ReWater MENA Project

1st NLA meeting in Beirut – October, 3rd 2019

Summary report

Table of contents

Table of illustrations

Objectives of the workshop, agenda, and participants

Objectives of the workshop

This one-day workshop was the first National Learning Alliance (NLA) of a series of six, planned all along the ReWater MENA project in Lebanon. The objectives of the workshop were to:

- Get to know each other (for the participants);
- Present the global vision of the ReWater MENA project (at the regional scale);
- Present the Lebanese case and the progress of activities;
- Present the field trials conducted by LARI and the progress made;
- Explain and underline the need to have participants involved in the process;
- Have inputs from the participants on different topics (viewpoint on the issues and opportunities of reuse in Lebanon, outline of the national baseline assessment study, information on data availability and accessibility).

Detailed agenda

The agenda planned a succession of various activities, both in plenary sessions and working groups. (cf. Figure 1). Despite this condensed planning, the participants' cooperation allowed the successful proceedings of all sessions, as described in the agenda below.

Figure 1: Agenda of the workshop, posted on the room

More precisely, the workshop was divided in two main sessions, one aiming at presenting the different components of the ReWater MENA project with a focus on the Lebanese case and the other one to have inputs from the participants on different important topics related to waste water reuse in Lebanon. The first session was organised in plenary and then followed by a "cross presentation"

activity, oriented towards highlighting the opportunities and constraints the participants see in the reuse topic.

The second session was then organized in different working groups, and ended with a reporting time where the different groups had the chance to look at the other groups' results. Two main activities were conducted: a brainstorming activity was dedicated to discuss the necessary conditions to implement safe water reuse in Lebanon; a second activity concerning data identification and gathering was organised in a similar way. Following the group reporting time, the workshop ended with a last activity aiming at assessing the "level of participation" participants wished to have along the project.

Participants of the workshop

The table below shows the list of participants who attended the workshop and contributed to the working group sessions. At the registration, participants were given a round badge showing their name and institution. There were four different colours for the badges, serving at distributing the participants among the four respective working groups that took place in the second part of the workshop (see Figure 2).

Name	Affiliation
Mrs. Mirvat Kerydiye	Ministry of Energy and Water
Mr. Yasser Sleiman	Ministry of Energy and Water
Mrs. Sabine Ghosn	Ministry of Environment
Mrs. Jamila El-Hadi	Ministry of Environment
Mr. Ghassan Mezeraani	Bekaa Water Establishment
Mr. Majed Arkadan	South Lebanon Water Establishment
Mrs. Ghada Rida	Beirut and Mount Lebanon Water Establishment
Mrs. Romy Menhem	Beirut and Mount Lebanon Water Establishment
Mrs. Hanine Abdel Rahman	LIBNOR
Mr. Youssef Abou Hamad	USAID-Chemonics, CSP project
Mrs. Joëlle Comair	UN-ESCWA
Mr. Youssef El Bizri	FAO
Mrs. Jasmine Kareh	PS-Eau
Mr. Vincent Dussaux	PS-Eau
Mrs. Claire Papin Stammose	European union – Madad pact
Mr. Ali Fadel	CNRS
Mrs. Elena Diato	GVC
Mr. Jawad Taher	GVC
Mrs. Roula Bachour	American University of Beirut (FAFS)
Dr. Désirée Azzi	University Saint Esprit Kaslik, Dpt of Agriculture and Food Engineering
Mr. Jules Hatem	Triple E
Mr. Joseph Bechara	Lebanese Reforestation Initiative
Mrs. Roupina Toumassian	Difaf
Mr. Mohamad Boudaya	Wastewater engineer, Municipality of Ablah
Mr. Farid Karam	ELARD
Mr. Salam Battani	BTD
Mrs. Fatima Sidaoui	Reseacher

Mr. Ghassan Tayoun	Union of Municipality of the North / Municipality of Zgharta
Dr. Karim Eid Sabbagh	IWMI consultant
Dr. Salim Roukoz	IWMI consultant
Javier Matteo Saggasta	IWMI project leader
Dr. Gihan Bayoumi	IWMI project manager
Mr. Mohamed Tawfik	IWMI-Cairo Office
Mrs. Marie-Hélène Nassif	IWMI project coordinator in Lebanon
Mr. Bassam Jaber	IWMI ambassador in Lebanon
Mr. Jean-Emmanuel Rougier	LISODE
Mrs. Audrey Barbe	LISODE
Dr. Marie-Thérèse Abi Saab	LARI

The workshop gathered a total of 38 participants, with a gender ratio close to 50% (more precisely, 53% men and 47% women), coming from 23 distinct institutions or organisations (non including the project partners).

Figure 2: Registration table and round badges given to the participants

Report of workshop activities

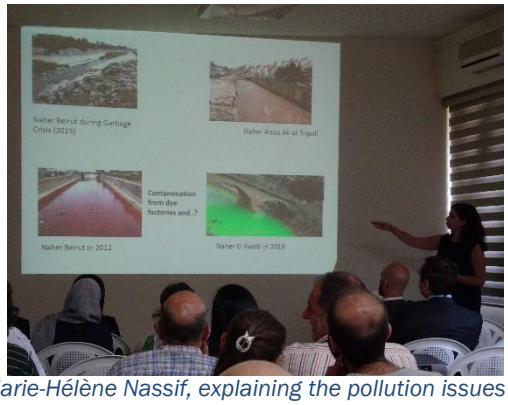
Opening sessions: plenary presentations

The workshop started with welcoming remarks given by Dr. Marie-Thérèse Abi Saab from LARI and Javier Matteo Saggasta, IWMI Project Leader.

The Regional Project Manager Dr. Gihan Bayoumi opened the plenary sessions with an overview of the ReWater MENA project, its objectives and different activities in Egypt, Lebanon and Jordan. After that, Marie-Hélène Nassif, project coordinator in Lebanon, gave an overview of the wastewater sector in the country and presented the Lebanese activities planned both at national and local scale, underlining how the participatory approach is an integral part of the project implementation. Then, Dr. Marie-Thérèse Abi Saab presented LARI's contribution to the ReWater MENA project with an emphasis on the experimental field trials currently conducted in Tel-Amar (Bekaa). Finally, Jean-Emmanuel Rougier (Lisode) ended the plenary session with a quick introduction to the concept of National Learning Alliance (NLA) and highlighted the fact that stakeholder's engagement and collaboration along the project is crucial to the success of the different national and local activities.

Javier Matteo Saggasta, opening the workshop

Dr. Gihan Bayoumi, giving an overview on the ReWater MENA project



Marie-Hélène Nassif, explaining the pollution issues in Lebanon and the project objectives in the country

Dr. Marie-Thérèse Abi Saab detailing LARI's contribution to the ReWater MENA project in Lebanon

Figure 3: Members of the ReWater MENA project during the plenary sessions

Cross presentations between the participants

For this cross-presentation activity, the participants were asked to group by three and encouraged to choose the persons they knew the least. They had 10 minutes to present themselves within their group and individually share 1) the most important issue and, 2) the best opportunity they see for reuse to be implemented in Lebanon. They then wrote these two ideas on an orange and a blue card respectively. After that time, the different groups came three by three and presented each other in

front of everyone. The presentations were done in a creative way: participant A presented participant B, saying their name and institution as well as the issue and opportunity stated by participant B; participant B did the same concerning participant C; and so did participant C concerning participant A. The Figure 4 below shows this presentation time.

Figure 4: Three participants contributing to the cross-presentation activity

Results of the presentation

The Table below is a transcription of the participants' different ideas, based on the cards written and presented during the cross-presentation activity. The original version is presented in the Annex: Posters from the working group sessions".

Opportunities	Issues
Sustainability	Level of operation of the wastewater treatment plant
Climate change adaptation	Technical operation and maintenance of wastewater treatment plants to set good effluent
Water conservation and plants' self-sustainability	Lack of proper monitoring (instruments for quality analysis)
Ensure a larger amount of water for irrigation and ability to sell this additional amount to guarantee income that could contribute to a sustainable operation of wastewater treatment plants	Mismatch between wastewater treatment plant & available sewers
Reduce input cost	Operation and maintenance of wastewater treatment plant by qualified technicians
Increase strategic water reserves	1/ among the 40 wastewater treatment plants in south Lebanon, only 5 are operated, we are working on this point; 2/ Lack of qualified technicians in operating wastewater treatment plant
Water conservation	Continuous maintenance
New resources, less pollution	Operation and maintenance
More water availability	Specialized inspection teams
Reduce water scarcity	No prerequisite for industrial effluent before discharging into sewage
Potential solution for meeting the increasing demand of water	Wastewater treatment plant not really treating wastewater
Increased water-stress in many watersheds	wastewater treatment plant mostly NOT OPERATIONAL ➔ bad quality ➔ problem of / no trust
Alleviate scarcity	Most wastewater treatment plant have only PRELIMINARY
More water	
Minimize pollution	
Reforestation	
Aquaculture	
Already un-treated wastewater is used by farmers (kind of acceptance)	

Farmers are willing to use wastewater Reduce cost of irrigation water Contribute to a better awareness related to the treatment and reuse of wastewater Reflect on the problems of wastewater Upgrade the wastewater treatment plants Upgrade wastewater treatment plant and operate them well with corrective maintenance New treatment techniques (reedbeds for small wastewater treatment plant) New initiatives are there We have this participatory approach that will link the field results to policy makers Citizen awareness More equitable distribution Urban green belt Most of needed data is available National database on wastewater	TREATMENT Monitoring treated water quality Contamination or health issue Lack of awareness Public acceptance Wastewater – People are disgusted Governance Implementation – political will (e.g. wastewater treatment plant in Tripoli) Lack of coordination among stakeholders 166 wastewater treatment plants / lack of ownership Weak development planning and coordination at all scale Regulatory framework Overcome fragmentation No law authorizing the use of treated wastewater for irrigation Lack of knowledge on the long-term effect on soils If water is not priced correctly, the use of safe treated water will not be appealing / convenient Are the farmers really willing to use treated waste water in agriculture? Support farmers for safe wastewater reuse No awareness campaign on the reuse topic Access to data

The participants saw in wastewater reuse an opportunity that comes along with the idea of having more water, water of better quality, less water stress and in other words, decreasing the pressure on water resources; this was stated by around 10 participants. Also, reuse is perceived as an opportunity to improve treatment, operate wastewater treatment plants, operate them correctly and/or consider new treatment techniques (5 participants).

