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WATER INNOVATION TECHNOLOGIES (WIT)

Market Assessment & Intervention Strategy Report
Water Saving Market System in Jordan, September 2017

September 2017

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MARKET ASSESSMENT & INTERVENTION STRATEGY REPORT

Water Saving Market in Jordan

September 2017

DISCLAIMER

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Acronyms

ACC	Agriculture Credit Cooperation
CBJ	Central Bank of Jordan
CBOs	Community Based Organizations
GDP	Gross Domestic Product
GOJ	Government of Jordan
HHs	Households
INGO	International Non-Government Organization
JCC	Jordanian Chamber of Commerce
JCI	Jordanian Chamber of Industry
JSMO	Jordan Standards and Metrology Organization
MAIA	Ministry of Awqaf & Islamic Affairs
MFI	Microfinance Institutions
MOA	Ministry of Agriculture
MSD	Market System Development
MWI	Ministry of Water and Irrigation
NCARE	National Center for Agricultural Research and Extension
NGO	Non-Governmental Organization
RSS	The Royal Scientific Society
R&D	Research and Development
TBC	To be confirmed
USAID	United States Agency for International Development
WIT	Water Innovations Technologies project
YWC	Yarmouk Water Company

Executive Summary

What's the problem?

Jordan's **agriculture and horticulture** sectors, particularly its stone fruit and olive sub-sectors, are major consumers of its fragile groundwater resources taking up over half of the country's supplies, and much of that agriculture remains water inefficient.

Farmers and farm managers continue to employ sub-optimal water efficiency techniques in their production processes. The problem persists because water conservation skills and weak and training opportunities are limited; farmers turn to unproven sources of information and advice that may or may not be relevant to their situation; and few if any key input suppliers embed relevant production advice and information in their sales and marketing business models.

Whilst drip and other irrigation technologies are widely used, farmers and farm managers make ineffective use of more water-efficient technologies. Irrigation installation, operation and maintenance skills are often out-of-date; technology suppliers offer little pre- or post-sales services; and information on equipment standards is limited.

Farmers under-invest in water-efficient technologies, constrained by formal banking regulations and capacity to target appropriate products at agriculture.

Meanwhile, amongst **households** in Jordan's northern governorates water shortages and supply inconsistencies are becoming the norm, exacerbated by the large and growing numbers of Syrian refugees settling the region. The water crisis itself and the conflict it creates is growing as a result of poor understanding amongst individuals and households in both communities of the impact of specific water use behaviours and the benefits of more efficient practices. Prevailing campaigns have been poorly targeted, overly generic and inconsistent.

Demand for water saving and supply technologies remains patchy and supply, consequently, fragmented. Suppliers under-invest in promotion while households under-invest in their technologies.

Photo 1: Olive plantation, Jerash, Jordan

Photo 2: Tomato seedlings, Mafraq, Jordan

What needs to change?

In the agriculture sector, farmers and farm managers need to adopt increasingly water-efficient production techniques, technologies and practices. This can only happen once better embedded pre- and post-sales advice and training is available on good production and irrigation practices, provided by more active input and technology suppliers backed-up with quality technical and economic research and information. More informed farm-level decision-making would, in turn require appropriate finance and credit options that support water-conscious investment decisions.

For both Jordanian and Syrian **households and communities** to recognize and act upon the economic and social benefits of water-efficient behavior and technology investment requires the development and delivery of

better, more behavior-specific information and advocacy for water-efficiency from private as well as public stakeholders. Information and awareness must, nonetheless be supported by effective marketing and supply of a range of appropriate – and cost-effective – water saving devices, supply technologies and recycling systems linked, particularly for those households where finance is a determining factor, with appropriate formal finance and credit options.

What WIT will do – an opening portfolio

WIT's opening portfolio will prioritise where greatest water efficiencies can be found, provide for a balanced and manageable level of risk, and seek to exploit immediate opportunities and partnerships in search of sustainable solutions to the water efficiency challenges amongst farms and households

Agriculture priorities:

1. Increase farmer and farm manager access to quality information and advice on appropriate water-conserving production techniques, by:
   - *Enabling input suppliers and researchers to offer more appropriate advisory and extension services*
   - *Building linkages between private and public partners to strengthen research on water-efficient practices*
   - *Catalysing relevant, commercially viable production skills training for farmers and managers*
2. Build the market for, and uptake of, more efficient irrigation technologies, by:
   - *Mobilising technology suppliers to embed advisory support and information in their business models*
   - *Catalysing relevant, commercially viable training courses in irrigation installation and maintenance*
   - *Facilitating the introduction of credible technology quality assurance and standards*
3. Extend farmer access to appropriate finance in support of water-conservation investments:
   - *Facilitating regulatory reform on formal lending repayment terms and conditions*
   - *Catalysing the development and promotion of agriculture-oriented finance products*
   - *Encouraging banks and MFI investment in staff training to better meet the needs of agriculture clients*

Household priorities:

1. Target better information at specific water efficient practices and behaviours, by:

- *Facilitate better targeted behaviour change efforts from a diverse array of private & public interest groups*
- *Mobilise public and media investment in more effective, coordinated awareness raising on water issues*

2. Build the market for, and uptake of, water saving devices and water supply/recycling technologies, by:

- *Stimulating more active and effective product marketing amongst water saving device suppliers*
- *Mobilising effective and informed promotion amongst water supply technology suppliers and recycling system researchers and suppliers*
- *Facilitating greater individual and household access to finance for water supply and recycling investments*

1. Background and purpose

Jordan has one of the lowest levels of water availability per capita in the world. With the Syrian crisis adding a dramatic population increase, and the population expected to double by 2047, meeting water demand has become more critical than ever. The Government of Jordan (GOJ) and its development partners have prioritized the availability of clean drinking water, but a balance must be made between drinking water needs and industrial and irrigation water requirements. The agricultural sector consumes 50 per cent of the country's water (while contributing only 3 per cent to Gross Domestic Product). Meanwhile many Jordanians continue to believe that water supply issues are only linked to poor water delivery infrastructure and inequity in distribution. Few recognise how their own water use behaviour directly relates to unsustainable water consumption.

In March 2017, Mercy Corps began implementing the five-year USAID funded Water Innovations Technologies (WIT) project. WIT seeks to sustainably increase water conservation by focussing on water efficiency in both the agricultural sector and amongst communities and households. WIT's sustainability ambition is underpinned by its adoption of a *market systems development* approach. The project targets the northern region where ground water reserves are under extreme pressure, exacerbated by the influx of refugees from Syria, and the Jordan Valley. Both these areas host intensive ground water-fed agriculture. By 2022, WIT seeks to have 18.5 million cubic meters of water saved through adoption of new and proven water saving practices and technologies. This will contribute to more secure water supply for people of Jordan.

As part of the inception process, and in accordance with the *market systems development* approach, WIT conducted market assessments for both agriculture and household market systems for water conservation during July and August 2017. This report summarises the findings of those assessments and outlines intervention strategy for both agriculture and household market systems.

2. Methodology

A market assessment for both agriculture and household market systems sought to establish sufficient

understanding and evidence upon which to develop WIT's opening intervention portfolio[1]. The approach taken has been guided by Mercy Corps own in-house experience and expertise in market systems analysis and was guided by its in-house toolkit and guidance materials. In addition, the assessment design and subsequent data analysis drew on external support from two Springfield Centre consultants.

The assessment process employed a variety of information sources, including:

- ***Secondary data*** including published and 'grey' literature and reports from Government, donor and INGO projects and sources; previous Mercy Corps assessments; and studies and reports from other USAID water interventions in Jordan.
- ***Individual and group interviews*** with Jordanian farmers and farm managers; and farmer associations
- ***Focus group discussions*** with households and community representatives from both Jordanian and Syrian communities; and landlords
- ***Key informant/expert interviews*** including agriculture input and technology suppliers and retailers; agriculture and irrigation research, extension and advisory service providers; household water saving, supply and recycling technology suppliers; Government and water utility stakeholders; and formal and informal finance service providers

Agricultural assessment approach

The agriculture assessment used semi-structured interviews supported by interview guides to support 55 separate interview sessions (see table). Respondents were selected in order to ensure a broad representation amongst farmer/market player stakeholders. Additional respondents / interviews were added as and where important market linkages were identified during the assessment process. Private businesses were selected through a combination of those identified as more active in the sector and northern governorates, and those suppliers and retailers identified by farmer respondents.

Bank, MFI and other finance service providers were identified through previous assessment of those most active and/or likely to be active in the agriculture and environment sectors.

Type of Actor	Number of interviews	Average time
Agriculture assessment		
Farmers	14	2-3 Hours
MFI's	3	45 Minutes
Farmer associations	3	45 Minutes
Banks (commercial & Islamic)	4	45 Minutes
Farmer cooperatives	1	45 Minutes
Government representatives	5	1-1.30 Hour
Insurance companies	3	45 Minutes
Loan Grantee providers	1	45 Minutes
Retailers	9	1-1.30 Hour
Manufacturers / suppliers	4	1-1.30 Hour
Suppliers	5	1-1.30 Hour
Technical Advisors	2	45 Minutes
NGOs	1	45 Minutes

Household assessment approach

Type of Consultation	Number of consultation	Number of participants
Household assessment		
Focus group discussions	24	200

[1] Market system assessment and analysis is an on-going process that will continue to be informed by project experience and learning.

Key informant interviews	28	28

The household assessment encompassed a combination of both quantitative and qualitative research methods. Quantitative data from water utilities on water consumption per capita across the target area provided baseline information to support geographic and community selection for subsequent qualitative research.
Subsequent qualitative research work (see table) combined both focused group and key informant interviews and followed a guided 'conversation style' methodology.
Separate focus group discussions were held with Jordanian women, Syrian women, Jordanian men (including landlords), and Syrian men in Jerash, Ajloun, Mafraq, Irbid and Azraq. Groups included respondents of a range of ages.

Key informant interviews were also conducted in Jerash, Ajloun, Mafraq, Irbid and Azraq. These also involved Jordanian and Syrian women and men representatives of all age groups, but targeted those identified as influencers at their respective communities, as well as landlords.

3. Target beneficiaries and their context

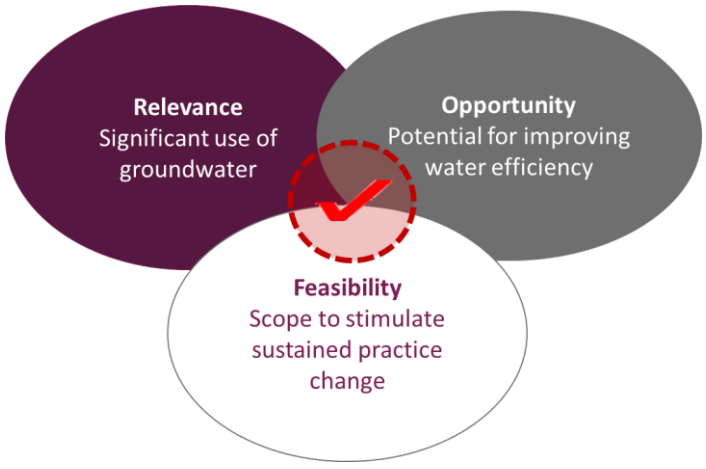
WIT targets high levels of water inefficiency in two distinct market systems:

- Agriculture and horticulture particularly farmers drawing on dwindling groundwater sources in northern governorates, as well as the Jordan valley; and
- Households and communities (domestic users) in the northern governorates from both Jordanian host and Syrian refugee communities.

The market assessment was used to further define and prioritise sub-groups amongst the two target groups at which to focus opening WIT interventions and activity. It is important to emphasise that this prioritisation process does not nor should it exclude other high water users in other farming or household communities. As the project matures and identifies successful partnerships and practice changes, these will provide the basis on which WIT scales up its interventions and expands to address the constraints facing other sub-groups amongst farmers and households. With the above in mind, the following summarises and provides the rationale behind WITs initial focus on specific agriculture and household target groups.

a. Agricultural water users

The scope of targets within agriculture and horticulture is potentially very broad, both geographically (including northern and eastern Badia governorates to the Jordan Valley) as well as in terms of farming systems (e.g. different horticulture products and systems; fruit, olive and other tree crops; and a diversity of agro-ecosystems in which those crops are produced).
Consequently, it has been important for WIT to focus, in the immediate term, in order to identify and pilot a manageable range of innovations and practice changes before it seeks to scale and expand its outreach. Building on market systems good practice, three criteria were applied to support this initial prioritisation:



- Relevance in terms of significant use of groundwater sources
- Opportunity to realise water efficiency benefits
- Feasibility for WIT to intervene and stimulate sustained change

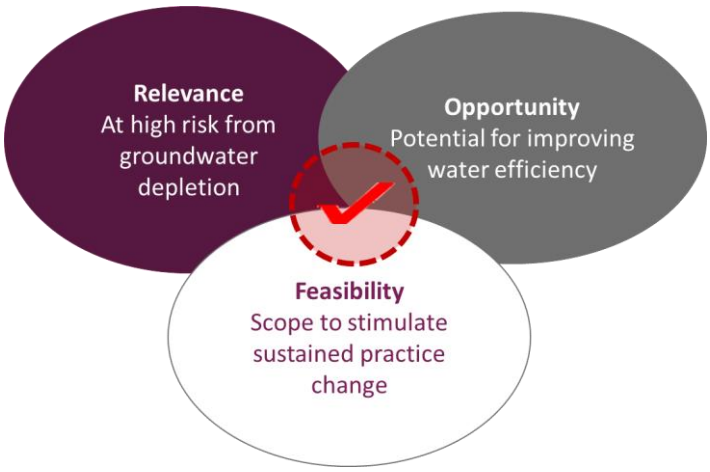
Criteria	Assessment
Relevance	Mafraq and Azraq, in the east (Badia) are both significant agricultural production areas and dependent upon groundwater sources. Groundwater consumption is high, annual rainfall low and prevalence of both legal and illegal wells is high. Approximately 95% of agriculture in Mafraq governorate is under irrigation. The western highlands and Jordan Valley, whilst also being within the geographic scope of WIT and large highly efficient agriculture and horticulture areas, nevertheless are less dependent upon groundwater sources and, for that reason, are considered a lower priority to the eastern target area.
Opportunity	Stone fruit and olive production has increased significantly in the Mafraq and Azraq areas, and both crops require large quantities of water. Evidence suggests that previous market incentives have driven this growth whilst not encouraging adoption of the best practices in tree and crop production and water application. Large numbers of medium-sized farms (i.e. 200-1000 dunam) operate and, as a group, account for the greatest proportion of production and water use. Many of their production methods, however, are significantly less water-efficient than the limited number of large-scale, more professional farms. The scope for increasing water efficiency amongst the medium-sized farm segment is, therefore, considerable.
Feasibility	Many large-scale producers are already relatively water efficient, whilst small-scale farmers lack the commercial capacity to invest in modern practices and technologies. Unlike medium-sized farmers, some smallholders are also the recurrent target of donor support and may be expected to lack incentive to engage in a more market-oriented intervention such as WIT. It therefore remains the medium-sized farmers who demonstrate both the capacity and incentives to up-grade their systems and invest in more water-efficient technologies and thus sustain practice changes if and where introduced. Suppliers of technologies and other relevant inputs also recognise the potentially significant market amongst large numbers of medium-sized farmers.

Based on the analysis above, ***WIT's opening portfolio of interventions will target medium-sized stone fruit and olive grove farmers in the Mafraq and Azraq governorates.***

b. Household water users

In order to support initial targeting within the household market system, WIT again used three basic criteria to identify communities:

- Relevance with respect to being at high risk from groundwater depletion
- Opportunity to realise water efficiency benefits
- Feasible for WIT to intervene and stimulate sustained behaviour change



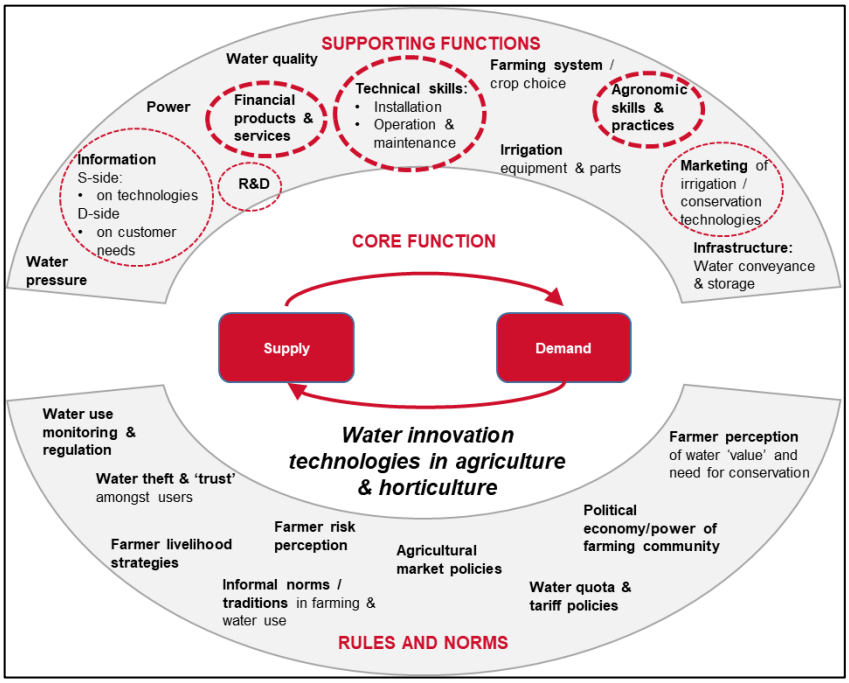
Criteria	Assessment
Relevance	Jordan's northern governorates (Jerash, Ajloun, Mafraq, Irbid and Azraq) have been those most immediately affected by the influx of Syrian refugees. The rapid decline in groundwater resources prior to the Syrian conflict has been accelerated immeasurably by the arrival of almost 2 million refugees over a 5-year period – many of whom remain spread across the northern governorates. Both host and refugee communities across the north are on 'the front line' of Jordan's water crisis.
Opportunity	The extent of the crisis in the northern governorates means water use and water saving is high on the agenda for most households, Jordanian and Syrian alike. It is also the case, however, that water conservation practices vary notably between these two communities since water is more abundant in Syria and refugees have to adapt to the scarcity Jordanians have lived with for many years. In this sense there is opportunity to increase efficiency amongst refugee communities and, at the same time, scope to reduce tensions between host and refugee communities over water consumption. Evidence also points to significant wastage in both communities through sub-optimal water use practices, behaviours and investment decisions. The prevalence of available water saving devices, water supply and recycling technologies varies significantly but, region-wide, uptake rates are generally low. Opportunity exists to increase efficiencies through specific behaviour changes and investment in appropriate technologies, particularly in kitchen and bathroom environments where most water is currently used.
Feasibility	The level of water-conscious behaviour and practices appears to vary between communities, households and individuals. Understanding of the impacts of different practices is variable and prevailing efforts to raise awareness and encourage behaviour change appear to have had inconsistent results. The variation in practices, however, and pockets of technology up-take suggest changing water conservation behaviours – whilst difficult – is nevertheless possible.

