component is very interesting and they need to capitalize on that. They implement a cooperative who operate a plastic waste recycling plant, mainly to make powder from plastic and to sale the output from the plant to recycling factory in Nairobi. So far, they only deal with hard plastic (not with plastic bags), but the cooperative is collecting between 400 000 and 600 000 KES/month which quite a significant income.

Solid waste recycling plant

The problems noticed are:

- workers do not wear they protection equipment
- the cooperative people do not know their running cost and the benefit they make clearly (so far they share the benefit between them…)
- no clear idea what to do with the benefit

The disposal site is located next to the recycling plant and seems to be correct in terms of environmental risk with drainage. The processing of the waste could be improved to ensure stabilization and reduce their volume: incineration and compaction.

The recycling plant could be upgraded to deal with plastic bag, but apparently the market is poor for such output. NRC is still thinking about way to improve it and use the money to fund some of the community activity depending on humanitarian fund.

As NRC doesn't have enough jerricane to distribute, they subsidy the plant in a way that they replace by new one all broken jerricane brought by the population of the camp.

Hygiene promotion:

Same comments as for others partners: not enough targeted and practical, no enough participatory/community based …

In the meantime, they have some good output at school with hygiene message paint on wall of some of the building in the school, writing should have been in Somali also… The approach seems to be a bit more dynamic than others partners.

35 hygiene promoter for the 108 000 pp of the camp paid 6800KES/month. Hygiene promoters are mainly doing door by door visit, child club at school and some mass events.

5. RECOMMENDATION AND ISSUES TO FOLLOW UP:

5.1 General (common recommendation/issue to follow up with more emphasized on the KRC):

5.1.1 Water:

- Improve control/supervision on FRC monitoring
- Improve the water meter coverage
- Improve the system of chlorination by using a regulation of the chlorination rate based on the flow. 2 propositions:
    - Using a dosing pump connected to the water meter (very close to the existing dosing pump) and regulate by the flow measured by the water meter. This type of dosing pump need power supply.
    - Using a venture system to regulate the injection of chlorine by the flow in the pipe. The venturi system need minimum 2 bars to work and we are located at the outlet of the BH so should be ok for venturi. The good point with venture is that it does not need power supply. However, this need a bit of investigation to see whether the venturi could work at the minimum light used for solar pumping.
- Implement a system to ensure appropriate and regular cleaning of the solar panel, especially important in such dusty place. The system should be the most user friendly and simple, for instance: pressure hydro jet and rubber scraper fix on long flexible handle… A ladder should also be present at each solarized BH location to not only ensure access for cleaning but also to check once in a while solar panel connexion etc…
- Record and capitalized the history of breakdown and service for all electrical and hydraulic equipment.
- HDPE pipe should be the type of materials use when replacing pipeline
- Integrate at least 10% of water loss by leakage to calculate the rate of water available per capita and per day.
- The tilt of solar panel should be checked and correct in accordance.

5.1.2 Sanitation:

- Improve the management of the latrine pit filling up, decommissioning and reconstruction:
    - The partners should be able to estimate and identify the latrine pit which are going to be filled up in the next one month (can already plan the decommissioning), the next 3 months and the next year. NRC and CARE seem to have quite similar tools but it could be more practical. This type of monitoring will help the partners to ensure safe decommissioning (avoiding that people wait for the pit to be totally full to decommission, to ensure that people doing it get the appropriate protection equipment, ensure the maximum reuse of materials for the new latrine structure…),
    - Better plan activity and budget needs as well as evolving of the access rate to latrine.