3 participants consider that reuse is an opportunity to improve sustainability and see it as mean of adaptation to climate change. 3 participants see that the current practices of farmers as an opportunity, as some of them seem to be already using wastewater (treated or not), and 2 participants highlight other topics such as aquaculture and reforestation as fields where treated water can be reused.

Concerning the issues that hinders the implementation of reuse, the problem of operation and maintenance of wastewater treatment plants is clearly the most important concern for participants; 14 of them have insisted on this problem, highlighting the lack of water quality monitoring and qualified technicians. Another 7 participants mention the problem of coordination, governance and the lack of political will. 3 participants pointed out the farmers' willingness to use treated wastewater as an issue, notably from an economic point of view. The question of acceptance is also highlighted by 3 participants.

Access to data was interestingly identified as both an issue and an opportunity. According to some participants, all required data exists and is available; but on the other hand, access to this data is considered to be an issue. Finally, working on awareness was pointed out as necessary to have a better implementation of water reuse.

The cross presentation activity was a successful transition between the plenary presentations and the following group sessions. It allowed participants to "break the ice", get to know each other in an original way, and introduced the interactive approach that shall be adopted in the next sessions. The

participants' opinions related to wastewater reuse opportunities and obstacles were rich and diverse. The most highlighted opportunity was the fact that reuse contributes to relieving water stress, which is explained by the conditions of water resources in Lebanon, which are currently over-exploited. Unsurprisingly, the problems of the wastewater sector were largely highlighted to be an obstacle to expanding reuse (low level of treatment, problems in O&M); conversely, reuse was considered as a good opportunity to reflect on these problems and potentially improve them.

Working group sessions

In the second part of the workshop, the participants were split into 4 working groups. Two groups were facilitated by Lebanese facilitators, one by an Egyptian facilitator and another one by a French facilitator, all trained by Lisode team previously in the year. The different working groups were constituted in advance, in a way to ensure that everyone could speak Arabic, English or French according to the language they feel comfortable with. The working groups were also constituted to mix different stakeholders and points of view in each group. The badge colour indicated the group.

For each activity, the objectives and the proceedings will be presented. The results of the discussions will be then presented in a table developed based on the original posters created during the workshop. All the posters can be found in a readable half or full page format in the "Annex: Posters from the working group sessions".

Activity 1: "What are the necessary conditions to implement safe water reuse in Lebanon?"

Activity 1: Objectives and proceedings

A brainstorming activity gives the opportunity to open up discussions and allows different viewpoints to be expressed. One of the objectives is to enable each participant to express their opinion and to ensure all viewpoints are heard. A brainstorming method is used to generate a wide range of ideas in a short space of time while involving all participants.

The session started with the facilitator giving the instructions to the participants. Facilitators gave participants three cards, to write down the most important ideas they have related to the question "**what are the necessary conditions to implement safe water reuse in Lebanon?**" Participants had few minutes to write down one idea per card. After that, the facilitator asked them to give him the card with the idea they judge the most important and stuck the cards on the board, trying to group similar ideas. When the cards were not sufficiently explained, the facilitator asked for clarifications to make the card more understandable. Several turns were made, and the brainstorming lasted as long as there were new ideas. At the end, each facilitator encouraged the participants to vote for the most important ideas on the board. They were given small stickers and asked to vote for individual ideas (their own ideas or ideas from other participants) or for the different clusters of ideas formed along the process.

Activity 1: Results of the working groups

The table below shows the translation of what was discussed in each group. Note that what is written in brackets like "[standards]" was added afterwards in order to help the reader understand the different categories, whereas the words without brackets were written by the group during the activity. The sign "+" refers to the votes made at the end of the session.

What are the necessary conditions to implement safe water reuse in Lebanon?

<table>
<tr><th>Group 1 facilitated by Audrey</th><th>Group 2 facilitated by Karim</th></tr>
<tr><td>[Farmers and end-users] (+)
Farmers' readiness to irrigate with treated wastewater (acceptability)
Farmers are aware of the health risks of using non-safe wastewater
Low tariffs (for farmers) (++)
Involving users in the whole process (+)
Consider potential for reuse before implementation of wastewater treatment plants (++++++)</td><td>Operation and maintenance
Planning, master plans include NWSS
Availability of testing laboratories
Operators training
Awareness and capacity building for technical personnel
Monitoring and auditing (MoE) (+++++)
Treated effluent quality assurance (+)
Specialized inspection teams (for WWTP and irrigation network)</td></tr>
<tr><td>[Standards]
A standard is not mandatory. It has to go through a technical legislation procedure to become mandatory.
Adopt standards and enforce law (+)
"Realistic" standards adopted for treated water reuse
Well treated wastewater = treatment that matches national standards (++)
Well known national standards on WW reuse -> have approved standards (LIBNOR, Ministries, etc.)
Understand the "safety nets": why don't we have more epidemics? (despite the very low percentage of treated water)</td><td>Infrastructure (+++)
Finding the infrastructure for collecting wastewater (+)
Functional WWTP with effluents respecting the regulations
Use of energy efficient equipment in new plants and renewable energy to the wastewater treatment plant
Use the Scada system that is already in place at most plants to monitor them from a central office
Safe treatment (+)
Use different disinfection techniques based on the use of treated water</td></tr>
<tr><td>[Institutional component]
Clarify institutional framework and responsibilities (+++)
Institutional aspects: norms; law; investments (Build, Operate, Maintain)</td><td>Public awareness (and institutional)
Raising awareness about the proper ways to reuse water?
Enhance awareness at community and institutional levels about the use of treated water in irrigation
Explain the pros and cons of water reuse to the end-target</td></tr>
<tr><td rowspan="3">[Technical aspects relater to water quality]
Produce safely treated water
Reliable means of evaluating waste water quality (technical expertise, human resources available, etc.) (+)
Technical aspects: good treatment; O&M; skilled technicians; continuous electricity (depends on the type of treatment)
Understand / identify at which level monitoring would be most efficient [for users & depending on public institutions capacities] ➔ then, have standards & protocols for monitoring
Stormwater goes to sewage network, then to WWTP, which is the cause of heavy metals pollutions of wastewater (+)</td><td>Government governance
Establish norms and standards for the treated wastewater: check available data treatments; fine tune; validate
Adoption of standards by the government
Issuance of laws and legislation after coordination between the different institutions
Enforcement of the laws: monitoring and analysis, cost recovery, etc. (++)
Secure necessary conditions for sustainable operation of wastewater treatment plants (+)
Sustainability includes: budget for operations, monitoring, reorienting option; at early stages, designs for less energy consumptions; reliance on easy to operate systems (+)
Observation and monitoring of the treatment process with full transparency</td></tr>
<tr><td>Consumer protection
Traceability of produce = governance at the market level (+)</td></tr>
<tr><td>[Political condition]
Political will (+++++)
Local will, local authorities, local organising (subsidiarity and participation)</td></tr>
<tr><th>Group 3 facilitated by Mohamed</th><th>Group 4 facilitated by Marie-Hélène</th></tr>
</table>

[Standards and regulation] Execution of standards Norms – "Codes and standards" **(+)** Legislation **(+++)** Regulation (pollueur = payer)	**[Standards]** First: Define "safe", "safe water", or "safe food – people" **(++)** Strict and enforced water quality standards Implementation of norms **(+)** Adequate regulations, including defining safe and minimal accepted levels
[Economic component] Price of treated water and its adaptability to the farmers' economic conditions **(+)** Budgets for operation and maintenance Subsidies for companies installing treatment centres Economic, logistic, regulation incentives	**[Coordination and governance]** Improve the contact between water establishments and municipalities to operate wastewater treatment plant Planning for reuse at the watershed level that account upstream-downstream relationships Governance Collaboration of different stakeholders (all on the same page)
	[Agriculture] Adoption of on-farm practices for the safe use of treated wastewater
	[Infrastructure and monitoring] Create independent monitoring units Proper monitoring of treated wastewater Proper infrastructure (including plants, networks, reservoirs, etc.) **(+)**
[Conditions for acceptability] Transparency of access to information Awareness Proper analysis for water quality **(+)** Citizens should trust and be confident to water quality	**[Economic component]** Existence of benefits / incentives **(++)** Making wastewater competitive **(++)**
	[Technical skills] University degrees for wastewater treatment plant operation and maintenance engineering **(+)** Technical skills for operation and maintenance actions
[Infrastructure and technical components] Control of private well production Upgrade wastewater treatment plant use **(+)** Proper storage + piping network Identify different applications for reclaimed water [Governance and Institutional component] Unified wastewater and irrigation utility (for region) Coops / committees capable of managing distribution networks (irrigation, private land)	**[Institutional and political component]** Clear institutional and regulatory framework **(+)** Political will **(+)** Who makes decisions at the end of the day? **(+++)**
	[Awareness and acceptability] **(+++++)** Acceptance by consumers (if reuse in agriculture) Awareness campaign and vulgarization Awareness campaign Marketing campaign aimed at seducing he public Public acceptance (terminology) water reuse in the circular economy

Activity 1: Cross-analysis between the different groups

The cross-analysis of the different results shows nearly the same "necessary conditions to implement reuse" to be raised by the 4 groups.