Based on the analysis above, ***WIT's opening portfolio of interventions will target all households across the northern governorates of Jerash, Ajloun, Mafraq, Irbid and Azraq but focusing on practice-specific behaviour change and technology investments within the house.***

1. Core market systems

1. 1. Agriculture water saving 'system'

The market system diagram shows the supporting functions and rule functions that are important for the effective functioning of the market system for water saving in agriculture.



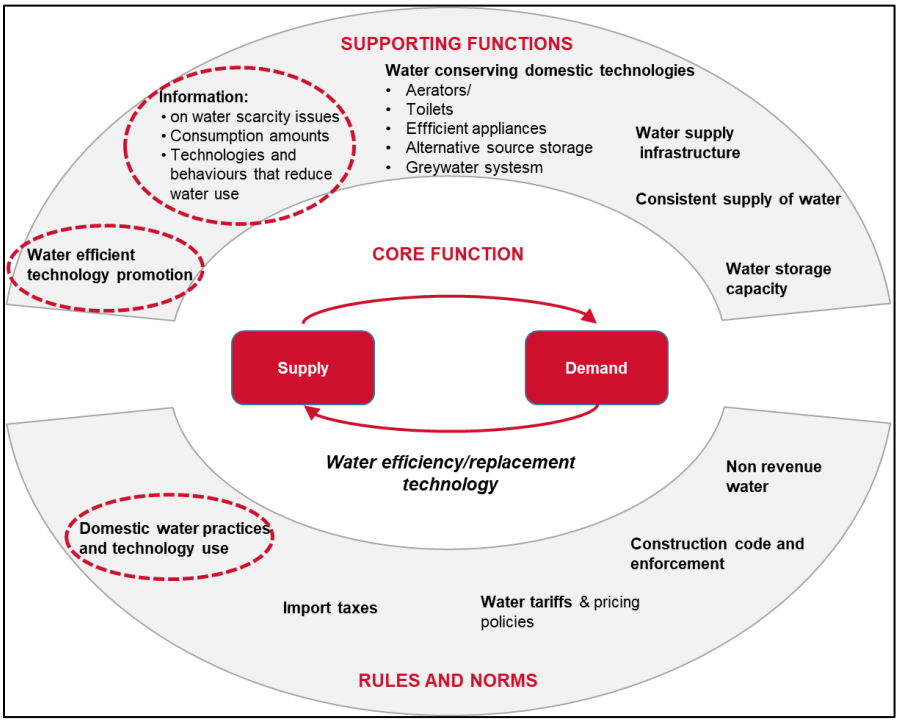
The table below summarizes those supporting functions and rules in the core market system for water in agriculture that will not be prioritized for the opening portfolio of interventions of the WIT program.

Function/rule	Why it is not prioritized
Water pressure	Infrastructure-related challenge being addressed by sister USAID programme
Power	Infrastructure-related challenge beyond the scope of WIT
Water quality	Water supply and standards issues beyond the scope of WIT
Farmer systems	Agricultural systems / value chain decision-making is beyond the scope of WIT, and is being addressed by other projects / donors (e.g. the Dutch government and the World Bank).
Irrigation equipment	Irrigation equipment is widely available, but promotion and advice about the use of that equipment is limited
Infrastructure	Infrastructure-related challenge beyond the scope of WIT
Water use monitoring and regulation	Utility-oriented capacity issue being addressed by sister USAID programme
Water theft & trust	Policy / regulatory issue being addressed by sister USAID programme
Farmer livelihood strategies	Livelihood decision-making is beyond the scope of WIT, and is being addressed by other projects / donors (e.g. the Dutch government and the World Bank).
Farmer risk perception	Feasibility challenge for WIT to address farmer-risk perception beyond improved information & advisory flow
Agriculture market policies	Policy issue beyond the scope of WIT
Water quotas & tariffs	Policy issue beyond the scope of WIT
Political economy of water	Politically / culturally charged issue beyond feasible intervention for WIT
Farmer perception of water value	Feasibility challenge for WIT to address farmer-risk perception beyond improved information & advisory flow

b. Household water saving 'system'

The market system diagram shows the supporting functions and rule functions that are important for the effective functioning of the market system for water saving in households.
The table below summarizes those supporting functions and rules in the core market systems for water conservation in agriculture that have not been prioritized for WIT's opening portfolio:

Function/rule	Why it is not prioritized
Water technologies	Accessibility is not a constraint, rather marketing, promotion and information availability
Water supply infrastructure	Infrastructure-related challenge beyond the scope of WIT
Water supply & consistency	Infrastructure and policy-related challenges beyond the scope of WIT
Water storage capacity	Infrastructure-related challenge beyond the scope of WIT
Water tariffs	The political economy of water pricing in Jordan renders this infeasible for WIT intervention
Non-revenue water	Utility-oriented capacity issue being addressed by sister USAID programme
Import taxes	Policy-related issue beyond the scope of WIT
Construction codes	Policy / regulatory issue in construction sector beyond the scope of WIT



2. Key constraints, capacities and incentives

To understand how and why the two systems for water conservation are not functioning effectively, the market assessment set out to understand better the key constraint areas and the capacity and incentive challenges facing the market players involved.

a. Agriculture market system constraints

The table below summarizes the constraints, capacities and incentives affecting those functions and rules identified by the market system assessment as critical to water conservation in agriculture. The analysis focuses on the role of medium-sized stone fruit and olive farmers in the market system and those constraints specific to this target group. It is to be expected, however, that whilst some of these constraints will also affect other farmer groups – e.g. horticulture producers in the north and Jordan Valley – WIT nevertheless expects to undertake further market assessment *before scaling up* interventions and/or expanding its work in horticulture or other farming systems associated with high levels of water use.

WIT's initial market assessment has identified constraints for stone fruit and olive farmers in three key supporting markets:

	Function/rule	Key constraints
1	Supply of research, training and information on **water conservation practices**	1.1 Supply of information and advice on conservation practices 1.2 Research and development into conservation best practice 1.3 Water conservation skills development and provision
2	Supply of information, training and standards on **water conservation technology**	2.1 Supply of technical information and advice for technology application 2.2 Technology skills development and provision 2.3 Technology standards and quality assurance
3	**Access to financial services** for conservation and technology investment	3.1 Regulation of products and repayment terms 3.2 Financial product development 3.3 Bank staff skills development and provision

1. Water conservation practices	Constraints / Capacities / Incentives
1.1 Supply of information and advice on conservation practices	**Constraints** The availability of quality information and advice on appropriate water conservation best practices is limited and of varying relevance to the specific needs of individual farmers and/or agro-ecosystem requirements. The current key sources of, and associated constraints to, information and advice are: • Internet-based research is undermined by limited differentiation or quality assurance of information accessed and its relevance or otherwise to Jordanian conditions. • Academic institutions offer limited information but lack effective dissemination strategies and much remains inaccessible to farmers • Input suppliers are passive in extending information beyond larger scale clients • Farmer Associations offer variable quality and sporadic information to members, often subject to the vagaries of project funding / support **Capacities**

	• Input suppliers of water soluble fertilizers and pesticides retain good information about good farming practices which support the best results from their respective products and are in regular and direct contact with farmers and farmer associations • Academic institutions produce graduates exposed to the latest thinking and practices in agriculture production and water application and require those graduates to undertake 3-month practical placement on farms **Incentives** • Input suppliers have strong financial incentives to ensure customers get the best results from their products and remain loyal, repeat clients. They also have incentive to make effective use of the internet as a marketing tool and to signpost farmers to relevant/valid information and advice • Academic institutions have incentive to place graduate interns with medium-sized farmers able to offer breadth and depth of practical experience and learning • Farmers/managers have economic incentives to optimize water efficiency and reduce high time and energy costs associated with water pumping and use
1.2 Research and development into conservation best practice	**Constraints** Prevailing research and development into conservation practices and their commercial benefits is academic in nature, not well related to on-farm realities, and poorly disseminated. Key sources of R&D are: • Farmer/manager experimentation based on trial and error is high risk and fragmented in terms of wider dissemination and up-take • NCARE undertakes research station-based R&D but which currently targets smallholder production and is poorly disseminated • Universities and research centers (international) undertake quality scientific research targeting peer audiences. Genuinely applied research is limited and poorly disseminated **Capacities** • Universities and research centers retain rigorous R&D capabilities and independence with the potential to undertake high quality applied research and economic analyses • Input suppliers often have significant R&D budgets and capability supporting product development and innovation and have practical on-farm demonstration experience **Incentives** • Universities and research centers increasingly seek opportunity to demonstrate more applied research skills and value collaboration with private sector partners • Input suppliers can exploit the marketing potential of improved and independent R&D, and in particular robust cost-benefit data associated with improved practices
1.3 Water conservation skills development and provision	**Constraints** Formal and informal skills development for farmers/managers remains limited. Few medium-sized farmers access consistent supplier support and no formal training courses currently exist outside longer-term degree and diploma curricula. • Input suppliers do not target medium-sized farmers/managers with the limited after sales support currently available • Commercial training providers do not currently offer agriculture or water conservation specific training **Capacities** • Input suppliers do provide valued advice and support to larger clients and those farmers/managers actively seeking advice and information

	• Commercial training providers including larger academic institutions and specialized private training businesses offer a range of competitive short courses in other sectors/subjects and have established procedural and pedagogical capabilities **Incentives** • Input suppliers recognize the value addition of embedded advice to key clients although currently do not appear to classify medium-sized farmers/managers as such • Commercial training providers have strong incentives to diversify into any training area with strong demand, including agriculture

2. Water conservation technologies	Constraints / Capacities / Incentives
2.1 Supply of technical information and advice for technology adoption	**Constraints** The flow of technical advice and information on irrigation layout, operation and maintenance is constrained by the limited outreach of a small number of suppliers/distributors and traditional reticence of some farmers/managers to seek and/or follow advice. Limited competition in the market (three primary providers offering 3 differentiated quality products) has not encouraged active product marketing and information flow, nor significant after sales support to any other than the largest of customers. Suppliers target niche segments of the market and greater competition has only recently emerged. **Capacities** • Technology suppliers have extensive expertise, knowledge and information on irrigation deployment and use and, subject to capacity, respond to requests for information/advice from customers. Two recent international market entrants bring with them international expertise and more pro-active pre- and post-sales business models and have rapidly raised their profiles in Jordan **Incentives** • Technology suppliers have strong financial incentives to provide support to ensure products are correctly used and maintained, to secure customer loyalty and to compete with growing competition in the Jordanian market • Farmers/managers have incentive to seek advice and support to irrigation deployment where advice is deemed independent and of high quality
2.2 Technology skills development and provision	**Constraints** Formal skills development on irrigation installation and operation remains limited. Suppliers do not offer training to medium-sized farmers/managers and no formal training courses exist outside degree and diploma curricula. **Capacities** • Commercial training providers including larger academic institutions and specialized private training businesses offer competitive short courses in other subjects and have established procedural and pedagogical capabilities • Technology suppliers retain hands-on expertise of irrigation set-up and use and currently offer informal training to larger customers **Incentives** • Commercial training providers have strong incentives to diversify into any training area with there appears to be a strong demand • Technology suppliers, particularly new entrants, have incentives to collaborate with training providers to compliment marketing and awareness raising strategies
2.3 Technology	**Constraints**

standards and quality assurance	Credible information on irrigation technology product and part standards and quality is not available, constraining farmer ability to differentiate between products beyond retail price. Jordan's standards agency is not currently active in the irrigation technology market. **Capacities** • Jordan Standards and Metrology Organization provides recognized national testing, calibration, standardization, quality assessment and accreditation services in multiple sectors **Incentives** • Jordan Standards and Metrology Organization is mandated to provide consumer confidence in products and materials on the market, including in the agriculture sector • Technology suppliers offering quality products on the Jordanian market have incentive to maintain industry standards and protect their competitive advantage against poorer quality products and imports.

3. Access to finance	Constraints / Capacities / Incentives
3.1 Regulation of products and repayment terms	**Constraints** Whilst current banking regulations provide for the Agricultural Credit Corporation to offer farmers products with flexible / seasonal repayment terms, commercial and Islamic banks and MFIs are restricted in offering anything other than monthly repayment terms and which are unattractive for farming customers. The Central Bank as regulator, governs the terms of products offered by formal providers and currently restricts those terms **Capacities** • Central Bank, as regulator, has autonomy in setting and reforming regulations and more flexible regulations already exist even if, currently, applicable only to ACC • Banks & MFIs have capacity to develop and roll out new products subject to the regulatory framework set by the Central Bank **Incentives** • Central Bank is under pressure from Government and World Bank to extend greater lending to both agriculture and, importantly, in support of water saving technologies and investments • Banks & MFIs have incentive to respond to regulatory reform and deploy preferential funding available for water conservation purposes but which is currently under-utilized
3.2 Financial product development	**Constraints** The majority of farmers resort to informal sources of finance – primarily product wholesalers or 'commissioners' – that offer flexibility of access and terms. Formal providers (commercial and Islamic banks, MFIs) do not currently offer products with terms tailored to the needs of the agriculture sector. • Formal finance providers do not target the agriculture sector, lack products and expertise relevant to the sector and perceive it as high risk • Technology suppliers offer credit to preferred clients but outreach is limited and inconsistent **Capacities** • Formal finance providers have proven and increasing capacity in relevant contexts such as small business lending and in supporting targeted sectors and technology investments such as solar energy • Loan insurance providers offer products in support of many existing lending products and have established relationships with formal finance providers • Technology suppliers have established protocol for credit provision as well as loan insurance service linkages

	Incentives • Formal finance and insurance providers have commercial incentive to lend (and insure lending) to a wider and more diverse customer base where risk levels are perceived as acceptable • Technology suppliers benefit from sales supported by credit provision and cover risk through interest charges
3.3 Bank staff skills development and provision	**Constraints** The limited 'offer' from formal finance providers to the agriculture sector means knowledge and experience of the sector is limited amongst bank and MFI staff. **Capacities** • Banks & MFIs routinely invest in internal capacity building to ensure staff remain up-to-date with new products and procedures and have established mechanisms for both internal and external staff training **Incentives** • Banks & MFIs operate in a competitive market and lending forms a primary source of business revenue. Subject to risk assessment, formal lenders have incentives to increase their client base in agriculture and thus to establish the in-house understanding and capacity to serve that market segment

b. Household market system constraints

The table below summarizes the constraints, capacities and incentives affecting those functions and rules identified by the market system assessment as critical to household water conservation. The assessment explored market constraints from the perspective of all beneficiary groups in the northern governorates, including both Syrian and Jordanian women and men, and Jordanian landlords. The assessment has identified constraints in two important supporting markets:

	Function/rule	Key constraints
1	Information on water efficient practices, behaviors & impacts	1.1 Information on water efficient practices and behavior 1.2 Awareness of water situation and risks
2	Supply and marketing of water saving devices and water supply/recycling technologies	2.1 Marketing and promotion of water saving devices 2.2 Marketing and promotion of water supply/recycling technologies 2.3 Access to finance for water supply/recycling investment

1. Information on water efficient practices	Constraints / Capacities / Incentives
1.1 Information on water efficient practices and behavior	**Constraints** Evidence suggests prevailing water use/practices, and thus sources of inefficiency/waste; vary significantly between communities (i.e. Syrians and Jordanians) and individuals (i.e. women & men, adults & youth). The quality and effectiveness of information and communications on appropriate water saving practices and behaviors is limited. Generic awareness and advocacy efforts have had disappointing results due to unclear targeting and fragmentation because of over-reliance on donor/project funding. The current key sources of, and associated constraints to, information flow are:

	• Public campaigns are poorly targeted, carrying generic messages focused on the holistic water challenge • Donor/INGO/project initiatives also tend to be generic, sporadic and poorly coordinated • Private sector contribution to information on water efficiency is minimal • Community/religious leaders communications are limited outside of INGO/project collaborations **Capacities** • Water utilities retain direct contact with all households through billing and other communications and have some experience in water conservation messaging • Ministry of Awqaf & Islamic Affairs / Religious leaders enjoy significant influence on the perceptions and behaviors of many households in Jordan and across a range of issues • Private companies deploy a range of marketing tactics for product sales, but are not experienced in 'extra'-product messaging and advocacy • Ministry of Water & Irrigation has experience in water conservation messaging and advocacy, albeit in the form of more generic campaigns **Incentives** • Water utilities have strong incentives to promote water conservation and to identify more effective advocacy tactics • Ministry of Awqaf & Islamic Affairs / Religious leaders recognize their role in community affairs and the significance of the water situation in many communities • Private companies have incentives both to link promotion of appropriate products with water conservation objectives, as well as to be seen as responsible businesses • Ministry of Water & Irrigation has incentive to promote water conservation and to identify more effective advocacy tactics
1.2 Awareness of water situation and risks	**Constraints** The quality and effectiveness of awareness raising as to the nature and extent of the water situation and associated risks in Jordan is variable and recognition as well as response amongst communities (Jordanian and Syrian) varies. The primary actors in more general awareness raising include: • Ministry of Water & Irrigation coordinates various awareness campaigns from its own and external budgets but lacks a definitive and consistent strategy • Water utilities collaborate in awareness campaigns with government and external partners but are otherwise relatively passive and/or ad hoc in their communications • Media engages in the debate on water issues on an ad hoc basis but the quality of interrogation and discourse varies • Donor/INGO/project initiatives continue to support other market actors financially and technically in awareness efforts **Capacities** • Ministry of Water & Irrigation has experience of awareness raising but limited capacity to learn from previous efforts and improve/innovate its approach • Water utilities also have experience but lack ability to assess and learn from previous experiences. They also have direct and recurrent communication with all households • Media has strong investigative capabilities but their application to the water sector/issues varies **Incentives**

	• Ministry of Water & Irrigation has strong incentives to strengthen the quality of awareness raising and to raise its profile/reputation in this regard • Water utilities have strong incentives to demonstrate their capacity and public responsibility in awareness raising • Media has incentive to address issues of interest to the general public and to hold public and private sector actors to account
Content development for targeted communication (1.1) and awareness raising (1.2)	**Constraints** The impact of information, messaging and advocacy initiatives is affected by the quality of content and communication methods. Specialist expertise exists in these spheres but its use is variable. **Capacities** Communication specialists exist in Jordan with creative expertise in communications and advocacy but which has not been routinely drawn upon in the water use space to-date **Incentives** Communication specialists will benefit commercially and reputation wise from a more diversified and sustainable work stream if able to develop services and/or specialize in water / environmental conservation communications

2. Water saving devices & supply/ recycling technologies	**Constraints / Capacities / Incentives**
2.1 Marketing and promotion of water saving devices	**Constraints** Water saving devices is generally available in the market, but irregularly stocked by many retailers in northern governorates. Previous 'free' handouts may have played a role in this and/or modest demand. Significant is the lack of information and differentiation between products available, and that most decision-making appears to be based on price. The level of consumer research activity, including understanding what actually motivates people to invest in their products, does not seem to be a priority for suppliers or retailers (who tend to be general hardware stockists). **Capacities** • Device suppliers market and promote water saving devices, but tend to focus efforts on Amman and other urban markets. There is one Jordanian manufacturer/supplier, and multiple imported good suppliers in Jordan • Hardware retailers stock and/or can easily source water saving devices and have experience in marketing various products in their stores **Incentives** • Device suppliers have incentives to extend sales beyond larger urban markets if volumes are sufficient to support distribution • Hardware retailers have some but limited incentives since water saving devices represent a small proportion of their business
2.2 Marketing and promotion of water supply/ recycling technologies	**Constraints** Water supply/recycling technologies exist on the market, although alternatives appear to be limited: • Water supply technologies (e.g. rainwater catchment systems) have a long history in Jordan, are familiar technologies to many, and in WIT target areas have also been

	promoted (and subsidized) by previous donor-funded programmes. Current systems available are bespoke construction requiring professional construction services, which are available. Wider up-take and construction contractor promotion has been limited. Rainwater catchment is particularly relevant to those living in highland and higher rainfall areas • Water recycling technologies (e.g. greywater systems) have also been promoted (and subsidized) by previous donor-funded programmes. However, a limited number of products are actively promoted in the market. Research into alternative technologies (e.g. by RSS) has generated other options but which have yet to find their way onto the market Lack of cost-benefit analyses of these products, and thus their 'internal rate of return' for households, has limited assessment of demand as well as for potential financing options. Access to finance may be influencing some household decision-making. **Capacities** • Water supply technology installation contractors have appropriate construction skills and capacity and a number have existing experience of project-specific design options, but appear to offer few design (or scale) alternatives • Water recycling technology suppliers have experience in these and other product promotion as well as existing distribution networks • Research & Development institutions (e.g. RSS) have research capacity but no marketing or distribution experience and have struggled to get innovations to market **Incentives** • Water supply technology installation contractors have incentives to promote their services in high rainfall areas, but are unlikely to specialize in the service. Evidence suggests there is unmet demand for such systems in some areas • Water recycling technology suppliers have incentive to stock and sell more and different technologies where they perceive there to be a market • Research & Development institutions have some incentive to promote their innovations, but institutions such as RSS are primarily incentivized by research funding and profile rather than commercial product development and retail • Homeowners appear to be most responsive to financial incentives to reduce the costs of managing water. Water conservation messaging appears to have had limited impact on technology uptake compared to financial incentives for water conservation • Tenants, including Syrians, are generally not responsible for their water bill. They continue to have financial incentive to conserve water if this reduces the number of additional water trucks purchased, but as tenants they lack incentive to invest in fixed water saving or supply technologies • Landlords have different incentives depending on the nature of tenancy agreement. Many pay or share water bills with tenants and therefore have a financial incentive to invest in water efficient fixtures for their rental properties. Some require tenants to cover the bills and have less immediate incentive to invest in water saving technologies • Owners, landlords & tenants may all have some incentive to respond to social and/or religious motivations to conserve water and secure their children's health and well-being, but financial incentives appear to be strongest

2.3 Access to finance for water supply/recycling investment	**Constraints** • Demand. There appears little financial constraint for households to purchase water saving devices, but supply and recycling technologies constitute larger investments. Many households are open to borrowing finance for household and personal items, and many have or have had multiple loans in the past. Decisions on borrowing depend on the perceived importance of the investment and the perceived length of 'payback' from the item purchased. Data on the payback period for rainwater catchment and greywater systems remain limited. Different households will also priorities investment in water conservation differently and this will be influenced by existing levels of indebtedness. • Supply. Product availability and promotion are the two main supply-side constraints. Lending requirements may be modest regarding water saving technologies and thus only attractive to MFIs. Whether or not that is the case, there is little product marketing and promotion targeting water saving technologies despite some history of preferential lending initiatives to stimulate environmentally-oriented investment **Capacities** • Financial institutions, particularly MFIs, have capacity and experience in developing and offering lending products suitable for smaller investments **Incentives** • MFIs have commercial incentives to provide finance to households and the recent national financial inclusion strategy further incentivizes the industry to innovate on products and geographical outreach

3. Map of supporting market actors and their linkages

This section maps and summarizes the market actors and their relationships in each of the prioritized supporting markets in agriculture and household market systems.

a. Agriculture market system actors

i. Water conservation practices

Figure 1 depicts the range of market system actors involved in the provision of information on water conserving agricultural practices. Descriptions of each actor are given in the table below the figure and further analysis of the quality of information provided is detailed in Annex 10.2

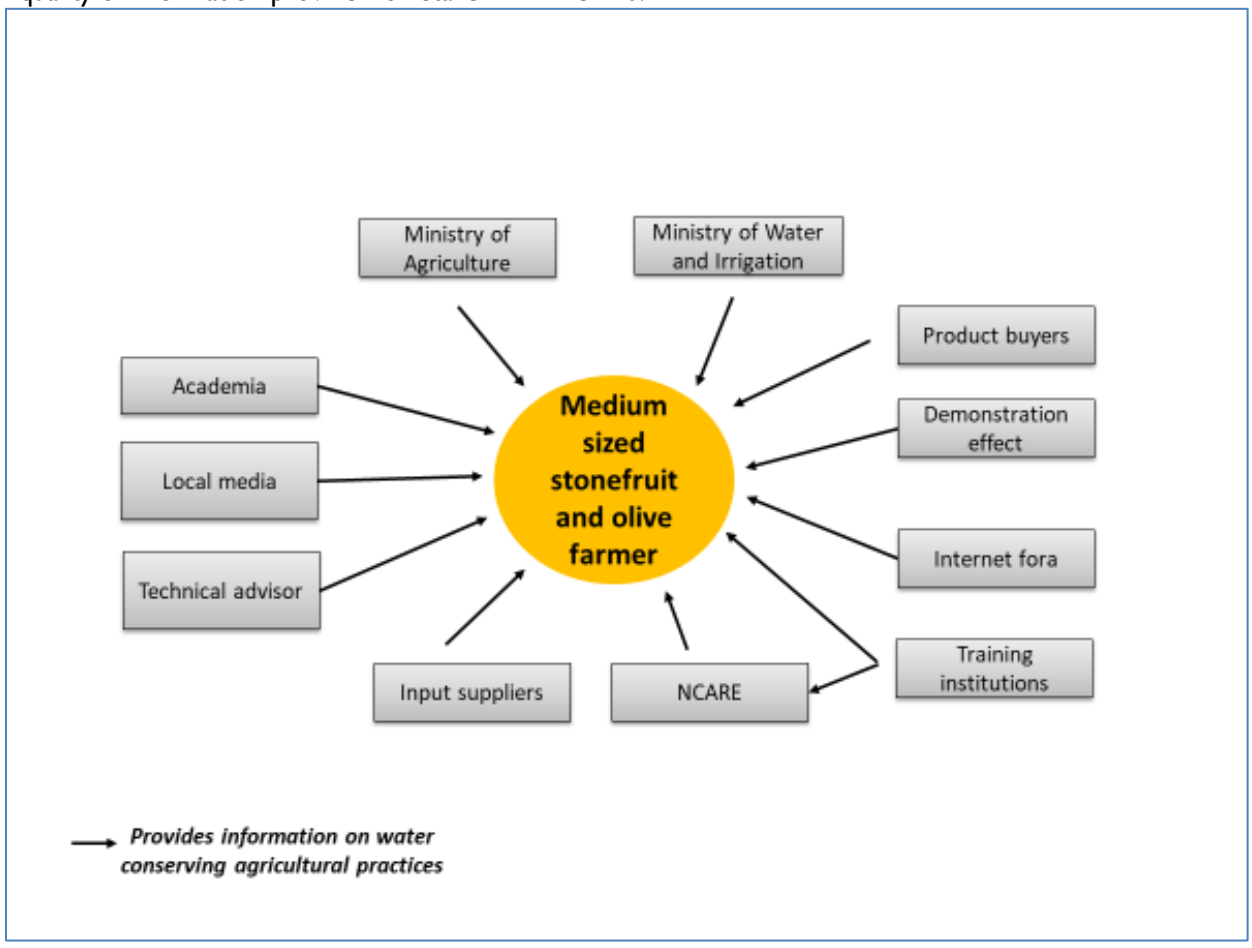


Figure 1. Market system actors providing information on water conserving agricultural practices

Market actor	Description
Farmers	Several hundred medium-sized stone fruit & olive farmers (landholding between 200 & 1000 Dunam). Wide variation of water conservation practices found with regards production techniques and tree/crop management.
Demonstration effect	Peer-to-peer learning and exchange. Significant technique transfer but fragmented, inconsistent and may result in transference of sub-optimal techniques.
Input suppliers	Variety of tree/crop input suppliers includes seed/plant suppliers and water-soluble fertilizers and pesticides. The market includes a small number of large-scale international suppliers and several smaller and/or national distributors.
Academia	Training and research institutions, including universities and schools. Only 3 or 4 specialize in the agriculture sector.
Media	Wide variety of traditional and multi-media players including TV, Radio and newspapers, internet and social media operators.
Technical advisors	A very limited number of individuals/small businesses offering agri-business advisory services in specific technical fields often service agri-business and supplier clients and some larger farmers. Includes some academic/research personnel freelancing in their own time.
National Center for Agricultural Research and Extension (NCARE)	Provides agricultural research and extension on agriculture and sustainable development, and capacity building for researchers and extension agents. Government funded, but collaborates with local, national and international partners on training provision and learning.
Training institutions	Institutes that are specialized in providing formal training in certain disciplines. Only 3-4 specializes in the agriculture sector.
Internet fora	Web-based sites offering information and advice on wide variety of water-efficient production techniques for numerous crops and environments.
Product buyers	Approx. 200 wholesalers of multiple agricultural products, including fruits and olives, and provide some informal advice on production and market issues to key clients. Also provide flexible sources of informal lending at varying but relatively high interest rates and often linked to sales agreements.
Ministry of Agriculture (MOA)	Responsible for achieving the government's integrated agricultural development goals in terms of production and productivity increase both quantitative and qualitative.
Ministry of Water & Irrigation (MWI)	Responsible for the overall monitoring of the water sector, water supply and wastewater systems and the related projects, planning and management, the formulation of national water strategies and policies, research and development, information systems and infrastructure procurement.

ii. Water conservation technology adoption

Figure 2 depicts the range of market system actors involved in the provision of information on water conserving agricultural technologies and the supply of such technologies. Black arrows represent the flow of information on water conserving technologies and red arrows represent the flow of water conserving technologies. Some of these actors are involved in both the provision of information and technologies, whereas others only provide information. Descriptions of each actor are given in the table below the figure and further analysis of the quality of information provided is detailed in Annex 10.2

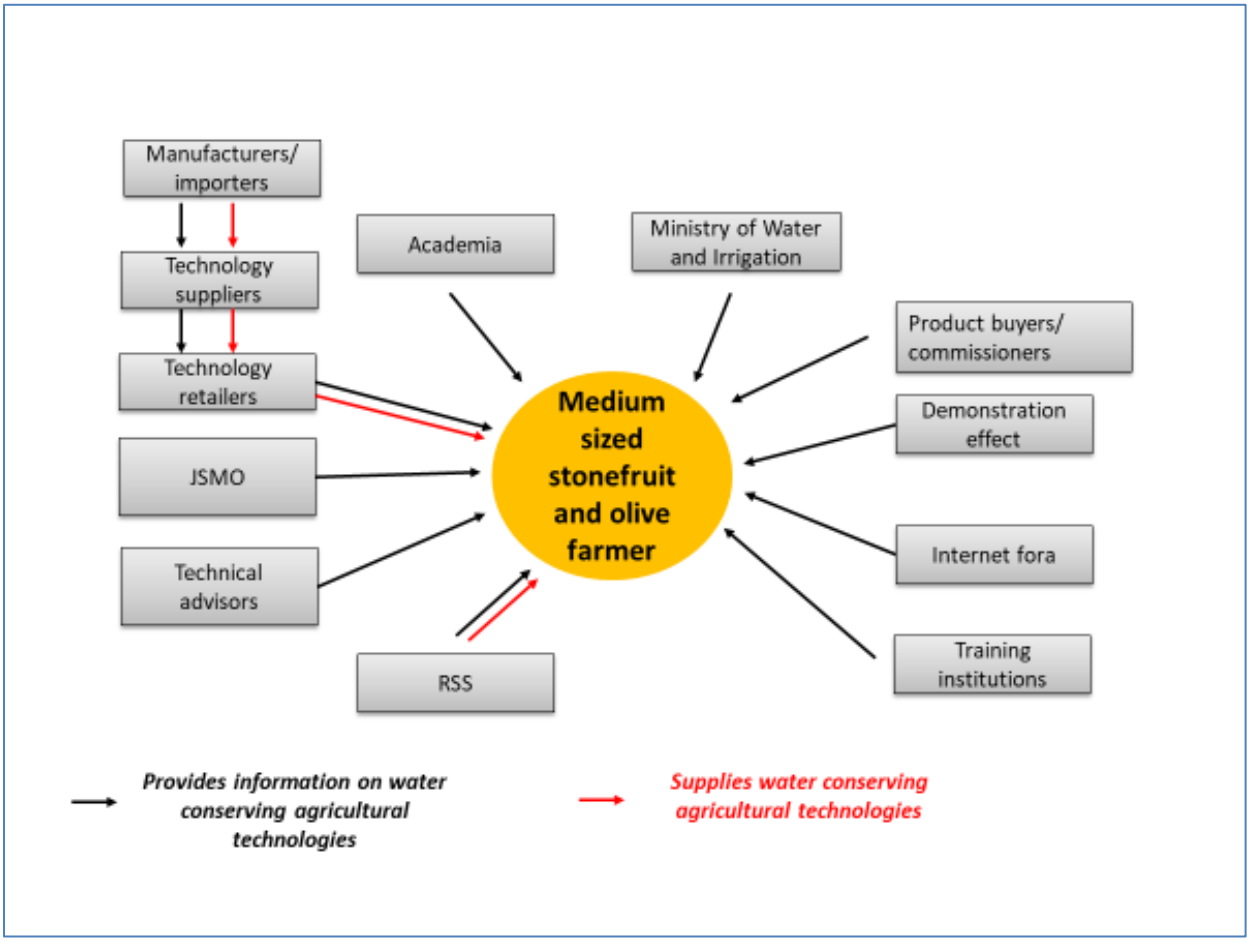


Figure 2. Market system actors providing information on water conserving agricultural technologies and supplying water conserving agricultural technologies

Market actor	Description
Farmers	Several hundred medium-sized stone fruit & olive farmers (landholding between 200 & 1000 Dunam). Significant numbers access informal finance from buyers (commissioners). Smaller numbers access credit and formal bank finance.
Demonstration effect	Peer-to-peer learning and exchange. Significant information and recommendation transfer but fragmented, inconsistent and may result in transference of sub-optimal practices and skills.
Commissioners	Approx. 200 wholesalers of range of agricultural products, including fruits and olives that act as flexible sources of informal lending at varying but relatively high interest rates and often linked to sales agreements.
Training institution	Institutes that are specialized in providing formal training in certain disciplines. Only 3-4 specializes in the agriculture sector.
Technical advisors	A very limited number of individuals/small businesses offering agri-business advisory services in specific technical fields often service irrigation suppliers and some larger farmers. Includes some academic/research personnel freelancing in their own time.
Technology suppliers	Commercial businesses specializing in provision of irrigation (primarily drip irrigation) technologies and parts, to farmers of all different crops and geographies.