- The partners should involve beneficiaries in the decommissioning but only under supervision of their staff to ensure safe action, after two or three times doing it under guidance and control of partners most of the users should be able to do it themselves.
- Technical briefing should be delivered by cluster to the latrine users to ensure that they don't wait for the pit to be totally full to be decommissioned, safe reused of the materials and rules of protection for people doing decommissioning. This point with the foregoing one could address the problem through different tilt and give more chance of success.
- The partners should built a strategy on long term according the different type of environmental, constraint encountered in the area to minimize as much as possible in time the need of involvement of external/humanitarian actors: safe decommissioning by communities, optimized reuse of the materials, increase as much as possible lifespan of the latrine pit, reconstruction of the new latrine facilities by the users, special system implemented for the most vulnerable people promoting the internal solidarity mechanism…. Few tracks could be explored regarding the latrine pit issues:
  - Implementation of the Arborloo approach which consists to identify the right plant which could be planted on the location of the decommissioned pit. This plant/tree will speed up the mineralization of the feces and will enable the owner of the latrine to build again his latrine on the same location after shorter time
  - IMO could also be tested in certain area to increase the lifespan of the latrine pit. The IMO are enzyme that will contribute to stabilize feces and reduce their volume.
- Substantial efforts have to be implemented to improve the situation of solid waste spread all over the camps in a community based approach. Commonly using hygiene promotion and community mobilization capacity.

5.1.3. Hygiene promotion:

⇒ The hygiene promotion component have to be much more dynamic, innovative, ludic, practical and targeted on concrete identified issues in terms of hygiene practice, community mobilization/approach, misused of equipment, care and maintenance of WASH facilities. The community should be much more involved in the design, implementation and monitoring of the activities. To feed your thinking outline of the CARE group and model home approaches have been provided to the UNHCR WASH officer and WASH partners (IFRC/KRC, CARE, NRC). Participatory is not only ensure by using a participatory method it is ensure by the way you interact with people and get to know them and involve them.

⇒ Noticed board should be implemented in strategic location like water point. Those notice boards could be used to do awareness posters campaign by topics for instance, to inform population about services, etc… it could also contributes to the ownership of the water point, people could be involved to select a name or a logo to represent the water point, etc…

⇒ The awareness materials have to design in a participatory manner, and tested with a representative sample of the population before production. Laminated and vinyl posters are fostered for a question of sustainability and to be able to have outdoor posters.

⇒ Given workload of hygiene promoter and as they are moving around in the camp, they could also be used to perform water testing which also contribute to awareness. Then, we could contribute to reduce a bit more the level of incentive and then the level of dependency to the relief fund.

5.1.4. Capacity building and community approach:

- Improve assessment of capacity building impact, by for instance:
    - having appropriate system to test entry and exit level of training attendees (*NRC is already doing it*)
    - To build training course content in a practical way and based on skill and proficiency gaps identification in accordance with what level of skill and what we expect to be done by the trainees.
    - Identify the strongest element in the different field tackle by the training and promote them to be kind of focal technical point to ensure supervision of others elements and dissemination of knowledge and skill continuously on the field as close as possible to the needs. Those stronger elements could be benefit from more advanced training and be able to achieve more and especially ensure appropriate supervision and control of the others elements. This approach will also generate a more sustainable dynamic of improvement and capacity building. It can also contribute to generate more stimulation/motivation within the community to do as there is potential to evolve.
    - Implement a mentoring system to ensure that the training have a sustainable impact and as a mitigation measure against loss of skill by trained people looking to valorized is new skill in better job. The mentoring system could be on 2 years basis, the staff trained could have a kind of trainee who will assist the guy to do the job during 1 year and the year after do it himself under supervision of the staff trained, to ensure transfer of knowledge and skill.
- Proposed by UNHCR WASH officer: implementation of a workshop to repair tools such as wheelbarrow and then increase its lifespan
- Improve the reuse of materials, for instance the abandoned latrine slab…

5.1.5. Supervision and monitoring:

- Improve at all level the internal and monitoring of the partners. There are quite good and comprehensive existing monitoring plan but it remains not very practical and concrete. The main representative of the populations should be involved in joint monitoring with the WASH actors in order to contribute to empower them on the daily issues at least in front of the population. They will face problems and issues together with the partners and then their capacity to handle highlighted problems should be put forward during the monitoring. It is also a good way to build relationship… The monitoring should enable and be used by the partners to

learn in real time from what they do and be able to use findings of the monitoring to review, adapt or fine tune the way activities are implemented

The monitoring should not only focus on the achievement but also on:

- the way activities are implemented,
- the way the service/facilities provided are matching the needs of people and are adapted to the context
- the level of dependency generate as well as potential nuisance…
- the set up
- the harmonization of standard and approach
- the data collection and the capitalization
- the coherence and the relevancy of the way the different component project is implemented along its implementation
- interacting with people to build appropriate relationship and then ensure better level of information