Two interrelated issues were **unanimously identified: first, the question of the reuse standards and second the institutional coordination and regulation needed in the wastewater and reuse sectors.** These ideas were found to be quite developed in 3 groups who underlined the distinction to make between standards and norms and pointed to the legislation work required to reach legal norms. For the last group, the question of the standards appears to be relatively less detailed than in the others. In this group, the issue of governmental coordination was more highlighted.

Another topic that also appeared to be quite unanimous is the question of **awareness and social acceptability of reusing treated wastewater** (whether from the perspective of farmers or other end-users). The issue of **operation and maintenance of wastewater treatment plants** was a fourth major point of discussion.

Some other topics were also addressed (although less detailed) by 3 groups out of 4, such as:

- The link between reuse, agriculture, farmers and end-users such as consumers,
- Water quality and the importance of having appropriate laboratories and water monitoring units to perform these tasks.

In terms of voting, the table below summarizes the topics and ideas that were voted for.

Group 1 (18 votes)	**Group 2 (20 votes)**
[Farmers and end-users] (+) Low tariffs (for farmers) (++) Involving users in the whole process (+) Consider potential for reuse before implementation of wastewater treatment plants (++++++) Adopt standards and enforce law (+) Well treated wastewater = treatment that matches national standards (++) Reliable means of evaluating waste water quality exist (technical expertise, human resources available, etc.) (+) Clarify institutional framework and responsibilities (+++)	Monitoring and auditing (MoE) (+++++) **Infrastructure (+++)** Finding the infrastructure for collecting wastewater (+) Safe treatment (+) Enforcement of the laws: monitoring and analysis, cost recovery, etc. (++) Secure necessary conditions for sustainable operation of wastewater treatment plants (+) Sustainability includes: budget for operations, monitoring, reorienting option; at early stages, designs for less energy consumptions; reliance on easy to operate systems (+) Traceability of produce = governance at the market level (+) Political will (+++++)
Group 3 (7 votes)	**Group 4 (19 votes)**
Proper analysis for quality (+) Price of treater water and its adaptability to the farmers' economic conditions (+) Upgrade wastewater treatment plant use (+) Norms – "Codes and standards" (+) Legislation (+++)	First: Define "safe", "safe water", or "safe food – people" (++) Implementation of norms (+) Proper infrastructure (including plants, networks, reservoirs, etc.) (+) Existence of benefits / incentives (++) Making wastewater competitive (++) University degrees for wastewater treatment plant operation and maintenance engineering (+) Clear institutional and regulatory framework (+) Political will (+) Who makes decisions at the end of the day? (+++) **[Awareness and acceptability]** (+++++)

The conditions that were found to be the most relevant in each of the four groups were respectively the following:

- To consider potential for reuse before implementation of wastewater treatment plants (6 votes);
- The monitoring and auditing, and the political will (5 votes each);
- The awareness and acceptability (5 votes);
- And the legislation (3 votes).

In a few words, we can say that the different groups identified similar "necessary conditions for the implementation of reuse", but ranked them differently and approached them with a various level of details. This can be probably explained by the participants' background, field of activity and experience.

Activity 2: Data required, data holders and data availability

Activity 2: Objectives and proceedings

The second session aimed at working on data identification and gathering related to the baseline assessment report. Previously in the workshop, Javier Mateo Saggasta from IWMI had made a quick presentation of this study, which objective is to assess "the wastewater reuse potential in Lebanon" and highlighted the need of good data for this work. This session intended to contribute and support IWMI work for undertaking the baseline assessment.

The process was quite similar to a brainstorming session in the sense that participants were asked to think about a specific topic and provide some knowledge and/or opinion about it. The only difference is that a framework was provided to support the brainstorming. It took the form of a diagram showing some of the different components of a reuse system. The first step consisted in making a list of the most important data needed for this study; after giving the participants some time to think, the facilitator collected the different cards, taping them on the craft paper similarly to what was done in the previous session. Then, the participants were asked to identify the respective data holders and assess the relative availability of each type of identified data.

Activity 2: Results of the working groups

Data	Who?	Availability
Group 1		
Population / inhabitants Masterplans Location of wastewater treatment plants Capacity of wastewater treatment plants	Ministry of Energy and Water, CDR, Litani River Authority, RWE	Yes, if contacts
Effectively treated load	Regional Water Establishments	
Costs for operation and maintenance for wastewater treatment plants	International funders, CDR, private companies, Regional Water Establishments	Not really
Water quality	Swiss Development Cooperation, Bekaa Water Establishment (for the Bekaa)	
Rainfall / evapotranspiration Quantity of water used for irrigation Source of water used for irrigation	USJ, LARI, CNRS, IRD, Lebanese Meteo National Service	Not free

Location of areas to be irrigated Crop pattern (water needs)		
Group 2		
WWTP Procedures to follow for water treatment Existing and proposed WWTPs Types of treatments and treatment levels Treatment level of existing and proposed WWTPs Treated effluent quantity of existing WWTPs Sludge quality / plant / treatment process Water balance (regional) Water usage / household / area Wells monitoring **Agriculture / irrigation** Agricultural / irrigated areas (crops / LUC, irrigation) Irrigation schemes (water users, government oversight) Quantity of water needed **Masterplans (infrastructure)** WWTP: capacity, treatment level, status (operational / not), monitoring analysis of water quality) Existing and proposed sewer networks Drip irrigation (basin, distribution network, metering devices, etc.) Case of Zgharta (farm lands using raw effluent)	Wastewater treatment plants operators Water establishments Ministry of Environment Consulting firms MEW, CNRS, FAO Regional Water Establishments Ministry of Agriculture, Regional Water Establishments, Ministry of Energy and Water, farmers and water suppliers Universities (but they don't share easily because of an ownership issue) Designers, project owners (CDR, Ministries) Municipalities Water establishments, LARI, LRA, CNRS and airports (rainfall and evapotranspiration)	Data quality issues? Law: right to access information Available Upon request for WWTPs operators Data available for specific areas Yes, yes, maybe, yes but may not be accessible Available Accessible through the appropriate channels
Group 3		
Quantity or capacity of wastewater Quantity of consumed water per household Design parameters + standards applied Need for independent transportation Know about the industrial wastewater (quantity, quality, location) Sludge destination) Operating cost (for a functional WWTP) Irrigation technologies and methods / practices Census Zoning / planning (land use) Cadastral maps	MEW, Ministry of the Interior, Municipalities, RWE, Litani River Authority, CDR Laboratories, Ministry of Public Works and Transport, consultants NGOs, Universities, private contractors, WWTP operators Cadastral offices, Ministry of Environment	Yes, eternal draft / review Yes, but expired Yes, but confidential Yes, but not necessarily true (from consultants, NGOs and ???)

Perception of export market Perception of export associations Perception of the irrigation users	LARI, Ministry of Agriculture, Ministry of Industry	
Group 4		
Water demand (agricultural)	Ministry of Agriculture, CNRS-L	No
Network of farmers		No
Irrigation schemes (in need of new water)		
Agricultural water consumption in targeted sites		
Types of fruits and vegetables we need to irrigate (category)		
Management of WWTP		
Status of treatment levels in WWTPs		
WWTP effluents (existing and planned / quantity and quality)	Universities, FAO, USAID, Regional Water Establishments, CDR, contractors	Yes at a cost
WWTP performance / effectiveness		Yes
Amount of treated water per WWTP		Depends
Usages of treated wastewater (irrigation, industries, discharge in the sea or a river)		Maybe
Types of existing vs needed irrigation methods for safe water reuse		Maybe
Availability of electricity in WWTP	CDR (+ contractors)	Maybe
Costs of operation and maintenance	Regional Water Establishments, Ministry of Energy and Water	Yes
Wastewater generation and fate (geolocation, quantity, quality)	Municipalities	Yes
Data on acceptance by communities (to assess awareness needs)	Donors	
Farmers and management of irrigations	Private sectors	Maybe

Results show that data can be categorized in three main fields: wastewater production, wastewater treatment and water use in agriculture. We can distinguish these categories in each group poster. Concerning data availability, it appears to be a consensus around the fact that the Ministry of Energy and Water and the Regional Water Establishments should already have most of the data required. A number of institutions were also identified to be having data, such as municipalities (since a number of them operate WWTPs, the Ministry of Agriculture for data related to agriculture and irrigation, universities, the private sector (consultancy firms, contractors and operators), etc. However, in each group, participants seemed to agree that accessibility to data was not easy or certain. Some data was identified to be accessible at a cost (meteorological data, updated satellite imagery). Data held by public institution was generally found to be "accessible through the appropriate channels", as stated by a participant in group 2. Another member of the group 3 explained that "if there is a will, there is data", which indicates that most of the data is not public and easily accessible.