Academia	Training and research institutions, including universities and schools. Only 3 or 4 specialize in the agriculture sector.
Internet fora	Web-based sites offering information and advice on wide variety of irrigation technologies for numerous crops and environments.
Technology retailers	Individuals or small businesses selling irrigation and water equipment and parts to farmers, often in relatively small quantities.
Ministry of Water & Irrigation (MWI)	Responsible for the overall monitoring of the water sector, water supply and wastewater systems and the related projects, planning and management, the formulation of national water strategies and policies, research and development, information systems and infrastructure procurement.
Jordan Standards and Metrology Organization (JSMO)	Provides technical testing protocol, advice and information on product standards and quality in Jordan based on agreed Jordanian Standards and/or Technical Regulations and/or Normative documents and/or related studies.
Royal Scientific Society (RSS)	RSS is the largest applied research institution, consultancy, and technical support service provider in Jordan and is a regional leader in the fields of science & technology. It provides expert testing and calibration services. With over 25 specialized locally & internationally accredited laboratories.
Manufacturers	Businesses manufacturing irrigation and other water-related technologies and equipment.
Technology importers	Businesses or individuals that import and distribute irrigation and equipment from international manufacturers

iii. Access to finance for conservation and technology investment

Figure 3 depicts the range of market system actors involved in the supply of formal and informal financing for water conserving agricultural technologies. Red arrows represent the flow of regulation and product development in the formal sector. Black arrows represent the flow of formal finance for water conserving agricultural technologies. And blue arrows represent the flows of informal sources of finance for water conserving agricultural technologies. Descriptions of each actor are given in the table below the figure and further analysis of the quality of information provided is detailed in Annex 10.2

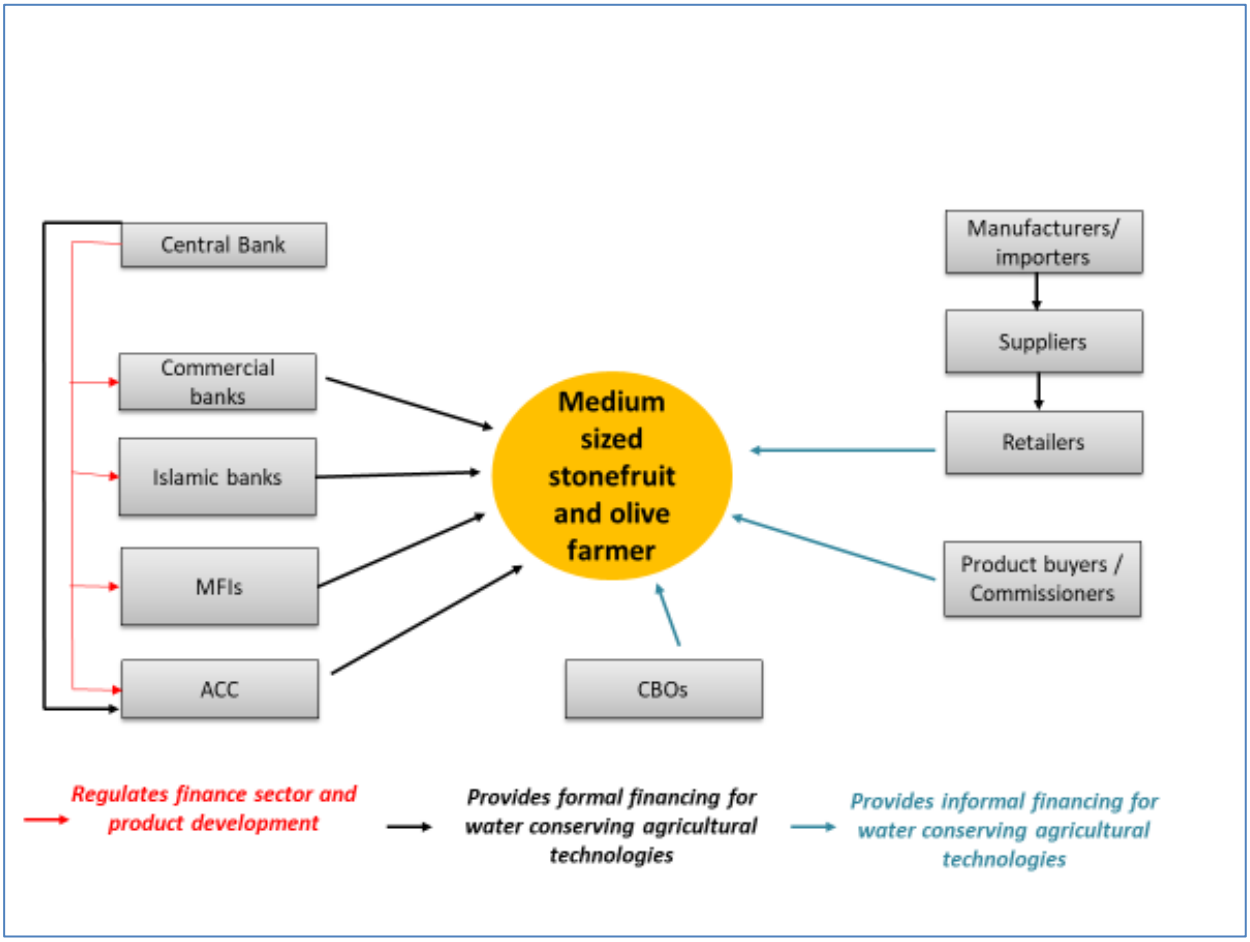


Figure 3. Market system actors involved in the provision of formal and informal financing for water conserving agricultural technologies

Market actor	Description
Farmers	Several hundred medium-sized stone fruit & olive farmers (landholding between 200 & 1000 Dunam). Significant numbers access informal finance from buyers (commissioners). Smaller numbers access credit and formal bank finance.
Commissioners	Approx. 200 wholesalers of range of agricultural products, including fruits and olives that act as flexible sources of informal lending at varying but relatively high interest rates and often linked to sales agreements.
Central Bank of Jordan	The regulatory entity responsible for all formal financing institutes and monetary policy.
Commercial Banks	A total of 23 formally registered financing institutions that are licensed by the Central Bank of Jordan, chartered by the government, and subject to banking regulations and supervision, that provide commercial financial products to cooperate and individuals
Islamic banks	A total of 4 formally registered financing institutions that are licensed by the Central Bank of Jordan, chartered by the government, and subject to banking regulations and supervision, that provide financial products based on the Islamic economics rules to cooperate and individuals

Microfinance Institutions (MFIs)	A total of 9 formally registered MFIs that are licensed by the Central Bank of Jordan to provide loans for low income population
Agricultural Credit Corporation (ACC)	Publically funded entity charged with contributing to the comprehensive agricultural and rural development through the provision of financial services to the agricultural sector, including through an array of commercial and subsidized lending instruments.
Community Based Organizations (CBOs)	Civil society organizations that operate within a single local community, often established through donor and/or government initiatives.
Technology suppliers	Business that provide water saving equipment and technology for farmers and households
Technology retailers	Individuals or small businesses selling irrigation and water equipment and parts to farmers, often in relatively small quantities.
Manufacturers	Businesses manufacturing irrigation and other water-related technologies and equipment.
Technology importers	Businesses or individuals that import and distribute irrigation and equipment from international manufacturers

b. Household market system actors

i. Information on water efficient practices and water situation

Figure 4 depicts the range of market system actors involved in the supply of information on water efficient practices and the general water situation in Jordan. Black arrows represent the flow of general water situation information and red arrows represent the flow of information on water efficient practices. Some actors are involved in both types of information provision and this is reflected with both black and red arrows. Descriptions of each actor are given in the table below the figure and further analysis of the quality of information provided is detailed in Annex 10.2

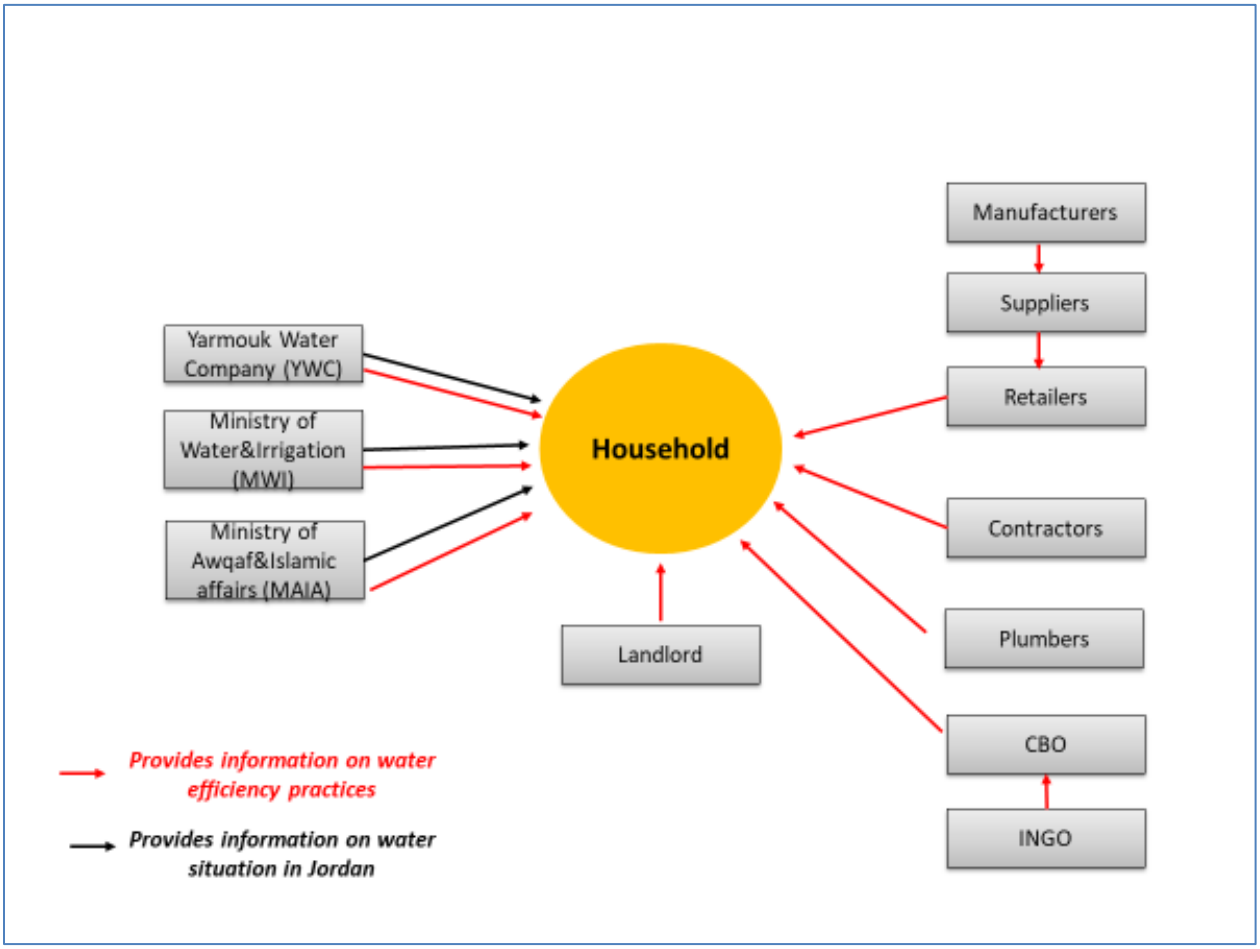


Figure 4. Market system actors involved in the provision of information on water situation in Jordan and water efficient practices

Market actor	Description
Households	Approx. 314,164 Jordanians and 235,784 Syrian refugees live in the Mafraq governorate (85,000 in camp), approximately 62,833 & 30,157 households respectively. Approx. 157,162 Jordanians and 18,917 Syrian refugees live in the Ajloun governorate approximately 31,432 & 3,783 households respectively.
Landlords	Landlords (exact number unknown) provide accommodation for both Syrian and Jordanian families.
Manufacturers	Businesses manufacturing water saving devices, technologies and equipment.
Suppliers	Businesses that supply and distribute water saving equipment and technologies.

Retailers	Individuals or businesses that sell or retail water saving equipment and technologies, often in relatively small quantities.
Contractors	An individual or business that constructs rainwater catchment systems.
Plumbers	An individual or business that installs and maintains grey water recycling and/or other household water appliances.
Community based organization (CBO)	Provides a range of information to households determined by donor priorities and funding.
Ministry of Water & Irrigation (MWI)	Responsible for the overall monitoring of the water sector, water supply and wastewater systems and the related projects, planning and management, the formulation of national water strategies and policies, research and development, information systems and infrastructure procurement.
Yarmouk Water Co.	The water utility that is responsible for water supply in the northern governorates.

ii. Water saving devices and water supply/recycling technologies

Figure 5 depicts the range of market system actors involved in the supply of water savings devices and rainwater catchment and grey water systems. Black arrows represent the supply of water savings devices and red arrows represent the supply of rainwater catchment and grey water components and/or construction. Descriptions of each actor are given in the table below the figure and further analysis of the quality of information provided is detailed in Annex 10.2

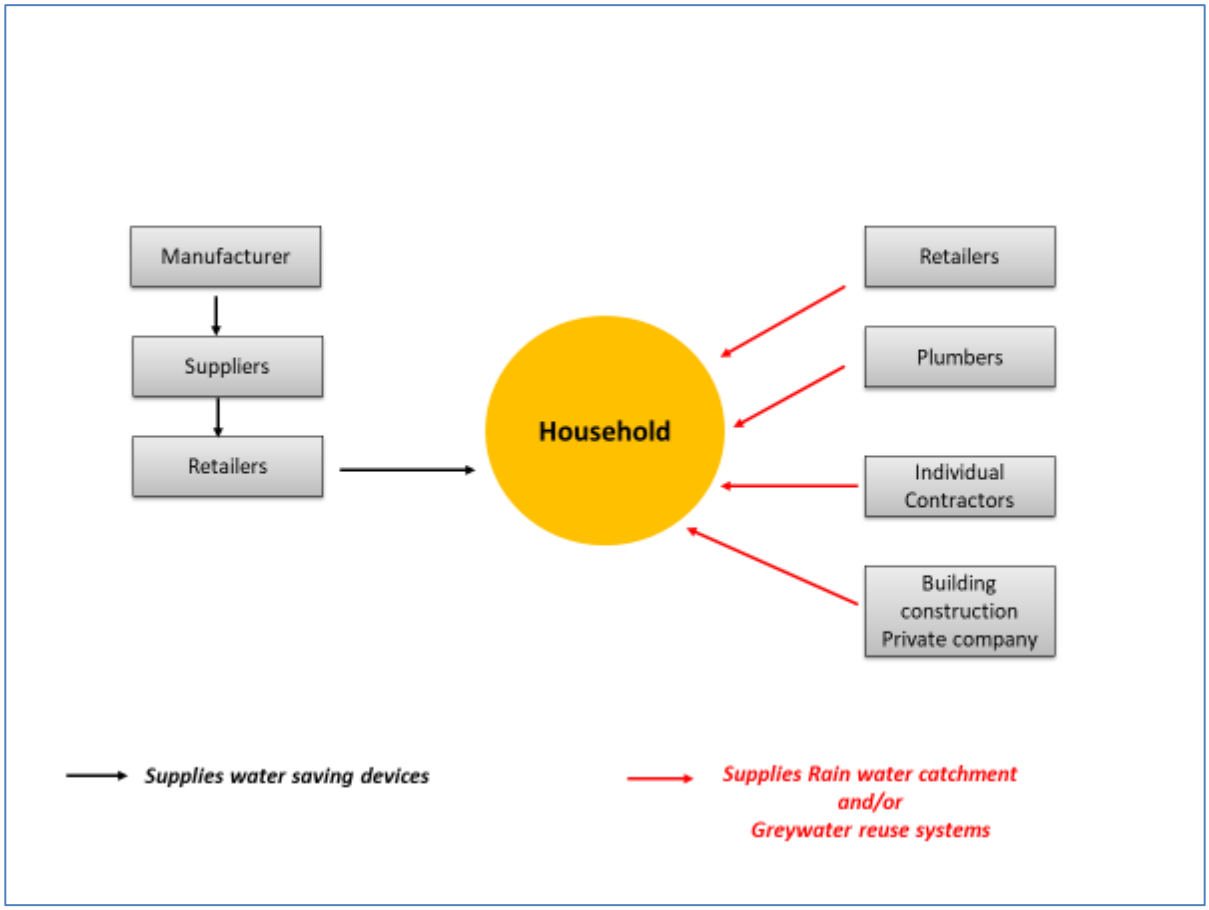


Figure 5. Market system actors involved in the supply of water saving devices and increased storage/re-use technologies

Market actor	Description
Households	Amongst both Jordanian and Syrian households, water saving device ownership is unknown. Estimates suggest that 30-40 % of households in Irbid governorate have rainwater catchment technologies, and that 30-40 % in Mafraq has greywater technologies installed in part or all of their houses.
Plumbers	An individual or business that installs and maintains water supply or recycling technologies and systems and/or other household water appliances.
Manufacturers	Businesses manufacturing water supply or recycling technologies and systems.
Suppliers	Businesses that supply and distribute water supply or recycling technologies and systems.
Retailers	Individuals or businesses that sell or retail water supply or recycling technologies and systems, often in relatively small quantities.
Individual contractors	An individual who constructs rainwater catchment systems.
Private construction companies	A business that constructs houses and rainwater catchment systems.