- The data collected should be better exploited to also give an idea of the evolving of the way we deliver relief, the impact, and be an evidence of the effectiveness of a going on dynamic of improvement. There is no point to collect data if they are never exploit and cannot contribute to improve the level of analyze…
- Implement a specific follow up on the hourly water production and power output along the best and worst solar irradiation day for each month of the year and on yearly basis to compare the system using 30kW pump with 57kW of solar panel and the one supply by 38kW of solar panel (CARE in Dagaley). This follow up could display on a graph with the two curves from the 38kW installation and the two curves from the 57Kw. This will help to define a relevant and appropriate loss correction factor and avoid inefficient oversizing of the installation.
- The safe on fuel or the level of output of solar energy should be monitored along a year and benefit and performance should be presented per solar system/BH.
- UNHCR should more involve or inform partners about going on survey about for instance sustainability of water resources, water quality…

5.2. Specific recommendation and issues to follow up:

5.2.1. Kenyan Red Cross, Ifo 2:

- ✓ Improve urgently and drastically the way the water supply system is operated and the set up of the water supply system and especially the schedule of water point opening and the solar pumping time, as well as the control on fuel
- ✓ Ensure as much as possible cover on the latrine drop hole
- ✓ Improve the supervision of the latrine activities
- ✓ Improve the situation of lack of pressure on some water point, for that:
  - Hydraulic calculation should be performed to check whether the pressure problem could come from under sizing of pipe

- The connexion of the pipe should be checked on few locations. As we speak about small diameter of PVC pipe connected with glue, the wrong application of the glue is widely noticed and will as consequence speed up considerably occurrence of leaks on the pipeline which will also increase the hydraulic loss and then undermine the level/performance of water supply

- ✓ Harmonized the level of incentive and number of incentive staff according the category of workers with others partners. The KRC is the only partners still having cleaner with incentive.
- ✓ Increase the involvement and contribution of community in all aspect of the action led. Coming together improve and ensure concrete impact on capacity building.
- ✓ Improve their knowledge about community
- ✓ Better document what they do, and improve in general the level of documentation on the field (technical, lesson learnt, strategic, guidelines/method…). Improve the existing map.
- ✓ Build a strategic vision/approach to progressively decrease their involvement in the activities at all level (design, implementation, monitoring) in time and increase in parallel contribution from community together with the way to build the capacity of the beneficiaries to be as most as possible self-reliant.

5.2.2. CARE, Dagaley:

- ✓ Improve the internal field monitoring: each field visit is an opportunity for monitoring so the means to do so should be always available, for instance: pool tester, translator…
- ✓ Improve the chlorination system, standardized and make it user friendly. The increasing of the mother solution chlorination dosage use for chlorination might due to an inappropriate volume of the chlorine solution containers that's could be the reason they end up in making a 2,2% percent solution instead of 1%.
- ✓ Improve/implement supervision of latrine pit decommissioning and briefing of beneficiaries on that
- ✓ Improve supervision of the latrine slab implementation to mitigate problem of drainage and standing water
- ✓ Improve the organization of the latrine activity to reduce gap in terms of supplied as noticed during the visit (the gap cannot be 6 months). Whether CARE had a better idea for instance of the number of abandoned slab, they could better plan the need of materials for the latrine shelter and avoid gap in providing the slab and the materials for the superstructure.
- ✓ Improve the procedure to operate pump and mitigate the risk of hydraulic hammer by putting long run closing valve.

Abandoned slab at airport site

5.2.3. NRC, Hagadera:

- ✓ Improve management and especially control of expiring date for perishable chemical such as: chlorine, reagent

- ✓ Improve the capacity of the cooperative in charge of solid waste recycling plant to better manage their activity and the income generate: estimation of market, expected evolving of benefit, way forward and potential investment to scale up this activity, calculation of the running cost, way to use the benefit….
- ✓ Ensure that workers at the recycling plant are wearing their protection equipment
- ✓ Increase in time involvement of beneficiaries in the management of the latrine: decommissioning, building, drainage, reusing of materials, etc...