These two brainstorming sessions served several purposes: first, these discussions came up with new ideas and perspectives around what should be focused on when assessing the reuse potential in Lebanon. Second, it contributed to defining priorities for the study, but also to identify the areas of interest and expertise of the different participants, and if/how they can contribute to the baseline

assessment. But beyond their functional objective, these collective discussions contributed to individual learning. According to their background and expertise, the different participants, including the facilitators, shared and received knowledge and information related to the particularities of the wastewater and reuse sectors in Lebanon.

Group reporting times

At the end of the two activities, the group reporting was conducted in working groups, and not in plenary as it is done in a number of cases. In turns, each of the groups visited the three other arenas, where facilitators gave a summary of the findings. The advantage of this set-up is that it enhances the active listening of participants: they stay in group, listen to one presentation at a time and have the opportunity to comment and express their opinion in a small arena. Also, this allows a better time management since participants do not have to listen to the restitution of their own work and topics they have been discussing in the past hours. Finally, it is a more interactive way for participants; it allows them to stay active and focused until the end of the workshop and move from one place to the other. The pictures below give an idea of these reporting times (see Figure 5).

Group 1 listening to the presentation of the work of group 2

Group 3 listening to the presentation of the work of group 4

Group 2 listening to the presentation of the work of group 1

Group 4 listening to the presentation of the work of group 3

Figure 5: Group reporting in working groups, for a more active and efficient restitution

Activity 3: Level of participation

Activity 3: Proceedings

This last activity of the workshop was not done in working groups but collectively. We presented the table showed in Figure 6 to the participants and explained how it would help the ReWater MENA project identify the participants' level of interest and willingness to contribute to the project. More specifically, they were given four different choices: 1) just to be informed of the activities; 2) share information without participating to public events; 3) participate to the project public events; or 4) be involved in the project overall reflection and share data and contacts. A distinction was made between the local and the national levels. We asked them to stick their badge in the columns that represents better their preference.

Activity 3: Results of the activity

The results were very positive as most of the participants (18 out of 20) showed willingness to actively be involved in the project; Only one participant (not living in Lebanon) preferred to be only informed and one other participant chose to share information without participating to public events. The others answers were equally distributed between participation to public events and willingness to be fully involved in the reflection, data sharing and contacts.

Figure 6: Most participants seem to be willing to participate in the project activities, both at national and local levels.

Evaluation of the workshop

At the end of the workshop, the participants were asked to fill in an anonymous evaluation form prepared by Lisode, containing the 8 following items/questions:

1. The objectives of the day were clear and transparent
2. The day was useful
3. I understand what the ReWater MENA project is about.
4. I know how I can contribute to the project.
5. The participants well represented the different stakeholders and points of view. If no, which stakeholder should be consulted?
6. The work method (tools, animation) was effective.
7. The facilitators were impartial with regard to the content of the discussions.
8. I had the opportunity to express and give my opinion.

For each of these questions, participants had the possibility to say if they "rather disagree", "rather agree" or "don't know". We gathered 21 evaluation forms by the end of the workshop; the results are presented in the Figure 7 below. .

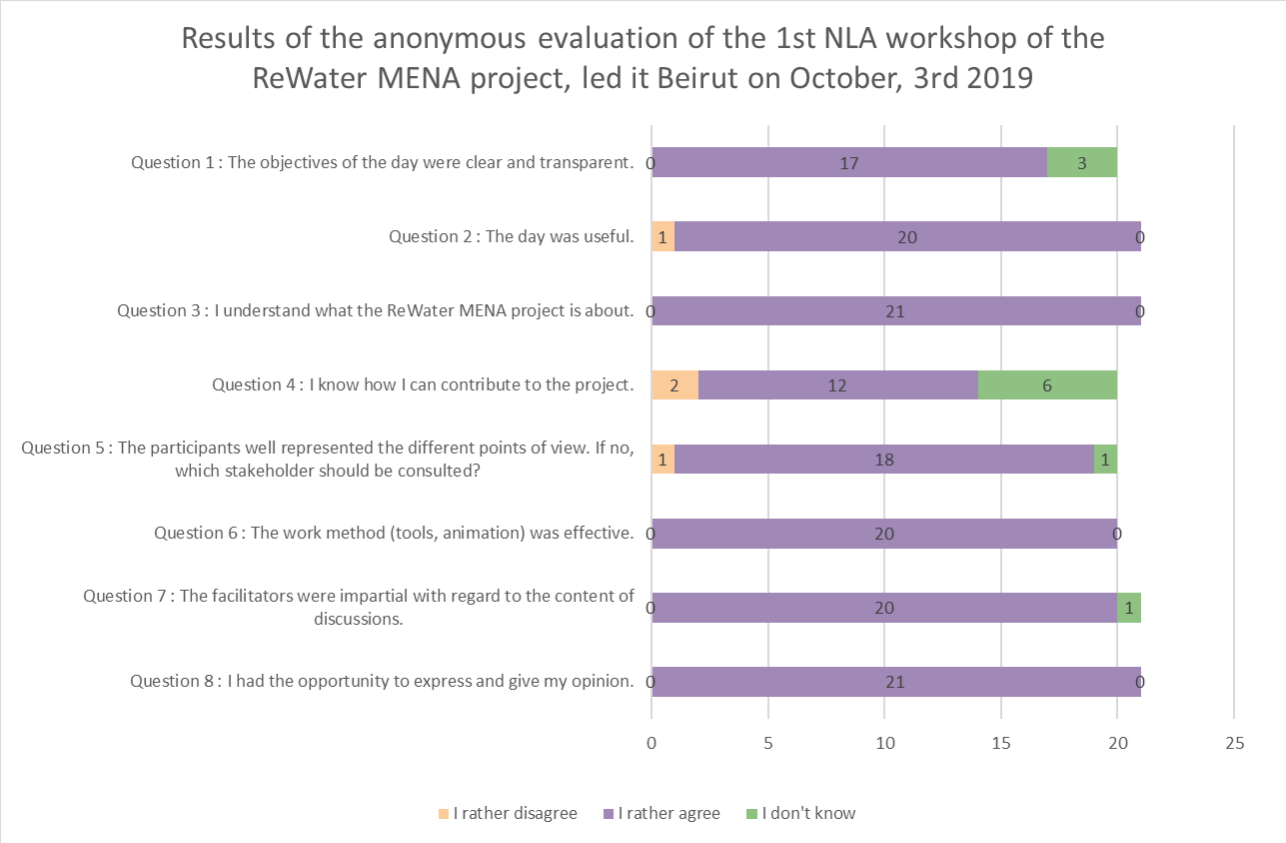


Figure 7: Quantitative results of the anonymous evaluation of the 1st NLA meeting in Beirut.

The overall quantitative results are **highly positive** with 11 "I don't know" and 4 "I rather disagree" out of a total number of 164 answers. We also received **very positive feedback on this interactive method**, coming for 6 participants (out of 12 who have written comments and recommendations).

The participants unanimously understood what were the ReWater MENA project's objectives and activities (question 3), found the work method effective (question 6) and had the opportunity to express themselves and give their opinion (question 8). Most participants found the objectives clear

and transparent, although 3 participants were not sure about it (question 1); only one participant did not find the day useful, but still interesting as expressed in the associated comment (question 2); and only one participant did not know if the facilitators were impartial (question 7). Two thirds of the participants appear to know how they can contribute to the project (question 4), 6 participants do not really know how to and 2 others disagree on the fact they can contribute to the project.

Concerning the question of stakeholders' adequate representation, only one participant does not agree on the fact that all stakeholders were represented and one person one does not know. However, most of the participants found that the workshop reached a good level of representation. Some suggested inviting farmers, consumers associations and more universities; others noted the absence of the CDR and the Ministry of Agriculture.

We shall explain that the two latter institutions were invited to be both part of the National Steering Committee and the National Learning Alliance. Both of them were met by the project team and showed interest in collaborating but are still not actively participating to the meetings. Recently, a representative from the MoA informed the project that they will do their best to participate in the future events. As for farmers, they are being involved in the local pilot studies, and it is planned that their participation to NLA workshop will come later in the project.

Several comments gave other insights: some participants found the data gathering exercise to have been confusing or repetitive, and another person wished this activity was further developed or given more in-depth reflection. Four participants stated they would have liked to have more details and/or the possibility to work in a more detailed manner. Two comments pointed out that the workshop was a bit too long and one participant recommended to the project team to make sure "there is life between 2 sessions", a quote taken from Jean-Emmanuel Rougiers (Lisode) when presenting the "level of participation" session.