4. Vision for the future

Sustainability lies at the heart of WIT's approach to stimulating more efficient and resilient systems for increased water efficiency in agriculture and households. The follow section builds on the preceding analysis and sets out WIT's overarching vision for both markets and how they will deliver and, importantly, continue to deliver lasting water efficiency benefits for Jordan.

a. Agriculture market system vision

WIT's vision for agriculture is one in which farmers and farm managers in both agriculture and horticulture sectors apply increasingly water-efficient production techniques and irrigation technologies and practices appropriate for the range of crops and agro-ecosystems in which they operate. More water-efficient farm practices and decision-making will be supported by enhanced quality and delivery of services including:

- More and better embedded pre- and post-sales advice on good production practices and techniques from input suppliers and research partners using appropriate tools and fora;
- Practical and accessible formal and informal training opportunities in water-efficient production and irrigation installation, management and operation skills
- Improved marketing and supply of quality differentiated water-efficient irrigation systems and equipment targeting medium-sized farm businesses;
- Increasing access to more appropriate and secure formal finance products under flexible repayment terms and conditions; and
- Increasing access to secured credit options offered by technology suppliers and manufacturers.

b. Household market system vision

WIT's vision for the household market system is one in which both Jordanian and Syrian households and individuals within those households recognize and act upon individual and household-level benefits, adopt increasingly water-

conscious and water-efficient behaviors and practices, and invest in a range of appropriate technologies and devices designed to save water, increase water supply options or recycle household water. More water-efficient household practices and decision-making will be supported by enhanced quality and delivery of services including:

- Development and delivery of more behavior-specific and actionable information and advocacy on water-efficient practices by a range of private and public stakeholders targeting the financial and other incentives driving water use behaviors;
- More effective, targeted and complimentary awareness raising about the nature and extent of Jordan's water challenge by appropriate utilities, government and media organizations;
- Improved marketing and supply of appropriate and cost-effective water saving devices, water supply technologies and water recycling systems; and
- Increasing access to appropriate formal and informal finance and credit products targeting household investment in water saving devices, water supply technologies and water recycling systems.

5. Intervention plans – opening portfolio

This section describes an opening portfolio of WIT interventions in the two market systems. The portfolio seeks to address the immediate challenges and priorities identified by the market assessment and preceding analysis. In particular, an opening portfolio has been identified that responds to three important operational criteria:

- Prioritization of the most urgent and significant constraints to improved water-efficiency in target agriculture and household communities
- Identification of those interventions that, based on WIT constraints and partnerships analyses to-date, offer greatest opportunity for water-efficiency impact
- Recognition of the need to balance WITs portfolio in terms of the risk profile of activities and potential partnerships, and the expected investment (time and resource) required for different interventions

Based on these criteria, the following two sections describe WIT's opening portfolio in the agriculture and household market systems respectively. It must be emphasized that this is an 'opening' portfolio subject to review, development and expansion, as appropriate and as WIT's understanding of the two market systems and their players evolves, and as initial partnerships provide learning and new intervention opportunities.

a. Supporting water conservation in agriculture

Within the opening agriculture portfolio there will be three intervention areas comprising of nine specific interventions:

	Intervention Area	Opening interventions
1	Supply of research, training and information on **water conservation practices**	1.1 Supply of information and advice on conservation practices 1.2 Research and development into conservation best practice 1.3 Water conservation skills development and provision
2	Supply of information, training and standards on **water conservation technology**	2.1 Supply of technical information and advice for technology application 2.2 Technology skills development and provision 2.3 Technology standards and quality assurance
3	**Access to financial**	3.1 Regulation of products and repayment terms

	services for conservation and technology investment	3.2 Financial product development 3.3 Bank staff skills development and provision

The tables below provide more detail on each intervention including the intervention-level vision system and behavior change objectives; and the proposed opening activities. Where possible and appropriate, relevant partnership options are identified against the various activities.

i. Intervention Area 1: Water conservation practices

1.1 Supply of information and advice on conservation practices		
Vision	Medium-sized stone fruit and olive farmers and farm managers access and apply relevant and high quality information and advice on water conserving production practices provided by trusted input suppliers and research sources.	
Systemic Change	• Providers of information and advice make better use of those information dissemination pathways relevant to and actively used by medium-sized farmers/farm managers • Greater recognition of and trust in high quality and relevant sources of information and advice	
Behavioral Change	Input suppliers	• Recognize the business case for embedding practice change advice and information in support of more effective application of their inputs • Cooperate with retailer networks to strengthen practice information and extension advice and messaging
	Researchers and research centers	• Strengthen dissemination pathways for technical and economic research outputs in collaboration with input suppliers and medium-sized farmers / representatives
	Farmers and farm managers	• Informed and discerning as to where they should access internet-based information and advice • Pro-actively seeking best practice advice and guidance from input suppliers (e.g. water-borne pesticides, fertilizers etc.)
Opening interventions	*Activities*	*Partner/options (if known)*
	i. Assess and categorize decision-making processes & responsibility for day-to-day on-farm water conservation practices between owners and managers in the medium-sized stone fruit and olive sectors	Miqdadi Agricultural materials; Syngenta Agro Services; Jordan Insecticide & Agro Treatment Manufacturing; Alqawafel Agro Industrial; Del Monte Arabia
	ii. Assess the respective will and skill of input suppliers to pilot embedded extension models and select partners amongst water soluble fertilizer and pesticide suppliers	Miqdadi Agricultural materials; Syngenta Agro Services; Jordan Insecticide & Agro Treatment Manufacturing; Alqawafel Agro Industrial; Del Monte Arabia
	iii. Develop and negotiate WIT support 'offer' to facilitate, monitor and measure results of embedded extension model pilot(s)	Miqdadi Agricultural materials; Syngenta Agro Services; Jordan Insecticide & Agro Treatment Manufacturing; Alqawafel Agro Industrial; Del Monte Arabia
	iv. Support selected input supplier partners to design and pilot viable embedded extension	Miqdadi Agricultural materials; Syngenta Agro Services; Jordan Insecticide & Agro Treatment Manufacturing;

	model in collaboration with retailer networks	Alqawafel Agro Industrial; Del Monte Arabia
	v. Identify academic/research institutions with existing relevant, applied technical and economic research material and support development of appropriate dissemination strategies and partnerships (e.g. supplier marketing, internet/social media etc.) targeting appropriate farm decision makers (farmers and/or farm managers)	TBC

1.2 Research and development into conservation best practice			
Vision	The quality and relevance of information and advice into water conservation practices is enhanced as a result of more applied and collaborative research and development undertaken by researchers, input suppliers and farmers/farm managers.		
Systemic Change	• Water conservation practices are informed by credible research and experimentation undertaken under relevant Jordanian agro-ecological conditions and medium-sized farming systems and management conditions		
Behavioral Change	Universities and research centers	• Collaborate with input suppliers and farmers/farm managers to undertake context-relevant applied research to inform water conservation practices • Recognize input suppliers and farmers/farm managers as primary audience and clients of research activities	
	Input suppliers	• Collaborate with applied researchers to inform best practices in the use of their inputs • Recognize the commercial value of customers utilizing production practices that maximize the results of their inputs	
	Farmers and farm managers	• Recognize the benefits of applying good production practices to maximize the results of inputs applied	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess the respective will and skill to pilot collaborative research and select input supply partners amongst water-borne fertilizer and pesticide suppliers		TBC. E.g. Bayer CropScience Jordan; Nippon Jordan Fertilizer Co
	ii. Identify academic/research institutions with the will/skill to collaborate with private sector partners in developing and disseminating water conservation practice and economics information and outputs		E.g. JUST; University of Jordan
	iii. Support research partners to establish input supplier (& farmer) partnerships to design and deliver applied research collaboration(s) into water conservation best practice and associated economics, including viable dissemination strategies targeting appropriate farm decision makers (farmers and/or farm managers)		TBC
	iv. Support collaborating partners to monitor (and adapt to) uptake and results amongst medium-sized farmers		TBC

1.3 Water conservation skills development and provision			
Vision	Medium-sized stone fruit and olive farmers and farm managers access formal sources of skills training and development in water conservation techniques. Quality skills development services are developed and offered by commercial training providers.		
Systemic Change	• Commercial training products in water conservation practices are developed that target medium-sized (and other) farmers/farm managers		
Behavioral Change	Commercial training providers	• Develop and offer appropriately priced short courses on water conservation practices • Recognize the demand and commercial opportunity represented by medium sized farmers/farm managers	
	Input suppliers	• Collaborate with commercial training providers in the provision of formal training	
	Farmers and farm managers	• Recognize the value of and invest in practical skills development on water conservation techniques	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess the respective will and skill of commercial training providers to develop and pilot short, practical training courses (in collaboration with input firms as appropriate) targeting medium-sized farmer/farm manager customers		TBC
	ii. Support training provider partner(s) to undertake demand and needs assessment for a training offer targeting medium-sized stone fruit and olive farmers/farm managers		TBC
	iii. Develop and negotiate WIT support 'offer' to training provider partner(s) to design and cost appropriate course curricula and methodologies; market and pilot course delivery		TBC

ii. Intervention Area 2: Water conservation technology adoption

2.1 Supply of technical information and advice for technology adoption			
Vision	Suppliers of irrigation systems and equipment provide medium-sized stone fruit and olive farmers and farm managers with high quality information, advice and guidance on optimal irrigation installation, operation and maintenance.		
Systemic Change	• Increased market competition strengthens incentives amongst suppliers to invest in pre- and post-sales services • Installation, operation and maintenance information and advice becomes the norm in supplier/distributor business models		
Behavioral Change	Technology suppliers	• Invest in advisory and training services (including on-site visits where appropriate) to irrigation customers	
	Farmers and farm managers	• Recognize the value of and respond to supplier advice on irrigation installation, operation and maintenance	
	Activities		*Partner/options (if known)*

Opening interventions	i. Assess the respective will and skill to pilot embedded extension and advisory models and select technology supply partners	Hunter Industries, Jain Irrigation, Netafim, Arzaq Group, Mais Irrigation, Jordan Greenhouses, Arab Greenhouses
	ii. Develop and negotiate WIT support 'offer' to facilitate, monitor and measure results of embedded extension and advisory model pilot(s)	Hunter Industries, Jain Irrigation, Netafim, Arzaq Group, Mais Irrigation, Jordan Greenhouses, Arab Greenhouses
	iii. Support selected technology supply partner(s) to design improved embedded extension and advisory pilot(s)	Hunter Industries, Jain Irrigation, Netafim, Arzaq Group, Mais Irrigation, Jordan Greenhouses, Arab Greenhouses

2.2 Technology skills development and provision			
Vision	Medium-sized stone fruit and olive farmers and farm managers access and invest in relevant and appropriately priced formal training on irrigation installation, operation and maintenance provided by high quality, commercial training providers.		
Systemic Change	• Commercially run, practical training offers target medium-sized (and other) farmers/farm managers investing in irrigation systems and equipment		
Behavioral Change	Commercial training providers	• Develop practical, short courses on irrigation installation, operation and maintenance targeting key agriculture and horticulture markets, including stone fruit and olive farmers/farm managers • Recognize the potential market in the medium and large scale farming community	
	Technology suppliers	• Recognize the commercial opportunity to collaborate with formal training providers in training on irrigation system installation, operation and maintenance	
	Farmers and farm managers	• Recognize the value or, and invest in, appropriate and quality short courses on irrigation installation, operation and maintenance	
Opening interventions		*Activities*	*Partner/options (if known)*
		i. Assess the respective will and skill of commercial training providers to develop and pilot short, practical training courses (in collaboration with technology firms as appropriate) targeting medium-sized farmer/farm manager customers	The Consultative Centre for Science & Technology; Abdul Hameed Shoman Foundation
		ii. Support training provider partner(s) to undertake demand and needs assessment for a training offer targeting medium-sized stone fruit and olive farmers/farm managers	The Consultative Centre for Science & Technology; Abdul Hameed Shoman Foundation
		iii. Develop and negotiate WIT support 'offer' to training provider partner(s) to design and cost appropriate course curricula and methodologies; market and pilot course delivery	The Consultative Centre for Science & Technology; Abdul Hameed Shoman Foundation

2.3 Technology standards and quality assurance	
Vision	Irrigation systems and equipment are subject to credible and transparent standards and quality assessment procedures and which inform farmer irrigation technology investment decisions.

Systemic Change	• Irrigation systems and equipment are subject to transparent national standards and quality testing		
Behavioral Change	Jordan Standards & Metrology Organization	• Adopts recognized international standards and testing protocol to assess and disseminate information on irrigation technologies and equipment	
	Technology suppliers	• Collaborate with JSMO in order to agree and establish a set of industry standards and testing protocol	
	Farmers and farm managers	• Make irrigation investment decisions based on quality as well as cost factors	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess the willingness and capacity of JSMO and key technology suppliers to collaborate on the development of industry standards and testing protocol		JSMO; technology suppliers
	ii. Develop and negotiate WIT support 'offer' to JSMO in leading process for collaborative development of industry standards and testing protocol		JSMO; technology suppliers
	iii. Support JSMO and industry partners to implement and promote industry standards and quality improvements		JSMO; technology suppliers

iii. Intervention Area 3: Access to finance for conservation and technology investment

3.1 Regulation of products and repayment terms			
Vision	Regulatory reforms allowing more flexible repayment terms and conditions lead to formal finance providers (commercial and Islamic banks, MFIs) offering new, agriculture sector-oriented financial products.		
Systemic Change	• Finance sector regulatory reforms enable the development and provision of more appropriate and affordable financial products for farmers		
Behavioral Change	Central Bank	• Instigate necessary reforms to enable Banks & MFIs to benefit from regulations currently allowing ACC to offer flexible repayment terms and conditions	
	Banks & MFIs	• Recognize and respond to the commercial potential of the agriculture sector market	
	Farmers	• Seek formal finance to support investment in more water efficient technologies	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess relevant regulatory framework affecting formal banking repayment terms and conditions, and specific procedure(s) for regulatory reform		Central Bank
	ii. Agree and develop WIT strategy and partnerships to lobby and advocate for appropriate regulatory reform		Central Bank, Commercial and Islamic Bank & MFI partners

	iii. Develop and negotiate WIT support 'offer' to Central Bank to facilitate and publicise necessary regulatory revisions / reform	Central Bank

3.2 Financial product development		
Vision	The formal banking sector invests in the development and promotion of more flexible and secure financial products targeting medium-sized and other farmers investing in water efficient irrigation technologies and equipment.	
Systemic Change	• More tailored finance and insurance products are available suited to agriculture customers and their repayment timelines and requirements • Increased availability of appropriate and secure formal finance increases investment in water efficient technologies	
Behavioral Change	Banks & MFIs	• Develop new finance products with flexible repayment terms applicable to stone fruit and olive production cycles • Recognize the potential of medium-sized (and other) farm customers
	Loan insurance providers	• Provide competitively priced loan insurance products in support of finance products targeting the agriculture sector market
	Input suppliers	• Recognize the opportunity for increased sales based on an appropriate credit 'offer'
	Farmers	• Recognize the commercial benefits of taking secured, formal finance to invest in improved water efficiency technologies
Opening interventions	*Activities*	*Partner/options (if known)*
	i. Assess the respective will and skill of formal finance market players to target agriculture sector customers (including medium-sized farmers) and invest in relevant product development accordingly	TBC amongst Commercial Banks, Islamic Banks, MFIs
	ii. Develop and negotiate WIT support 'offer' to formal finance provider partner(s) to develop appropriate finance products targeting medium-sized stone fruit and olive farmers	TBC
	iii. Identify and support one or more input provider to strengthen credit options targeting medium-sized farmers	TBC
	iv. Support finance provider partner(s) to undertake market research / needs assessment amongst medium-sized stone fruit and olive farmers	TBC
	iv. Support finance provider partner(s) to invest in and promote agriculture-relevant product development	TBC

3.3 Bank staff skills development and provision	
Vision	Formal banking institutions invest in in-house and external services to strengthen staff capacity to understand the agriculture client market; tailor sales, support and promotional activities; and administer new agriculture-oriented products.

Systemic Change	• The formal banking sector recognizes and invests accordingly in its capacity to service the agriculture sector market	
Behavioral Change	Banks & MFIs	• Allocate training budgets to support head office and branch staff training in agriculture sector market and product delivery
Opening interventions	*Activities*	*Partner/options (if known)*
	i. Develop and negotiate WIT support 'offer' to formal finance provider partner(s) to assess staff training needs and develop appropriate skills training programme	TBC
	ii. Support finance provider partner(s) to undertake staff training needs assessment	TBC
	iii. Support finance provider partner(s) to design and deliver staff training in support of agriculture sector product delivery	TBC

b. Supporting water conservation in households

Within the opening household portfolio will be two intervention areas comprising five specific interventions:

	Intervention Area	Opening interventions
4	**Information on water efficient practices, behaviors and impacts**	4.1 Information on water efficient practices and behavior 4.2 Awareness of water situation and risks
5	**Water saving devices and water supply/recycling technologies**	5.1 Marketing and promotion of water saving devices 5.2 Marketing and promotion of water supply/recycling technologies 5.3 Access to finance for water supply/recycling investment

The tables below provide more detail on each intervention including the intervention-level vision system and behavior change objectives; and the proposed opening activities. Where possible and appropriate, relevant partnership options are identified against the various activities.

i. Intervention Area 4: Information on water efficient practices, behaviours and impacts

4.1 Information on water efficient practices and behavior	
Vision	The development and supply of information on water efficient practices should be specific and actionable, and delivered by individual actors or groups of actors with complementary incentives. Multiple actors recognize the benefits of water use behavior change and seek to leverage different financial, religious, social and/or public good incentives to stimulate that change. Responding to diverse household incentives individually or in collaboration and targeting specific behaviors, a blend of actors will provide mutually reinforcing messages and advocacy.
Systemic Change	• A blend of public, private, and religious market system actors have adopted the practice of regular and reinforcing communication on specific good practices that conserve water, using messaging strategies that appeal to individual's financial, social, religious or other incentives

Behavioural Change	Water utilities	• Embed targeted and actionable water efficiency messages in existing communication channels (internet, billing etc.)
	Ministry of Awqaf & Islamic Affairs / Religious leaders	• Incorporate targeted water conservation and behavior messages in their existing communication channels
	Private companies	• Companies selling relevant household products (e.g. general bathroom or kitchen products) leverage water conservation messaging to build trust and credibility with household customers (using commercial and/or CSR budgets)
	Ministry of Water & Irrigation	• Incorporates targeted water conservation and behavior messages in existing communication channels
	Communication specialists	• Develop appropriate and competitively priced services and expertise to support multiple actors to develop quality information and messaging

	Activities	*Partner/options (if known)*
Opening interventions	i. Assess will/skill of Yarmouk water company to include specific water efficiency messages, targeting high use kitchen and bathroom water practices, in their existing communications	Yarmouk Water Co.
	ii. Assess will/skill of Ministry of Awqaf & Islamic Affairs to include specific water efficiency messages, targeting high-use consumption practices (e.g. in kitchens and bathrooms), in their existing communications channels	Ministry of Awqaf & Islamic Affairs
	iii. Identify private companies selling other kitchen and/or bathroom products and assess their will/skill of potential to bundle specific water efficiency messages in existing communications strategies	TBC
	iv. Assess capacity of Ministry of Water and Irrigation to support and invest in behavior specific information and messaging	Ministry of Water and Irrigation
	v. Identify and assess will/skill of communication specialists to develop high quality, competitively priced communication services to support public or private entities to strengthen information and communication products	Media partners; Creative and marketing agencies i.e.: Leo Brunett, Y+R advertising and Ogilvy. – TBC
	vi. Develop and negotiate WIT support 'offer' to Yarmouk to strengthen targeted behavior change messaging	Yarmouk Water Co.
	vii. Develop and negotiate WIT support 'offer' to Ministry of Awqaf & Islamic Affairs and selected religious leaders to strengthen targeted behavior change messaging	Ministry of Awqaf & Islamic Affairs, Religious leaders (Ajloun & Mafraq)
	viii. Develop and negotiate WIT support 'offer' to a limited number of motivated private companies to strengthen behavior change messaging targeted towards high water consumption practices	Private sponsors (Manaseer, Zain, etc.
	ix. Support partners (Yarmouk, Ministries of Awqaf & Islamic Affairs & Water & Irrigation, private companies)	Yarmouk Water Co.; Ministry of Awqaf &

	in collaboration with communications specialists as appropriate to pilot, monitor and measure the impacts of targeted water efficiency messages in Ajloun and Mafraq	Islamic Affairs; Ministry of Water and Irrigation; private companies & communication specialists
4.2 Awareness of water situation and risks		
Vision	Effective awareness raising by appropriate public and media market players compliments and reinforces more targeted information strategies. Government and utilities recognize respective responsibility and financial incentives to raise awareness of water situation. A responsible media recognizes and prioritizes the public interest and profile of water and water conservation.	
Systemic Change	• Public and media market system actors share responsibility for on going message dissemination about the water situation in Jordan. Both have the capacity to update the content of their messages to respond to what actually motivates people to conserve water	
Behavioral Change	Ministry of Water & Irrigation	• Collaborates in improved general awareness raising communication, building on and complimenting more targeted behavior change messaging
	Water utilities	• Collaborates in improved general awareness raising communication, building on and complimenting more targeted behavior change messaging
	Media	• Investigates and brings to public attention the challenges of the water situation and the benefits of (various) water conservation practices • Holds to account the actions of both public and private stakeholders with regards water conservation
Opening interventions	*Activities*	*Partner/options (if known)*
	i. Assess Ministry of Water & Irrigation and Water Utility awareness raising history, capacity and will/skill to develop and deliver improved awareness communication and messages	Ministry of Water & Irrigation; Yarmouk Water Co.; Miyahuna
	ii. Assess media awareness raising history and capacity, and will/skill or potential media partners to strengthen investigation and public discourse into water issues	Media partners - TBC
	iii. Develop and negotiate WIT support 'offer' to Ministry of Water & Irrigation to strengthen awareness raising	Ministry of Water & Irrigation
	iv. Develop and negotiate WIT support 'offer' to Water Utilities to strengthen awareness raising	Yarmouk Water Co.; Miyahuna
	v. Develop and negotiate WIT support 'offer' to 1 or more media outlets to strengthen water-related journalism and communication	Media partner(s) - TBC
	vi. Support selected partners to pilot, monitor and measure the impacts of water messages to compare and determine most effective tactics	MWI; Yarmouk Water Co.; Miyahuna; Media partners – TBC
	vii. Further investigate the potential for leveraging Landlord incentives to utilize innovation rental agreements that encourage water conservation amongst tenants, including Syrian tenants	Landlords

ii. Intervention Area 5: Water saving devices and water supply/recycling technologies

5.1 Marketing and promotion of water saving devices			
Vision	Private companies selling water saving devices (e.g. kitchen and bathroom fixtures and fittings) have the commercial incentives and capacity to market and promote effectively those technologies that reduce household water inefficiency. Companies will utilize a range of appropriate and proven marketing strategies and tools supported by valid product-specific quality and cost-benefit data.		
Systemic Change	• Suppliers of water saving devices recognize the potential of the household consumer market amongst WIT's target beneficiaries and employ effective marketing tactics to persuade them to purchase their products based the consumer motivation to save money by saving water		
Behavioral Change	Product suppliers	• Capacity to develop effective marketing products and messages targeting consumer cost-conscious incentives • Capacity to effectively demonstrate and market solutions and services developed	
	Product retailers	• Capacity to support supplier initiatives to effectively demonstrate and market solutions and services developed	
	Research entities	• Establish mutually beneficial partnerships with product suppliers to test, validate and demonstrate water- and cost-efficiency attributes of products marketed	
	Householders & tenants	• Respond to promotion and financial incentives to install water saving technologies	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess supplier partnership options using will/skill analysis to identify 2-4 partners in a) bathroom and b) kitchen appliance markets to pilot new/improved marketing and promotion strategies in pilot locations		TBC. E.g. El Amman Co; Attaqdam
	ii. Develop and negotiate details of WIT 'offer' to 2-4 suppliers that aims to build relevant capacity to deploy multiple effective marketing tactics		TBC
	iii. Support supplier partners to identify key retailers / networks to support development and piloting of new/improved marketing and promotional strategies		TBC
	iv. Negotiate deals with retailers to build their capacity to deploy multiple marketing tactics		TBC
	v. Develop and negotiate details of WIT 'offer' to 1 or more research entity to collaborate with product suppliers to test, quantify and demonstrate product benefits		TBC. E.g. RSS
	vi. Broker collaboration between research and supplier partners to support product testing, validation and demonstration		TBC
	vii. Support supplier partners (and their retailer networks) to conduct, monitor and measure the impacts of marketing pilots to compare and determine most effective tactics		TBC

	viii. Investigate potential (including partnership options) to pilot innovative tenancy agreements that incentivize tenants to save water and/or disincentive excessive water consumption	Landlords – TBC

5.2 Marketing and promotion of water supply/recycling technologies			
Vision	Private companies providing water supply/recycling technologies (e.g. rainwater catchment systems, greywater technologies) have the commercial incentives and capacity to market and promote effectively those technologies. Companies will utilize a range of appropriate and proven marketing strategies and tools supported by valid product-specific quality and cost-benefit data.		
Systemic Change	• Suppliers of water supply/recycling technologies recognize the potential of the consumer market amongst WIT's target beneficiaries and employ effective marketing tactics to persuade consumers to purchase their products based the consumer motivation to save money by saving water		
Behavioral change	Contractors (rainwater catchment)	• Capacity to effectively market solutions and services developed	
	Greywater system vendors	• Capacity to effectively market solutions and services developed	
	Research entities	• Establish mutually beneficial partnerships with technology suppliers to demonstrate water- and cost-efficiency benefits of uptake	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess rainwater catchment supplier partnership options in Ajloun and Mafraq governorates using will/skill analysis to identify partner(s) to pilot new/improved marketing and promotion strategies		TBC
	ii. Support rainwater catchment partner(s) to undertake market research and develop an appropriate business 'offer' in collaboration with MFIs as appropriate		TBC
	iii. Develop and negotiate details of WIT 'offer' to rainwater catchment partner(s) to more actively market and promote catchment services		TBC
	iv. Map water recycling technology availability and assess commercial supplier options using will/skill analysis to identify partner(s) to pilot new/improved marketing and promotion strategies		Private partner(s) – TBC; RSS
	v. Broker and support collaborative research between water recycling technology supplier partner and a research partner to quantify and communicate costs and benefits (incl. septic tank management savings) of technology options		Private partner(s) – TBC; RSS
	vi. Develop and negotiate details of WIT 'offer' to water recycling technology partner(s) to more actively market and promote technologies		TBC

5.3 Access to finance for water supply/recycling investment			
Vision	Formal and informal finance providers recognize the demand for household investment in water supply/recycling technologies, and develop and promote appropriate finance products in collaboration with product/service suppliers. Suppliers will collaborate with finance providers to extend sales and compliment promotional activities.		
Systemic Change	• Formal finance providers will target the market for water supply/recycling investments with small scale lending products • Suppliers and retailers will develop appropriate credit options for households bundled with water supply/recycling products/services		
Behavioral change	MFIs	• Identify and target new business opportunities in household water supply/recycling market	
	Contractors (rainwater catchment)	• Promote lending products in collaboration with MFIs • Develop credit options appropriate for customers	
	Recycling system providers	• Promote lending products in collaboration with MFIs • Develop credit options appropriate for customers	
Opening interventions	*Activities*		*Partner/options (if known)*
	i. Assess MFI partnership options using will/skill analysis to identify partner(s) to pilot bundled finance in support of water supply/recycling technology investments		MFI – TBC
	ii. Support MFI partner(s) to undertake market research into nature and demand for finance for water supply/recycling investment		MFI – TBC
	iii. Develop and negotiate details of WIT 'offer' to MFI partner(s) to develop finance products in collaboration with technology suppliers		MFI – TBC
	iv. Broker collaboration between MFIs and water supply/recycling technology suppliers and retailers		Private partner(s); MFI – TBC
	v. Support water supply/recycling technology supplier and retailer partners to pilot credit options to promote sales		Private partner(s) – TBC

6. Intervention rationale

The following summarises the basic rationale for WIT's interventions in agriculture and household market systems. Detailed results chains for each market intervention are provided in sections 9.1 and 9.2 below.

The rationale for agriculture intervention

WIT's goal is to improve water efficiency in agriculture and horticulture, with its opening portfolio focusing on high water use target groups amongst stone fruit and olive farmers in the northern governorates.

This will be achieved through farmers and farm managers applying and investing in more water-

efficient production practices and irrigation technologies.
Water-efficient farmer and farm manager decision making will result from improved access to appropriate technical information, advice and training provided by input and technology providers in collaboration with research and training specialists, and more relevant formal and informal finance services.

WIT will work with a range of input, technology, agricultural research, training and finance providers to pilot, develop and rollout improved, viable and sustainable business and service models that target agriculture and horticulture farmers and clients.

The rationale for household intervention

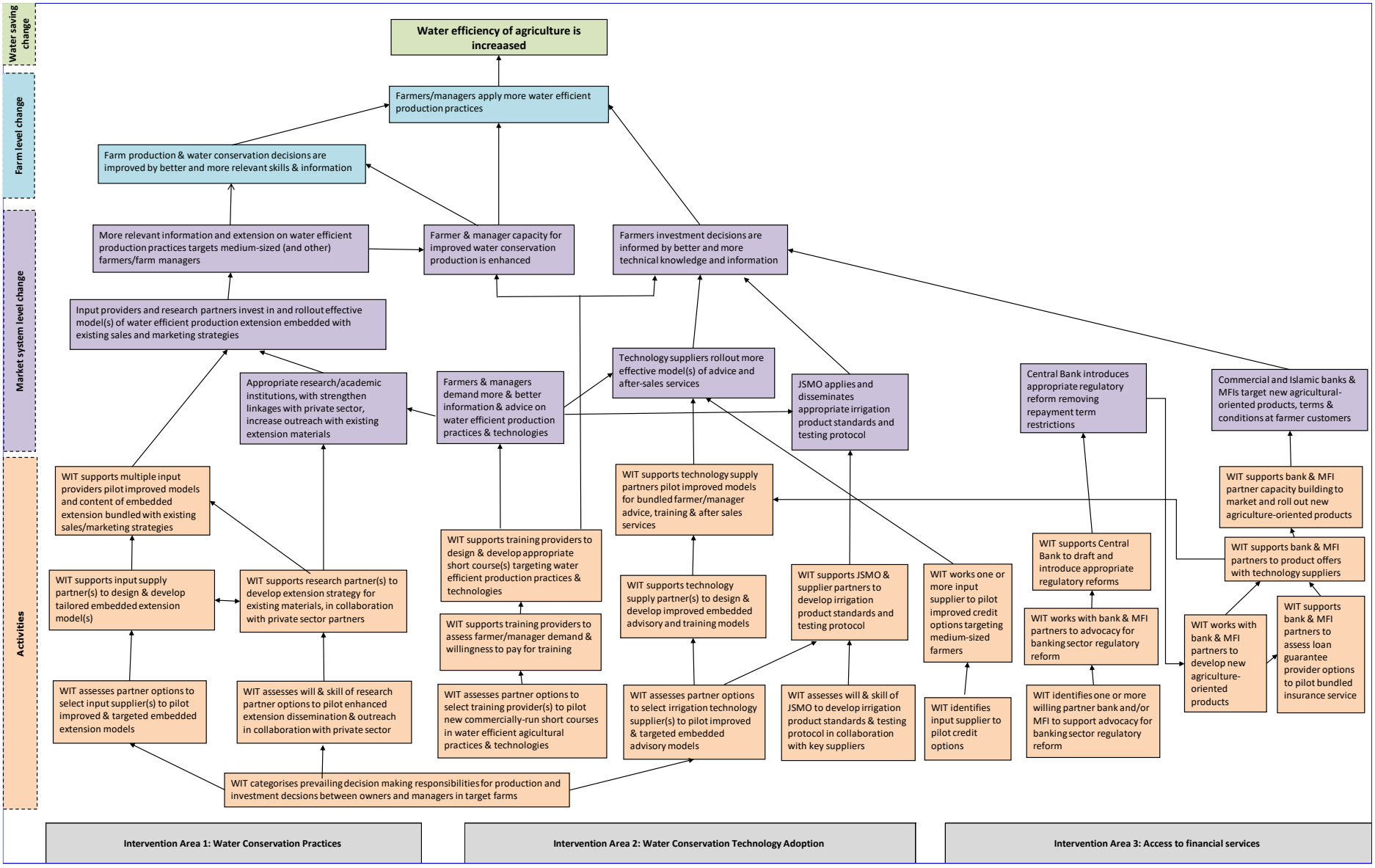
WIT's goal is to improve water efficiency in Jordanian and Syrian households in the northern governorates.

This will be achieved through individuals and households adopting more water-efficient behaviours and technologies that address those household practices where greatest water-inefficiencies persist.