Conclusions and recommendations

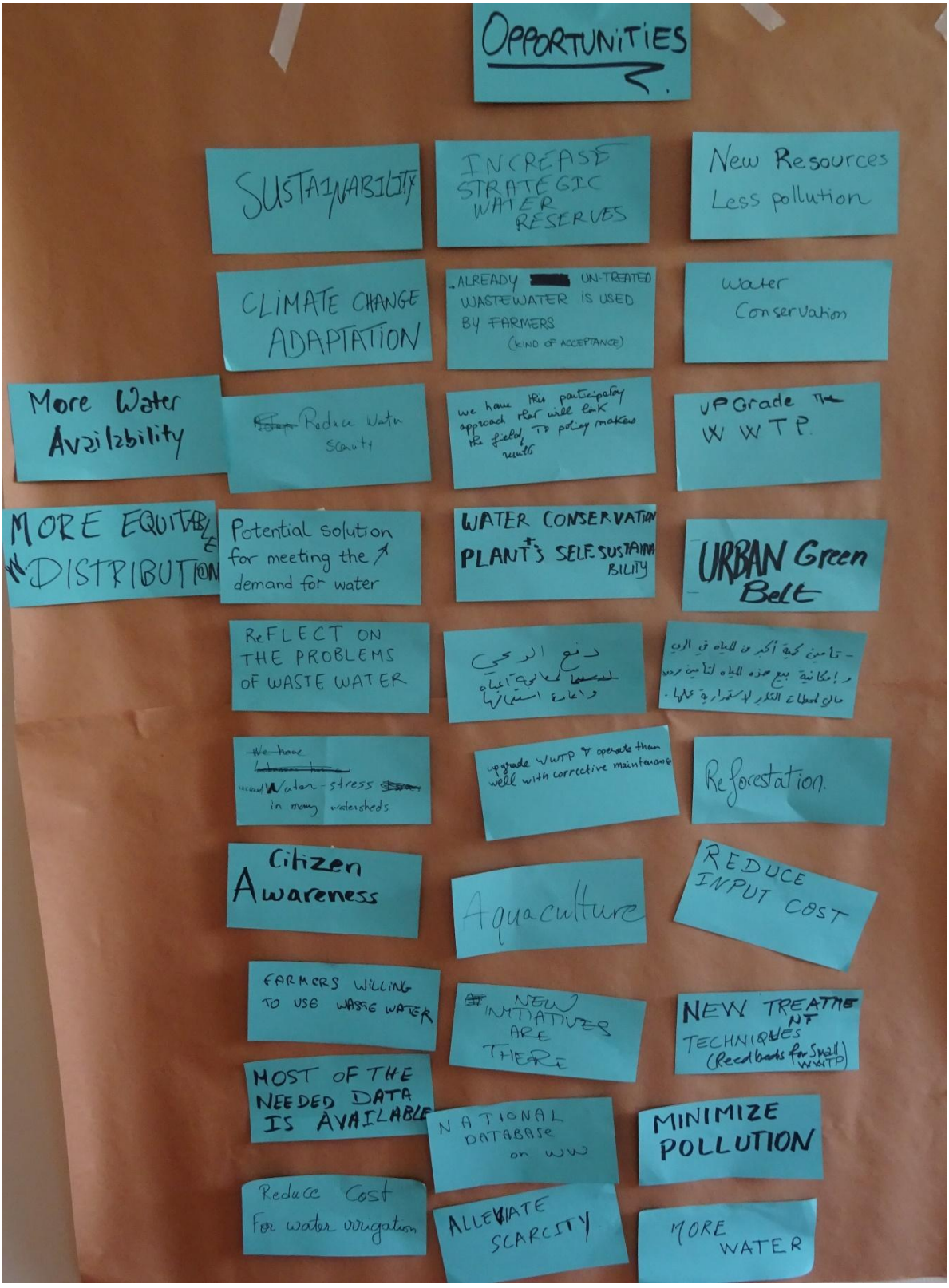
The outcomes of the first National Learning Alliance in Lebanon seem promising. The level of attendance to the meeting (around 80% of the persons invited), the dynamic atmosphere of the day, and the fact that participants of all age, statuses and background took active part to the different activities reveal that this approach would be very useful for organizing the future NLAs in Lebanon.

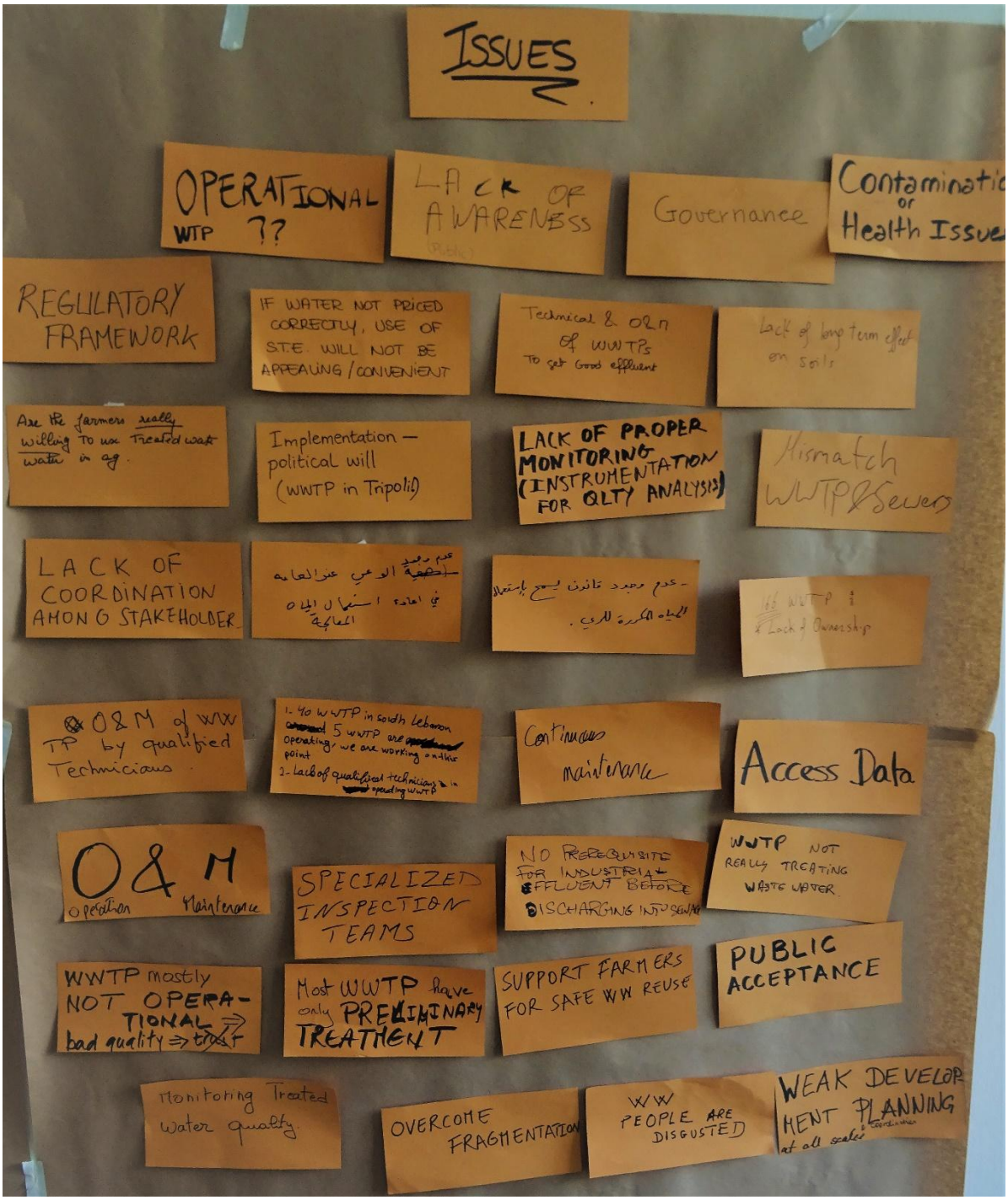
This first meeting allowed the project's objectives to be presented fluidly and to be discussed interactively. The two brain storming sessions were a good way to organize the discussions around the "necessary conditions to implement reuse in Lebanon" and to reflect on the needed data and its accessibility for the baseline assessment. Participants and facilitators were also able to get to know each other, share their ideas and perspectives on different topics, and learn from each other's diverse experiences and backgrounds. The evaluation showed that most of the participants are willing to play an active part in the project. It also showed that future NLAs would benefit from the participation of other public institutions (MoA and CDR), more universities and other actors such as farmers and consumers associations. It also pointed out that the activities' objectives might be more useful if better framed, a comment that the ReWater MENA will be taking into account for future meetings.

Finally, the project team wishes to thank all the participants that took part to the workshop, and renews its commitment to make participation an integral part of the project, ground all activities on the sector's opportunities and constraints, and maximize the participation of all stakeholders.