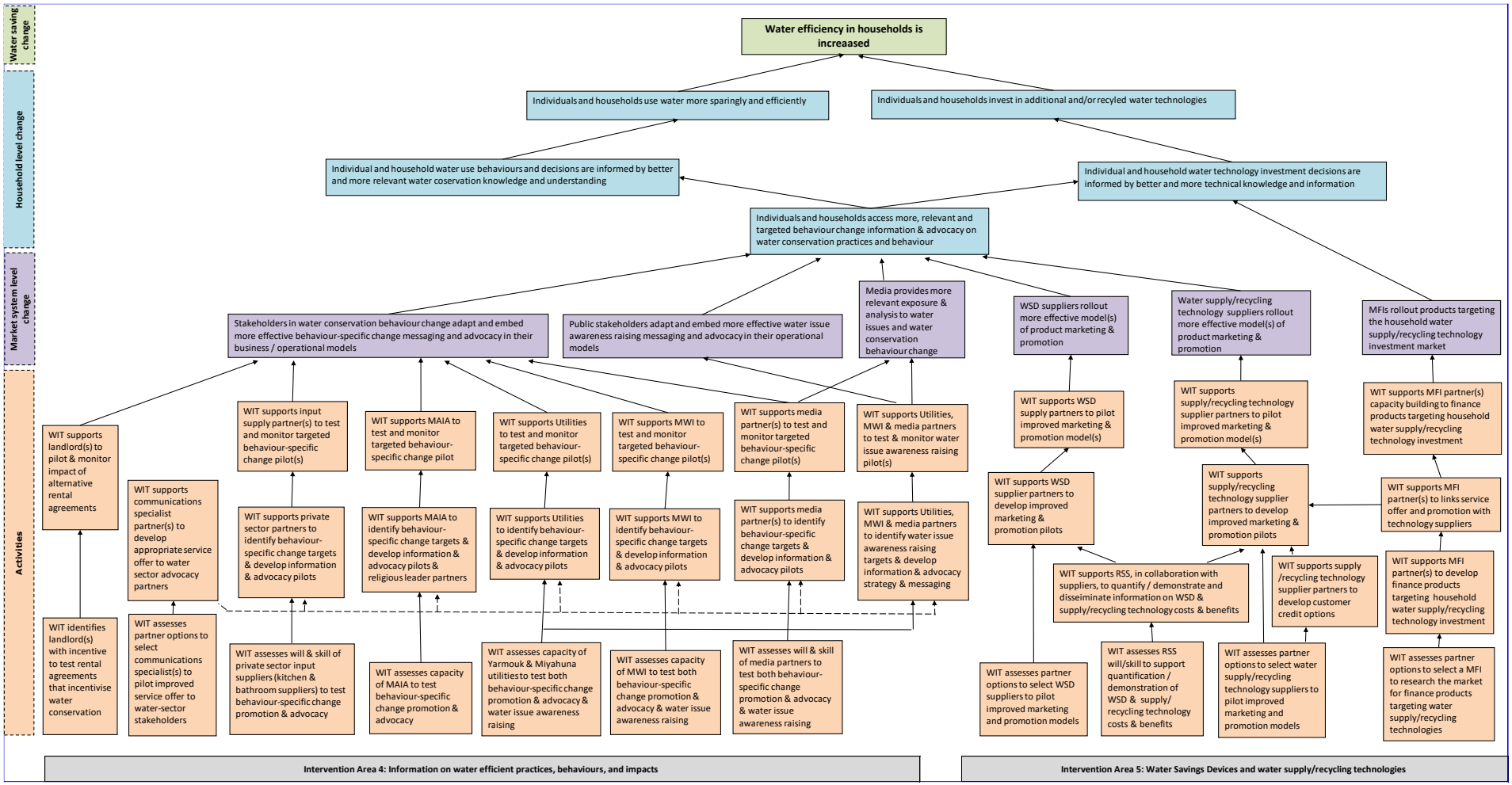
More water-efficient individual and household behaviour will result from exposure to better targeted and quality information and advocacy on specific behaviour changes and their economic and social benefits for individual households, complimented by effective awareness raising as to the water situation. Households will act upon that information with greater access to appropriate water saving, supply and recycling technologies and associated financing products.

WIT will work with a diverse array of private sector suppliers of household products, utilities, government, media and communication specialists to improve the quality and targeting of information and awareness, and with water saving, supply and recycling technology providers to better promote appropriate and affordable water-efficient products and technologies.

Results Chain - Agriculture intervention



c. Results Chain - Household intervention

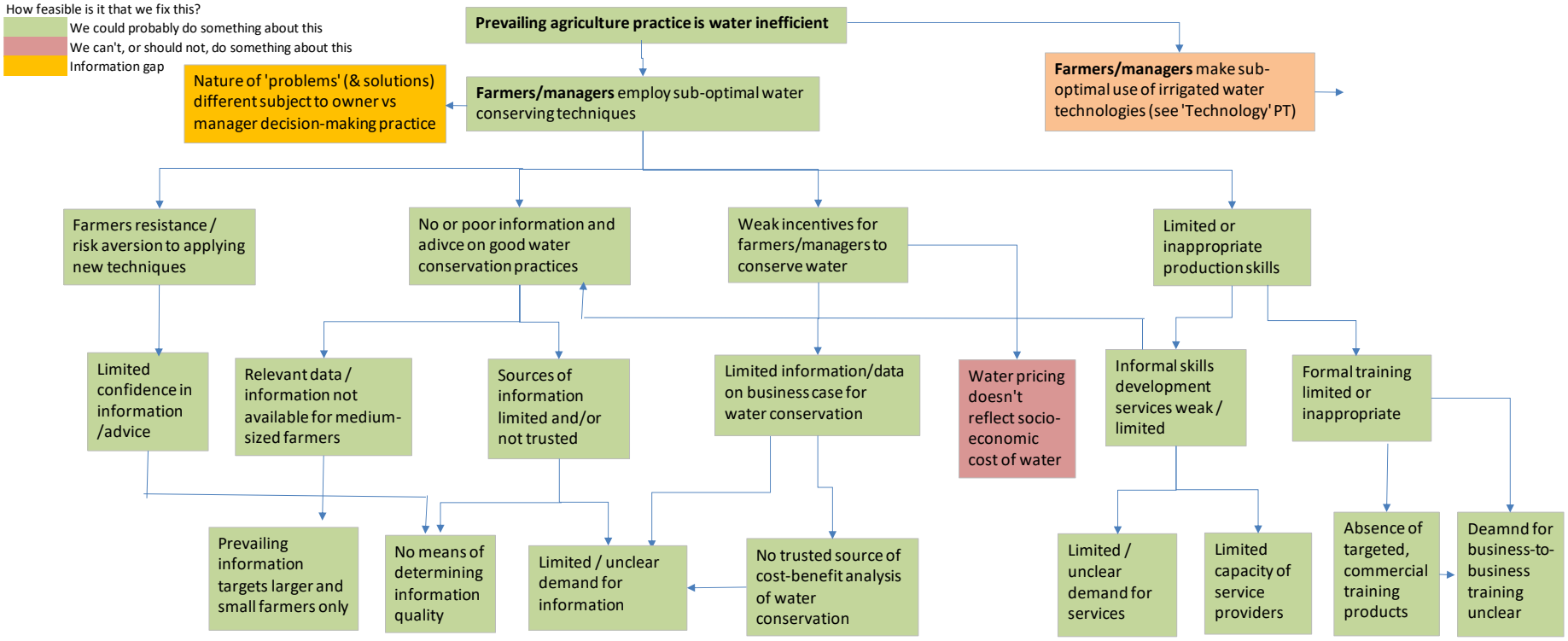


6. Annexes

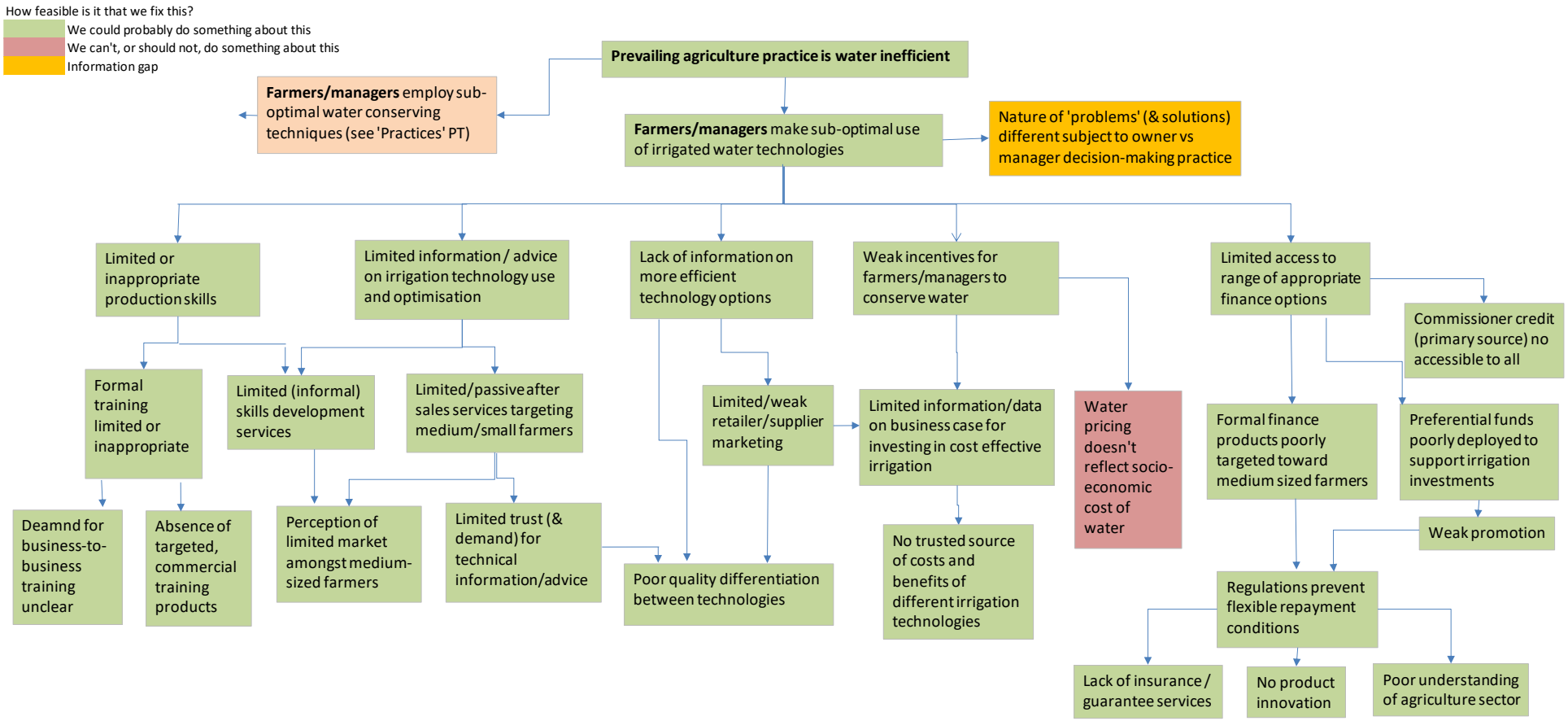
a. Problem trees

As part of the market assessment analysis, problem trees were used by the WIT team to identify the root causes of inefficient agricultural and household water practices and limited uptake of water conserving technologies. Identifying the root causes of underperformance allowed the team to determine where to focus their opening interventions, as well as a causal impact logic.

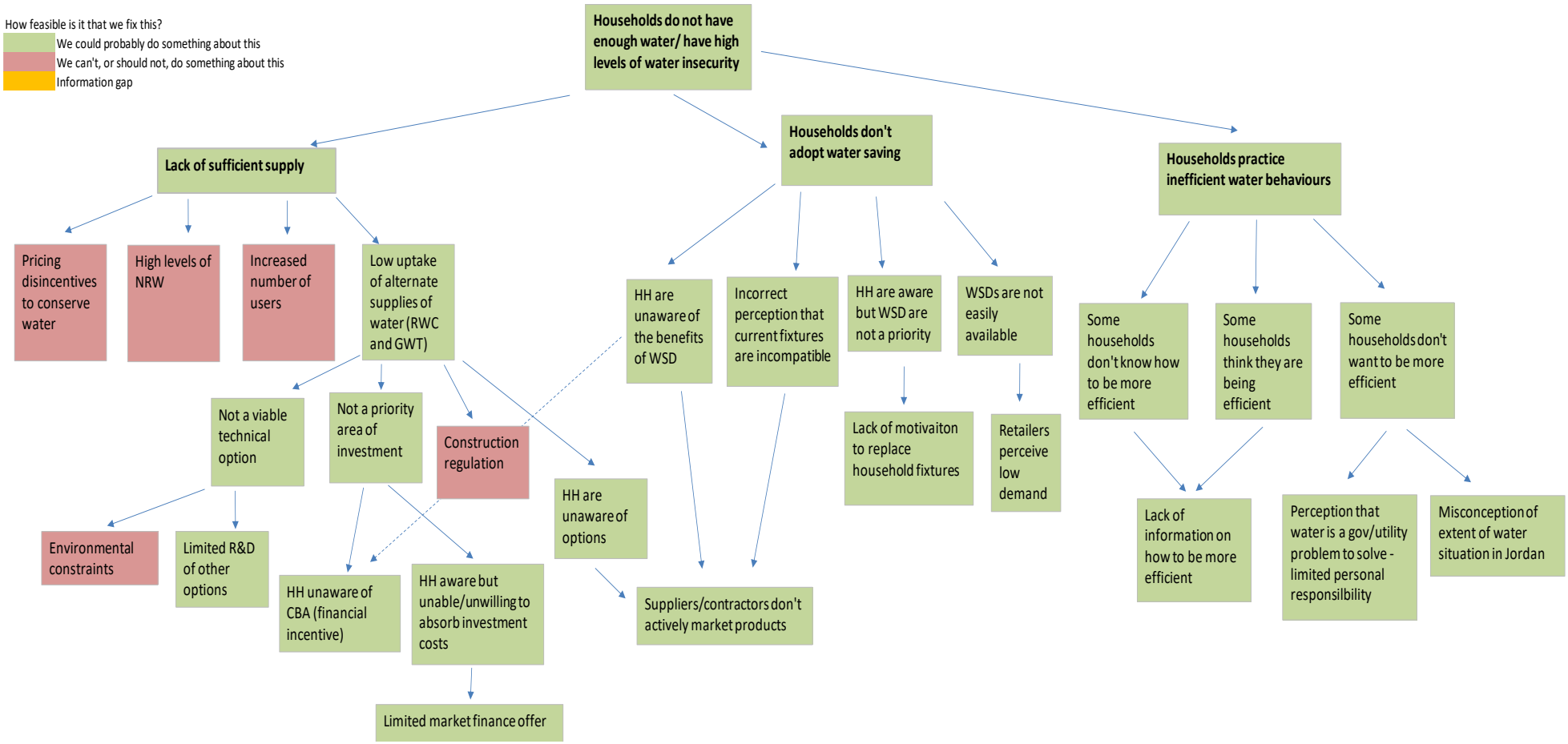
i. Water conservation practices in agriculture



ii. Water conservation technologies in agriculture



iii. Water conservation in households



iv. *Agriculture system 'Who Does, Who Pays' analyses*

Water conservation practices

	Current picture			Future vision	
Function / Rule	Who is doing?	Who is paying?	Current performance (Inadequate, Mismatch, Absent)	Who will do?	Who will pay?
CORE FUNCTIONS					
Supply of information/advice on conservation techniques/practices	Peer-to-peer	Farmers	Inadequate. 'Closed' system with variable demonstration effect		
	Internet for a	Farmers, Contributors	Mismatch. Limited/no scope to filter Jordan context-relevant materials or quality assure information	Relevant input suppliers	Input suppliers, Farmers
	Media (local)	Farmers, Govt, Donors	Inadequate. Limited media engagement in advisory services		
	Product buyers	Farmers, Buyers	Inadequate. Volume and quality of information flow variable		
	Academia	Farmers, Government	Absent. No substantive interface between academic institutions & farmers	Academia - via graduate outreach	Academia, Input suppliers, Farmers
	Input suppliers	Farmers, Input suppliers	Inadequate. Information flow & quality variable / fragmented	Relevant input suppliers embedded in marketing	Input suppliers, Farmers
	Farmer coops / associations	Farmer members	Inadequate. Information flow & quality variable / fragmented & project-driven	Input suppliers in collaboration with Associations	Input suppliers, Farmer members
	Projects/INGOs	Donors	Inadequate. Information flow & quality variable and unsustainable		
	NCARE	Government	Inadequate. Information flow & quality variable and targeting smallholders		
SUPPORTING FUNCTIONS					