Annex: Posters from the working group sessions

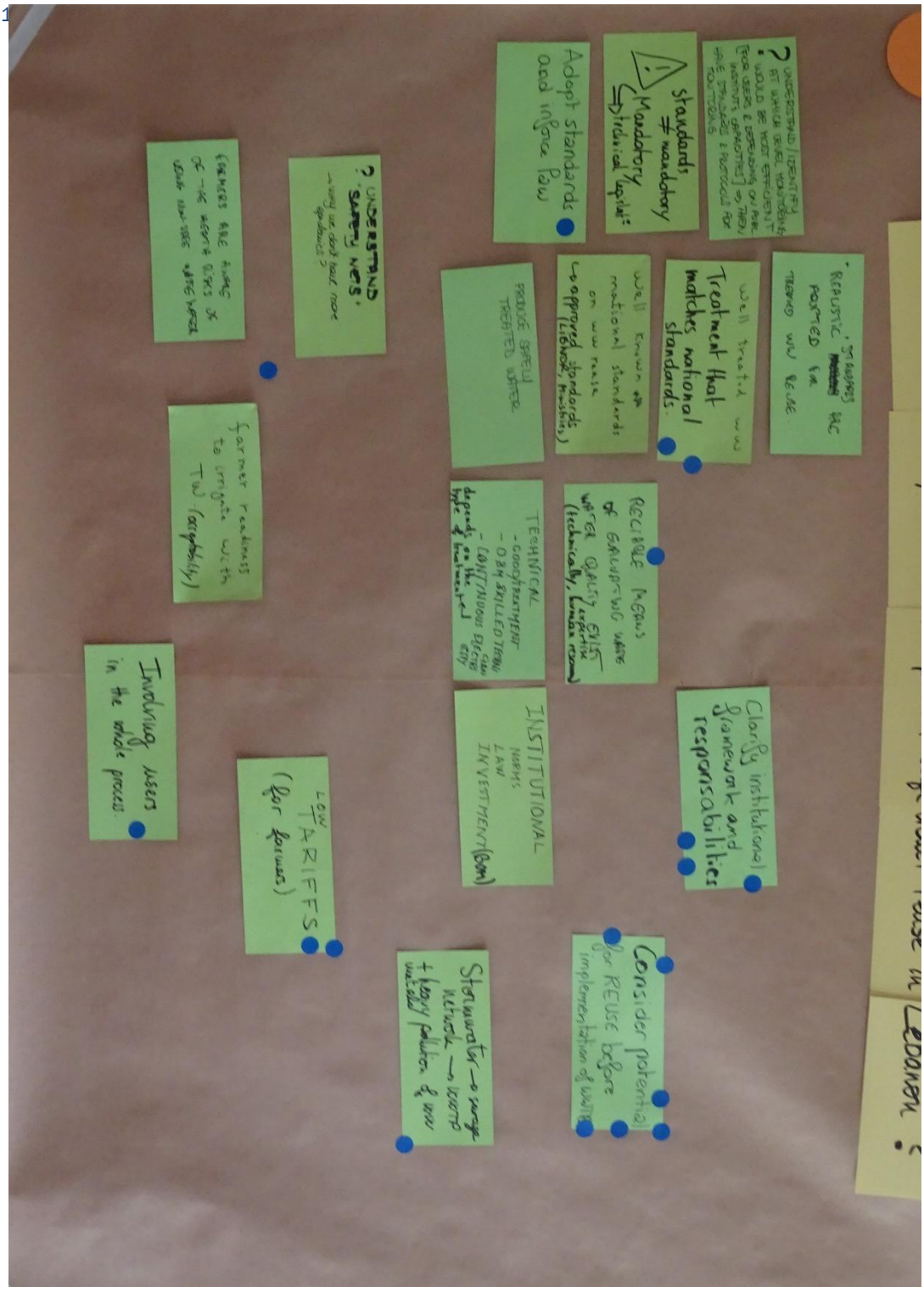
Cross-presentation activity



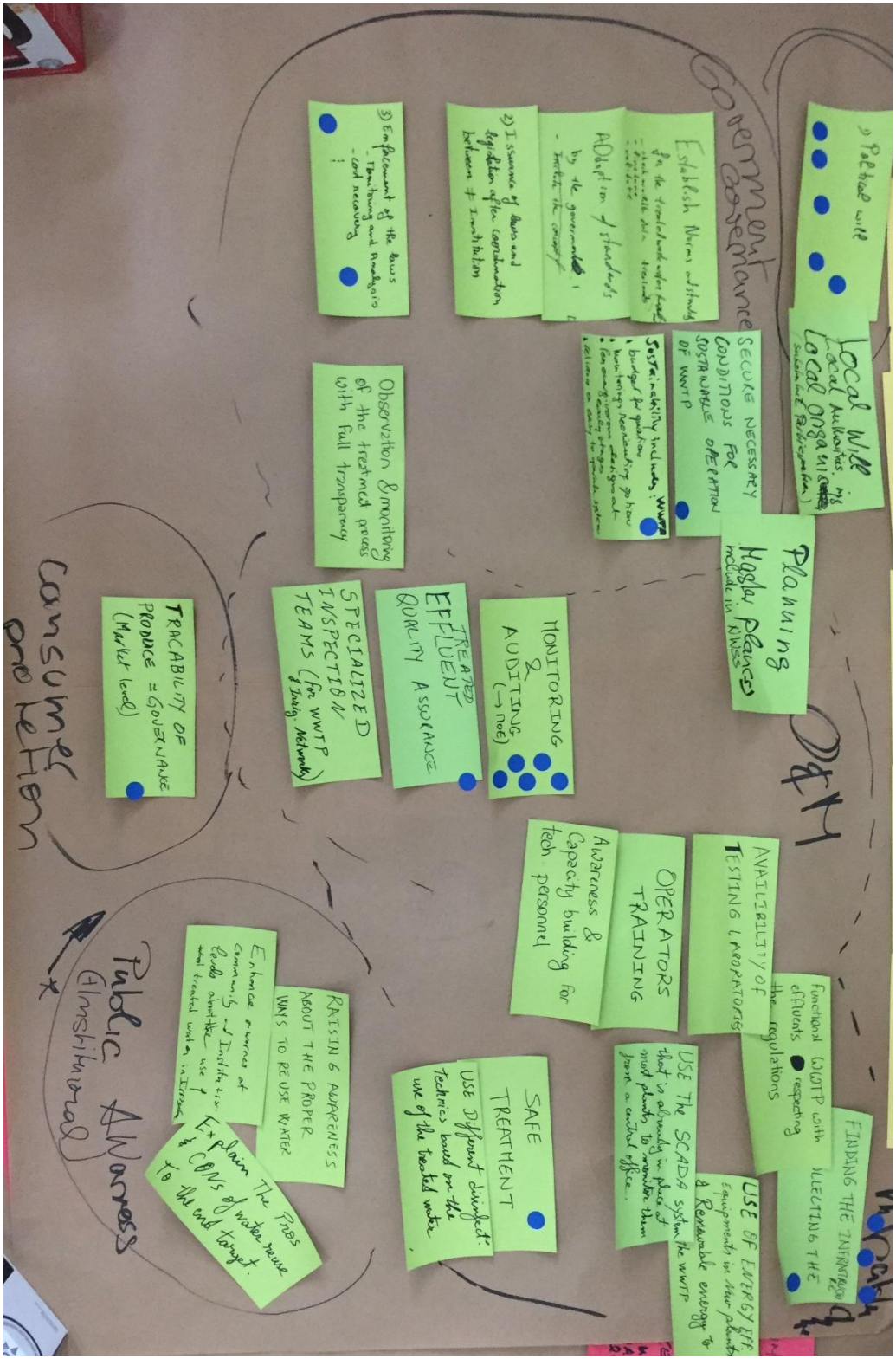

ISSUES
OPERATIONAL WTP ??
LACK OF AWARENESS
Governance
Contamination or Health Issues
REGULATORY FRAMEWORK
IF WATER NOT PRICED CORRECTLY, USE OF STE WILL NOT BE APPEALING / CONVENIENT
Technical & O&M of WWTPs To get Good effluent
Lack of long term effect on soils
Are the farmers really willing To use Treated wast water in ag.
Implementation — political will (WWTP in Tripoli)
LACK OF PROPER MONITORING (INSTRUMENTATION FOR QLTY ANALYSIS)
Mismatch WWTP & Sewers
LACK OF COORDINATION AMONG STAKEHOLDER
Lack of Ownership
O&M of WWTP by qualified Technicians
Continuous maintenance
Access Data
O & M
Operation
Maintenance
SPECIALIZED INSPECTION TEAMS
NO PREREQUISITE FOR INDUSTRIAL EFFLUENT BEFORE DISCHARGING INTO SEWAR
WWTP NOT REALLY TREATING WASTE WATER
WWTP mostly NOT OPERATIONAL bad quality
Most WWTP have only PRELIMINARY TREATMENT
SUPPORT FARMERS FOR SAFE WW REUSE
PUBLIC ACCEPTANCE
Monitoring Treated Water quality
OVERCOME FRAGMENTATION
WW PEOPLE ARE DISGUSTED
WEAK DEVELOPMENT PLANNING at all scales

Activity 1: Brainstorming on the necessary conditions to implement safe water reuse in Lebanon

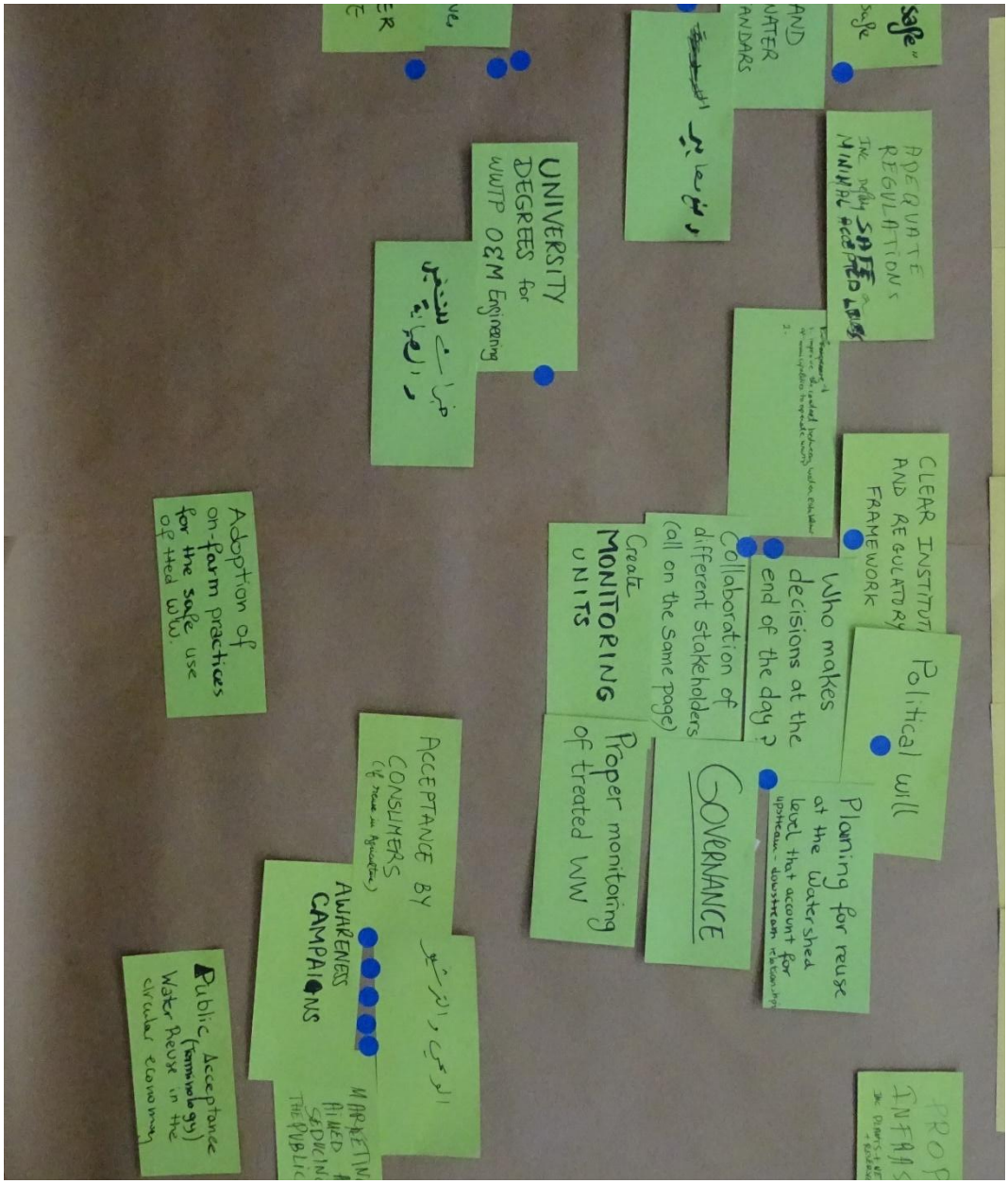
Activity 1, group 1



Activity 1, group 2



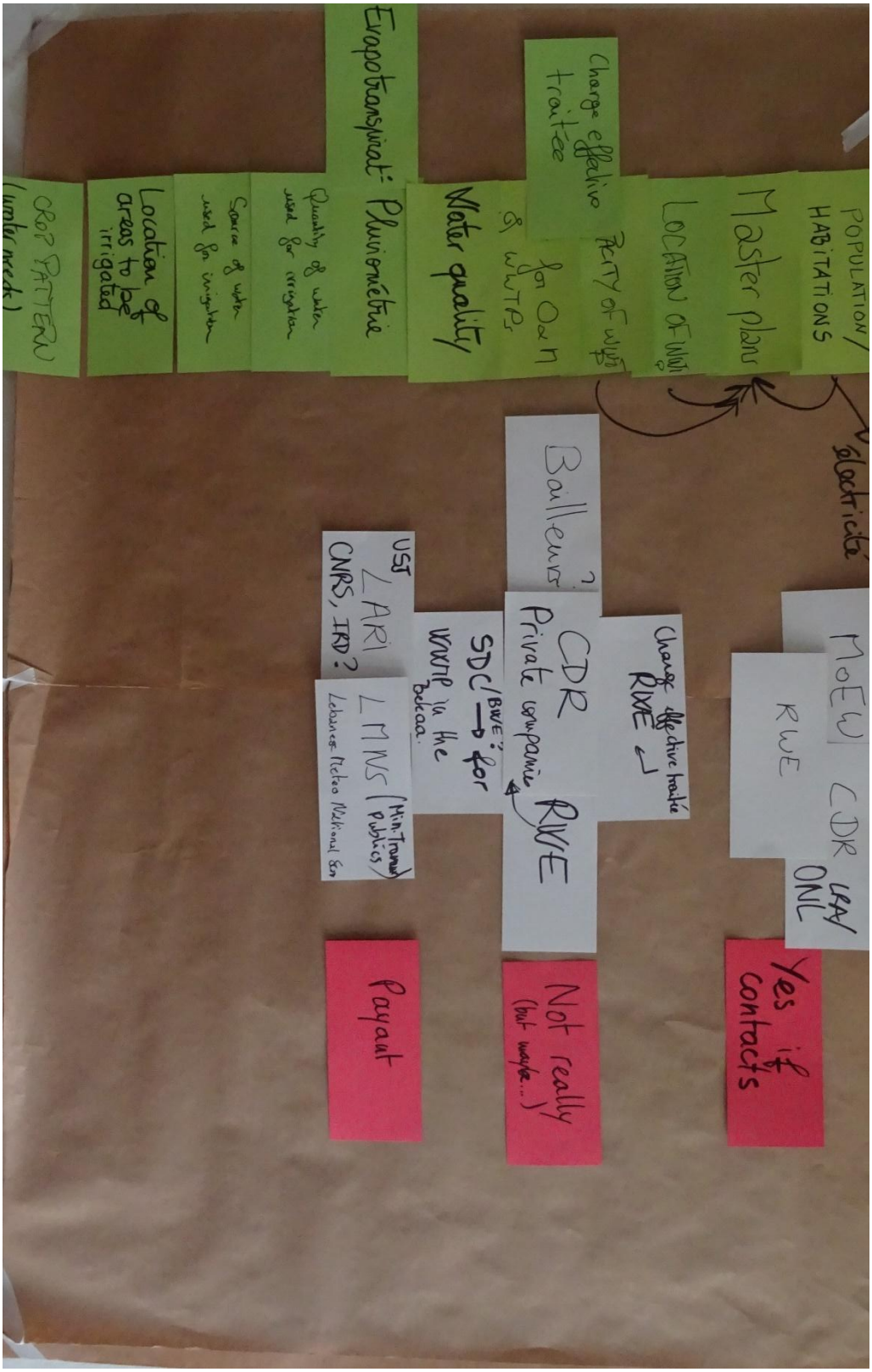
Activity 1, grou



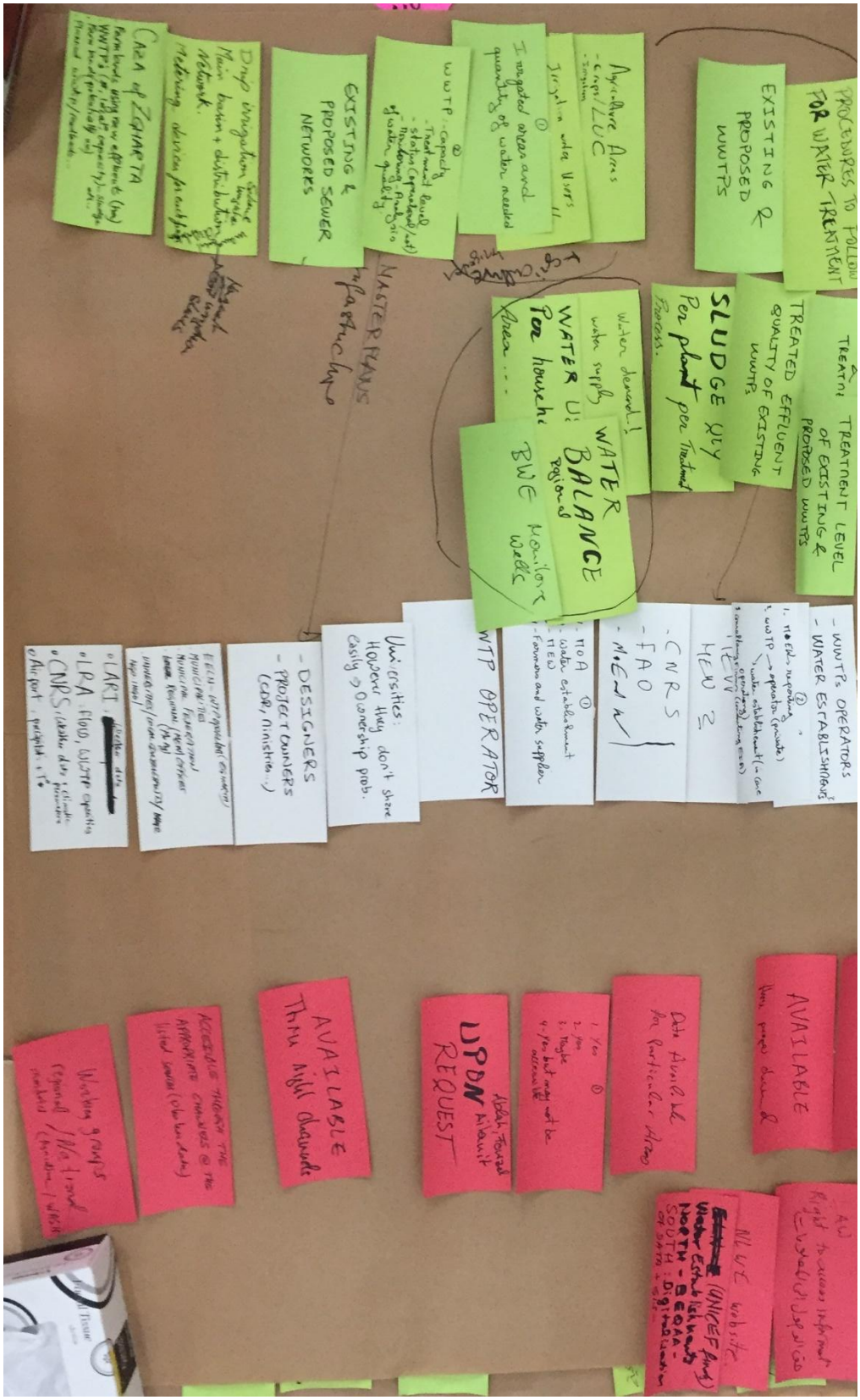
Activity 1, group 4

Activity 2: Data gathering

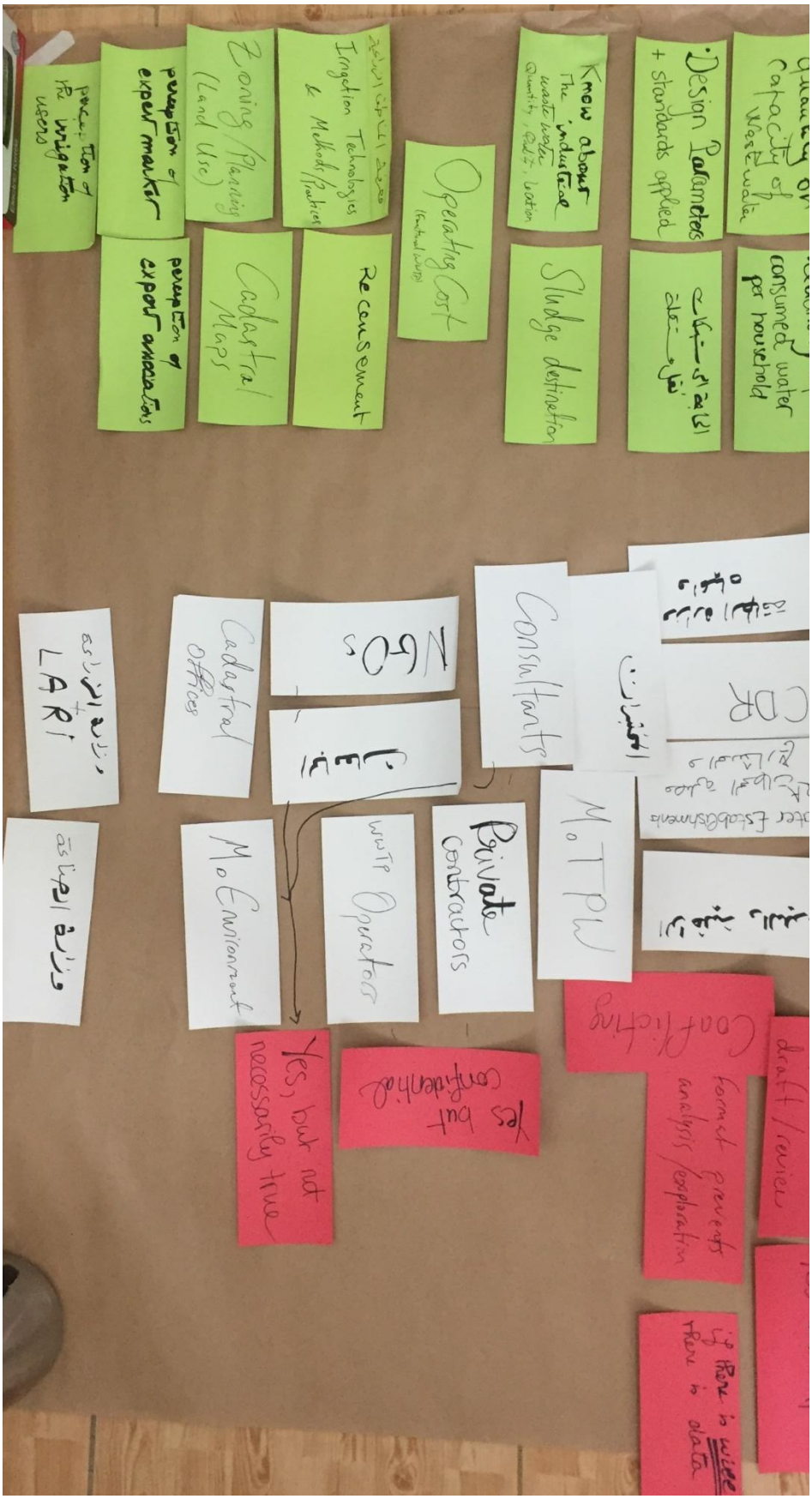
Activity 2, group 1

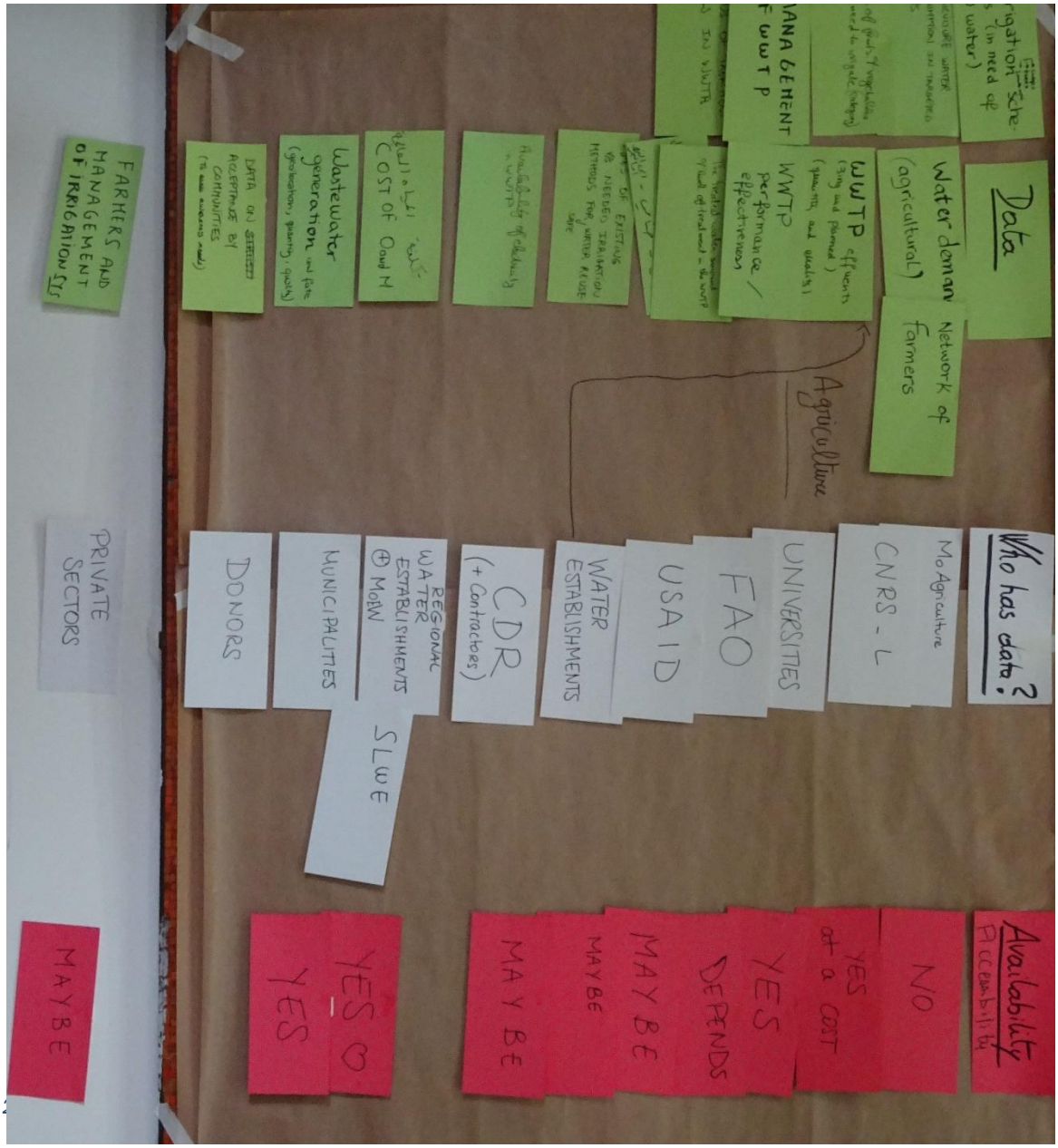


Activity 2, group 2



Activity 2, group 3




Data
Water demand (agricultural)
Network of farmers
WWTP
WWTP performance / effectiveness
Agriculture
Who has data?
Availability
Accessibility
MoAgriculture
CNRS - L
UNIVERSITIES
FAO
USAID
WATER ESTABLISHMENTS
CDR (+ Contractors)
REGIONAL WATER ESTABLISHMENTS ⊕ MoEW
MUNICIPALITIES
DONORS
SLWE
NO
YES at a cost
YES
DEPENDS
MAYBE
MAYBE
MAYBE
MAYBE
YES
YES
Wastewater generation
COST of O and M
FARMERS AND MANAGEMENT OF IRRIGATION SYS
PRIVATE SECTORS
MAYBE

Activity 2