Research & Development on conservation practices	Farmers	Farmers	Inadequate. 'Closed' system where trial & error research efficacy & efficiency is limited and high risk	Input suppliers in collaboration with research centre(s)	Input suppliers, Farmers, Government
	NCARE	Government, donors	Inadequate. Weak dissemination pathways		
	Universities, Research centers	Government, donors	Inadequate. Weak dissemination pathways, variable practical application		
Water conservation cost-benefit analyses	Universities, Research centers	Government, donors	Inadequate. Limited on-farm based analysis of water conservation practices	Research centers in collaboration with Input suppliers	Input suppliers, Farmers, Government
Farmer skills development (informal)	Input suppliers	Farmers, Input suppliers	Inadequate. Limited evidence of active training/coaching	Relevant input suppliers via after sales services	Input suppliers, Farmers
Farmer skills development (formal)	Training institutions	Farmers, Government	Mismatch. Formal training curricula out-of-date and poorly accessed	Commercial training providers	Farmers

v. Water conservation technology adoption

	Current picture			Future vision	
Function / Rule	Who is doing?	Who is paying?	Current performance (Inadequate, Mismatch, Absent)	Who will do?	Who will pay?
CORE FUNCTIONS					
Supply of information/advice on irrigation technologies & their application	Peer-to-peer	Farmers	Inadequate. 'Closed' system with variable demonstration effect		
	Internet fora	Farmers, Contributors	Mismatch. Limited/no scope to filter ecosystem context-relevant products or assess product quality	Technology suppliers	Suppliers, Farmers
	Academia	Farmers, Government	Absent. No substantive interface between academic institutions & farmers		
	Technology retailers	Farmers, Retailers	Inadequate. Limited skills / knowledge		
	Technology suppliers	Farmers, Suppliers	Inadequate. Product push focus, with limited after sales support /advice	Technology suppliers	Suppliers, Farmers
SUPPORTING FUNCTIONS					
Marketing	Technology suppliers	Suppliers, Farmers	Inadequate. Weak/passive marketing targeting larger scale farmers	Technology suppliers	Suppliers, Farmers
After sales services	Technology suppliers	Suppliers, Farmers	Inadequate. Limited / no after sales services beyond on-demand response to post sales problems	Technology suppliers	Suppliers, Farmers
Farmer basic irrigation skills development services (informal)	Technology suppliers	Farmers, Suppliers	Inadequate. Limited evidence of active training/coaching	Technology suppliers	Suppliers, Farmers
	Independent advisors	Farmers	Inadequate. Services perceived as expensive & rarely used. Quality unclear.		
Farmer basic irrigation skills development services (formal)	Training institutions	Farmers, Government	Mismatch. Formal training curricula out-of-date and poorly accessed by Farmers	Commercial training providers	Farmers
RULES / NORMS					
Technology standards / quality assurance	Government	Jordan Standards and Metrology Organization	Absent or unenforced.	Jordan Standards and Metrology Organization	Government, Suppliers

vi. Access to finance for conservation and technology investment

	Current picture			Future vision	
Function / Rule	Who is doing?	Who is paying?	Current performance (Inadequate, Mismatch, Absent)	Who will do?	Who will pay?
CORE FUNCTIONS					
Supply of appropriate finance products	Commercial banks	Farmers	Inadequate. Weak 'offer' of appropriate finance products	Commercial & Islamic banks, MFIs	Farmers
	Islamic banks	Farmers	Inadequate. Weak 'offer' of appropriate finance products		
	MFIs	Farmers	Inadequate. Weak 'offer' of appropriate finance products		
	Commissioners, Wholesalers	Farmers	Mismatch. Weak/unclear incentives to promote irrigation-specific investment		
	Technology suppliers	Farmers	Inadequate. Credit-based sales of technologies selective / targeted at large and/or connected farmers	Technology suppliers in collaboration with formal finance partners	Farmers
	ACC	Farmers, Government	Inadequate. High interest rates, targeting small-scale investments		
SUPPORTING FUNCTIONS					
Preferential funding support	Central Bank	Government, donors	Inadequate. Earmarked funds not being drawn-down by banks or significantly increasing access to preferential financial products targeting irrigation investment		
Loan insurance	Insurance providers	Banks, Borrowers	Inadequate. Limited, targeting loan products to attract insurance services	Insurance providers linked to 'new' formal loan products	Banks, Borrowers
Bank/MFI personnel skills development	Banks, MFIs	Banks, MFIs	Inadequate. Limited demand for in-house skills development for agricultural market	Banks, MFIs	Banks, MFIs
RULES / NORMS					
Financial sector regulation	Central Bank	Government	Inadequate. Regulatory constraints on formal bank lending/repayment terms	Central Bank	Government

b. Household system 'Who Does, Who Pays' analyses

vii. Information on water efficient practices and water situation

	Current picture			Future vision	
Function / Rule	Who is doing?	Who is paying?	Current performance (Inadequate, Mismatch, Absent)	Who will do?	Who will pay?
CORE FUNCTIONS					
Supply of information on water situation in Jordan	MWI	Donors, MWI	Mismatch-type of information provided not persuasive or sustained	Media	MWI and private sector
	Media	Donors	Inadequate-mostly information about donor projects	Religious leaders	MAIA
	CBOs	Donors	Inadequate-dependent on donor funding and limited in reach	Utilities	Households and MWI
	Schools	MinEd	Absent above primary school		
Supply of information on water efficiency practices	N/A	N/A	Absent	Utilities	Households
				Religious leaders	MAIA
				Media	Private sector
Demand for information	N/A	N/A	Absent	Households	Households
SUPPORTING FUNCTIONS					
Content development/ audience research	N/A	N/A	Absent	Private sector, MWI, specialized firms	Private sector or MWI
Water billing system	Utilities	HHs, GOJ, donors	Inadequate - provides consumption, but not how to reduce it	Utilities	HH (landlord or tenant)
RULES/NORMS					
Changing HH perception of shared responsibility for water efficiency	N/A	N/A	Absent	Private sector	Private sector
				MWI	MWI, Private sector

viii. Technology adoption of water efficient fixtures and diversified water supply product

	Current picture			Future vision	
Function / Rule	Who is doing?	Who is paying?	Current performance (Inadequate, Mismatch, Absent)	Who will do?	Who will pay?
CORE FUNCTIONS					
Supply of water saving & recycling technologies	Retailers (via suppliers)	Households	Absent (in some areas)	Retailers (via suppliers)	Households
Supply of water supply technologies	Contractors, plumbers	Households	Inadequate-not proactive	Contractors, plumbers	Households
		Donors	Inadequate-not sustainable		
Demand for WSDs and/or RWC/GW	Households	Households, donors	Inadequate-not priority for households	Households	Households
SUPPORTING FUNCTIONS					
Consumer research	N/A	N/A	Absent - lack of understanding what motivates people to invest	Suppliers/retailers-in house or outsourced	Suppliers/retailers
Marketing water savings devices	N/A	N/A	Absent-no proactive strategies	Suppliers/retailers	Suppliers/retailers
Marketing diversified water supply technologies	CBOs/plumbers	Donors	Inadequate (depends on donor funds)	Contractors/plumbers	Contractors/plumbers
Technology R&D	RSS	GOJ, Donors	Inadequate	RSS, Private sector	GOJ, Private sector
Financial solutions for RWC/GW	CBOs	Donors	Inadequate-limited in scale and sustainability	Banks and MFIs	HH
RULES / NORMS					
Changing HH perception of shared responsibility for water efficiency	N/A	N/A	Absent	Private sector	Private sector
				MWI	MWI, Private sector

ix. Schedule for household market assessment

Governorate	District/Community	Coordinates	Date of visit	Methodology	# of Attendees	Nationality	Gender
Mafraq	Khaldieh	32.154066,36.284875	20-Jul-17	Focus Group Discussion (FGD)	5	Syrian	Female
Mafraq	Khaldieh	32.154066,36.284875	20-Jul-17	FGD	5	Jordanian	Male
Mafraq	Khaldieh	32.188463,36.307755	20-Jul-17	Interview (Retailer الذهبي السيف)	1	Jordanian	Male
Mafraq	Khaldieh	32.175282,36.301202	23-Jul-17	FGD	8	Syrian	Male
Mafraq	Khaldieh	32.175282,36.301202	23-Jul-17	FGD	10	Jordanian	Female
Mafraq	Khaldieh	32.175282,36.301202	23-Jul-17	Individual interviews (Community Leaders)	2	Syrian	Male
Mafraq	Khaldieh	32.175282,36.301202	23-Jul-17	Individual interviews (Community Leaders)	1	Jordanian	Male
Azraq	Southern Azraq	31.8337070,36.8116210	24-Jul-17	FGD	8	Jordanian	Male
Azraq	Southern Azraq	31.8337070,36.8116210	24-Jul-17	FGD	6	Jordanian	Female
Azraq	Southern Azraq	31.8337070,36.8116210	24-Jul-17	FGD	10	Syrian	Female
Azraq	Southern Azraq	31.8337070,36.8116210	24-Jul-17	FGD	4	Syrian	Male
Irbid	Deer Yousef	32.491016,35.784248	25-Jul-17	Individual interviews (Community Leaders)	8	Syrian	Male
Irbid	Deer Yousef	32.491016,35.784248	25-Jul-17	FGD	9	Jordanian	Male
Irbid	Northern Mazar	32.471241,35.797120	25-Jul-17	Individual interviews (Landlords)	2	Jordanian	Male

Irbid	Northern Mazar	32.471241,35.797120	25-Jul-17	Individual interviews (Community Leaders)	3	Syrian	Male
Irbid	Northern Mazar	32.471241,35.797120	25-Jul-17	FGD	5	Jordanian	Female
Irbid	Northern Mazar	32.471241,35.797120	25-Jul-17	FGD	12	Syrian	Female
Irbid	Irhaba	32.418006,35.808670	26-Jul-17	Individual interviews (Landlords)	2	Jordanian	Male
Irbid	Irhaba	32.418006,35.808670	26-Jul-17	FGD	14	Jordanian	Female
Irbid	Irhaba	32.418006,35.808670	26-Jul-17	FGD	10	Syrian	Female
Irbid	Zoubia	-	26-Jul-17	Individual interviews (Community Leaders)	2	Jordanian	Male
Irbid	Zoubia	-	26-Jul-17	Individual interviews (Community Leaders)	1	Syrian	Male
Irbid	Zoubia	-	26-Jul-17	FGD	14	Syrian	Male
Irbid	Zoubia	-	26-Jul-17	FGD	14	Jordanian	Male
Ajloun	Ajloun City	32.332712,35.752987	27-Jul-17	FGD	6	Syrian	Female
Ajloun	Ajloun City	32.332712,35.752987	27-Jul-17	FGD	5	Syrian	Male
Ajloun	Ajloun City	32.332712,35.752987	27-Jul-17	FGD	6	Jordanian	Male
Jarash	Sakeb	32.287026,35.808509	30-Jul-17	Individual interviews (Community Leaders)	3	Syrian	Female
Jarash	Sakeb	32.287026,35.808509	30-Jul-17	FGD	6	Jordanian	Female
Jarash	Sakeb	32.287026,35.808509	30-Jul-17	FGD	10	Jordanian	Male
Jarash	Sakeb	32.287026,35.808509	30-Jul-17	FGD	8	Syrian	Female
					200		

x. Schedule for agricultural market assessment

Date	Number of visit	Time	Team	Company Name	Stakeholder	Contact	Title	Phone Number	Location
		9:00-11:00	B	Supplier	Supplier				Mogabalin
		11:30-1:00	Lamia, Layanah, Cyrin	Capital Bank	Bank	Tawfiq Shoubash / M. Joudeh	Product Dev Supervisor / Product Dev Dept Manager	0777007799 / 0796721008	Amman
23-Jul-17	3	1:30-3:00	Lamia, Layanah, Cyrin	JEPA	Farm	Basil El-Deek	Board Member	795911911	Amman
		9:00-11:00	Bayan, Sameer, Jafar, Cyrin	Farm	Farm	Basheer Ghzawi		0795601280 - 0788212000	Mafraq
		10:00-11:00	Lamia, Layanah	Jordan Commercial Bank	Bank	Saleem Swalha	AGM - head of retail		Amman
		12:00-1:00		Jordan Insurance company	Insurance		Marketing dep.		
		11:30-1:00	Bayan, Sameer, Cyrine, Jafar	Farm	Farm	Thaer Al-Zoubi		795713163	Mafraq
		1:30-3:00	Bayan, Sameer, Cyrine, Jafar	Aghadeer	Supplier	Abo Bassam	Manager	795570635	Mafraq
24-Jul-17	6	3:30-	Bayan,	Farm	Farm	M. Mallouh		796409000	Mafraq

		5:30	Sameer, Cyrine, Jafar			Al-Issa			
		10:00-11:00	Bayan, Sameer, Lamia	GIG	Insurance	Ibrahim Qadadah	Debuty Director	795328343	Amman
		10:00-11:00	Layanah, Jafar, Cyrine	AlRajhi	Bank	Osama Assaf	Head of SME's & Commercial	799209555	
25-Jul-17	2	9:00-11:00	WIT Team	Weekly Meeting @ 2:00 pm					
		9:00-11:00	Cyrine, Bayan, Qardan	Jordan Greenhouses Manufacturing	Manufacturer	Mohamad Diab	Area Sales Manager	796605010	Amman
		1:00 - 2:00	Bayan, Qardan	ADRITEC	Manufacturer	Basel Al-Naser / Loai Rabah		0797146670 / 0797778827	Sahab
		2:00 - 3:00	Bayan, Qardan	Universal for Industry of Irregation Pipes	Manufacturer	Eng. Nedal		799308889	Sahab
		10:00-12:00	Layanah, Jafar, Lamia, Sameer	Zomot Farm	Farm	Yosef Botrus		775688159	Mafraq
26-Jul-17	5	12:00-3:00	Layanah, Jafar, Lamia, Sameer	In care Mafraq	Government				
		10:00-12:00	Bayan, Sameer	Mais Company	Manufacturer - Retailer - Supplier	Kamal Al-Kawalit	Sales Manager	795530800	Amman - Abo Alanda
		10:00-11:00	Lamia, Layanah	Central Bank of Jordan	Government	Maha AlBahou	Executive Manager	799059767	Amman - Downtown
		11:30-1:00	Lamia, Layanah	Ag Ministry	Government				
27-Jul-17	4	1:30-3:00	Sameer, Bayan	JOPEA	Association	Fayad Zyoud	Chairman	64622262	
28-Jul-17									
29-Jul-17									

		9:00-10:00	Sameer, Bayan	Irshidat Company	Household	Mohamad Zawahreh	Project Mnager	65601797	Amman
		9:00-10:00	Cyrine, Layanah	VITAS	MFI	Darweesh Sweidan	Credit Manager Head Office	778437472	Amman
		11:00-12:00	Sameer, Bayan	Aman Factory	Manufacturer / Supplier Household	Nabeel Ayyad	Factory Manager	77990555	Sahab
		12:00-1:00	Sameer, Bayan	Zallum Factory	Factory	Ryad			
		2:00-3:00	Sameer, Bayan	Attal Institution	Household - Retailer	Ammar Al Attal		797588872	Ras Al Ain
		3:00-4:00	Sameer, Bayan	ATTAQADOM Company	Household - Supplier	Nael Mohmoud	Branch Manager	777337222	Ras Al Ain
30-Jul-17	7	10:00-12:00	Layanah, Lamia	Agriculture Risk Management Fund	Government	Mohammad AL Awaideh	General Manager	799028416	Amman
31-Jul-17	1	9:00-11:00	Sameer, Layanah, Cyrine, Lamia	Central Market	Government	Anas Mahadeen	Central Market Dept Manager	798165645	Down town
		10:00-12:00	Layanah, Lamia, Sameer	Jordan Loan Guarantee Corp	Loan Guarantee	Moh'd Al-Jafari	General Director		
1-Aug-17	1	2:00-4:00	WIT Team	Weekly Meeting @ 2:00 pm					
		9:00-10:00	Layanah, Cyrine	FINCA	MFI	Makhmoud Saidakhmatov	Chief Executive Manager	65373070	
2-Aug-17	2	11:00-1:00	Sameer, Jafar	Mai&Fai	Supplier	Mahmoud Akhras /Hamzeh Abo Jloud	G. Manager	0777343923/07 88171587	Amman
		9:00-10:00	Layanah, Cyrine	Tamweelkm	MFI	Tawfiq Yousef	Partnerships&Buisness Development Specialist	799223203	
		10:00-11:00	Bayan, Sameer	Eco Sol	Consultant	Hasan Suboh / Amjad Alqam	General Manager - Regional Manager	07961212909 / 0799000908	Amman
3-Aug-17	4	10:00-11:00	Layanah, Cyrien	Cairo Amman Bank	Bank	Rana Sunna	Deputy General Manager for Credit	65006860	

							and Tresury Services		
		11:30-1:00	Bayan, Sameer	Al-Alawneh Company	Supplier and Farmer	Olwan Alawneh	General Manager	796764999	Amman
4-Aug-17									
5-Aug-17									
		10:00-11:00	Sameer, Cyrine	AL-Jumairah	Supplier	Saed Qashou		796868000	Amman
6-Aug-17	2	12:00-2:00	Sameer, Cyrine	ICT International	Consultant	Dr.Ghazi Abo Rumman		777054400	Amman
7-Aug-17	1	9:00-11:00	Cyrine, Layanah, Lamia, Sameer, Jafar	Yousef Sarhan Farm	Farm	Yousef Sarhan			
		2:00-4:00	WT Team	Weekly Meeting @ 2:00 pm					
8-Aug-17	1	11:00-1:00	Sameer	NDICO National Drip Irregation Company	Manufacturer	Zarif Baradei / Ayman Al-Edreesi	Vice Chairman /	0795531289 / 0795578817	Amman - Sahab
9-Aug-17	1	9:00-11:00	Sameer, Bayan	MIRRA	Consultant	Samer Tallouza			
11-Aug-17									
12-Aug-17									
13-Aug-17		9:00-11:00	A,B,C,D						
14-Aug-17		9:00-11:00	A,B,C,D	Presentationwith Roger					
15-Aug-17		9:00-11:00	A,B,C,D	Weekly Meeting @ 2:00 pm					
23-Aug0217		2:00-3:30	Sameer, Jafar	Amaan Company	Supplier and Importer	Anas Alawneh	Sales Manager	798868899	Amman
27/8/2017		10:30 - 12:00	Sameer Bayan	Agriculture Plastic Industrial Company	Manufacturer & Supplier	Hassan Badawi	Marketing Manager	779999371	
		12:30 - 1:30	Sameer Bayan	Mada for Drip Irregation	Manufacturer & Supplier	Nasser Al-Darabia	Executive Director	796759759	

		2:00 - 3:00	Sameer Bayan	Al-Wasael Company	Manufacturer, Supplier, Retailer & Importer	Mustafa Asa'd	General Manager	795656166	
		3:30 - 5:00	Sameer, Jafar	Mai & Fai	Supplier, Importer and Distributer	Mahmoud Al Akhras	General Manager	777343923	
28/8/2017		1:00-2:30	Sameer, Bayan, Jafar, Cyrin	Consultants Company (HH)	(Household) Supplier & Retailer	Firas Ammour	General Manager	795532801	Amman - Khalda
		2:00-3:00	Lamia, Sameer, Layanah	JEDCO					
		12:00 - 1:00	Sameer , Lamia	JRF					
30/8/2017		1:00-2:00	Jafar, Orwa	Miqdadi Agriculture Material Company	Input Supplier	Basel Al-Ahmad	Manager	65939890	Amman

xi. Photos of market assessment

Agriculture asssesment: WIT team interviewing farm manger (photo left) and farm owner (photo center) in Azraq, Jordan. Farmer focus group, Jerash (photo right)

WIT team investigating water saving products in household supply retailers in Mafraq, Jordan (left and center). Investigation of household grey water garden (photo right).



Household focus groups: Female refugees from Syria in Azraq, Jordan (photo left and center) and Jordanian males in Irbid, Jordan (photo right).

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