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Opportunities and potential for organic farming in the arid lands of Jordan

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Al-Khaldi, K. (2005a) Figure 4.5: Participants Seated in a U-Shape

Al-Khaldi, K. (2005b) Figure 4.6: Farmers Talking to the Minister of Agriculture

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Appendices

Appendix A: Examples of state policy support for organic farming

Tunisia, organic farming has gained benefits like other agricultural investments benefits which included tax reductions, VAT exemption and direct financial benefits in the following cases:

- Subsidies, related to project study fees, equivalent to one percent of investment amount and up to 1500 Tunisian Dinars (TD¹) for B category investment and 5000 TD for C category investment.
- Investment subsidies fixed at 30% of the value of equipment, implements and means specific to organic projects.
- Annual subsidies over a five-year period to cover the inspection and certification fees, equivalent to 70% of the cost, provided that the overall value of the subsidies does not exceed 5000 TD.

(Al-Bitar 2006: 181-182)

Austria, government efforts encouraged both conversion and maintenance of organic farming through developing a government programme called the Austrian Agri-environment Programme. The overall aim of this programme is the promotion of environmental awareness and creation of an extensive and natural habitat protecting agriculture. The Austrian government efforts led to a rapid growth of organic farming in which 9.8% of farms in 1999 were run under organic farming principles (Schneeberger, Darnhofer, and Eder 2002) and now more than 13 % of agricultural land is organic (Willer 2006).

Denmark, organic farming has been a concern for the public and politicians since the 1980s as converting to organic farming was perceived as a solution to problems resulting from conventional farming. As a result, the government produced legislation to support organic farming called Act on Organic Production (1987) which included two support systems to promote and support conversion to organic farming:

- 1. The financial support system included two schemes
 - A conversion grant scheme to provide grants for farmers to cover the costs during the conversion period due to yield reductions and extra labour needs because premium prices cannot cover these costs. The total spent by the end of 1992 was Danish Krone (DKK²) 39 million to convert. Accordingly, farmers had to comply with the official organic standards set in the Act on Organic Production, (1987).

¹ 1 TND = 0.756430 USD

² DKK= 0.18254 USD

- A development support scheme to support the development of the research including the setting up of an extension and marketing infrastructure enhancing organic farming (DK 98 million at the end of 1992).
- 2. An official labelling system for organic products with public control of production and marketing through a legal framework to protect both consumers and producers.

(Dubgaard and Holst 1994)

Switzerland: support policies can direct the degree of financial aid on the percentage of area converted or production. A common example was used in Switzerland in which the five Swiss cantons pay conversion subsidies as a single premium one part per farm and another per hectare. Other conditions for the payments include:

- 50% of the money will be paid to the farmer after the first year if requested;
- The farm must be operated organically for 12 years, otherwise the subsidies must be repaid;
- State farms cannot receive a subsidy;
- Farmers with a very high income (because of other sources of income) receive less money.

(Schmid 1994: 395)

Farm's number:	Questionnaire number:	
Date of interview:	Time of interview: begin-	end-
Farmer's name:	Sex/ Age:	
Family size:	Qualification:	

A. Farm's information:

- 1. Farm's GPS Coordinates
- N: E:
- 2. Farm's total area:
- 3. Crops grown 2003/2004
- 4. Livestock (type and number) 2003/2004
- 5. Jobs existing on the farm/wages paid
- 6. How many of your family members depend on:

On-farm income Off-farm income

B. Extension:

1. As a farmer what is the best way to get the information you need about your agricultural production?

C. Pest control and management:

- 1. What are the main pests that attack your crops? Control methods used?
- 2. What are the pesticide types do you use to control pests in your farm? Rank according to the percentage of the use (Use images).

3. What non-chemical strategies do you use to control pests in your farm? (Checklist # A)

D. Soil fertility management:

1. What area the main steps that you take to make your land ready for growing your crops? Soil analysis- soil moisture and evaporation- soil pH - soil amendments.

2. What is the inorganic fertilising programme do you use from the land preparation to harvesting stage? (Use the chart).

E. Organic fertilisers: as a farmer in this area, could you:

- 1. List what types do you use? (Type, amount per dunum, and the Price JD ton⁻¹).
- 2. Give three reasons why do you use organic fertilisers?

- 3. Give three constraints to using organic fertilisers?
- 4. What non-chemical strategies do you use to improve the soil fertility? Checklist # B.

F. Environmental impacts:

1. What environmental impact have you seen with practise of the conventional farming on your farm?

G. Organic farming:

1. Have you heard about organic farming (alzeraa'h alodweyah)? What is the best translation for it?

Organic farming barriers

- 2. What are the main technical barriers could face organic farming?
- 3. What are the main cultural barriers could face organic farming?
- 4. What are the main economic barriers face you to adopt organic farming?
- 5. Give three potential factors in your area to produce organic products?

H. Adoption of organic farming:

If officials from the ministry of agriculture came to your farm and advised you to adopt organic farming, would you accept that advice? Why?

Farmer's interview checklists

Strategy	Note
Clean stock/ Sanitation/ Good	
hygiene	
Crop rotation	
Fallow periods	
Hand picking	
Live barriers	
Mulches (black plastic)	
Resistant varieties	
Site plantation (crops pattern)	
Spraying water	
Summer and winter oils	
Tillage and irrigation management	
Timely planting	
Sulphur	
Weeding	
White stone (lime stones)	

Checklist A: Non-chemical strategies used to control pests

Checklist B: Non-chemical strategies used to improve soil fertility

Strategy	Note
Compost application	
Crop rotation	
Fallow period	
Manure	
Mineral rocks	
Mulching	
Timing of various activities: seeding,	
fertilisations	
Windbreaks	

in. Sig Blank Insecticide مبير میں عنادی Fungicides Acaricides vici بماوري Nemacides Herbicides

Visual aids used to rank amount of pesticides used by farmers

The fertilisation programme used

Land's preparation

The growth stage

The flowering stage

Fruit set stage

Before marketing











Farms observation checklist

Water source
Water reservoir
Water pumping system
Irrigation system
Fertilising systems
Land preparation
Planting
Pest control
Pesticides and fertilisers storing
Fruit collecting
Packaging and marketing
Farm's layout

Appendix C: Private Agricultural Store Suppliers' Questionnaire (PAS)

Group's number:	Questionnaire number:	
Date of interview:	Time of interview: begin-	end-
Store owner's name:	Sex/ Age:	

Part A: information about the store

1. Organic pesticides:

Pesticide	Pest	Crop(s)	Source

2. Organic fertilisers:

Fertiliser	Crop	Source

3. Store observations

Part B: Organic farming:

1. Have you heard about organic farming (alzeraa'h alodweyah)? What is the best translation for it?

Organic farming barriers

2. What are the main technical barriers could face organic farming in your area?

3. What are the main cultural barriers could face organic farming in your area?

4. Give three potential factors in your area to produce organic products? Barriers

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524

Appendix	D:	Key	Players'	interviews

Key player	Interview details
Professor Fayes Alkhasawnieh was Dean for two university agriculture faculties, MoA Minister, and the Yarmook University Vice Chancellor during the fieldwork	Two visits were made to Yarmook University to interview the Vice Chancellor, in July and August 2004. The interview covered the perception of the organic farming, the main institutional barriers, government role, academic work regarding organic farming and recommendations to establish organic farming system in Jordan.
The ex-Secretary General of the MoA	Engineer Mazen Alkhasawnieh he was the only farmer in the study area who used a more ecological system to manage his farm. The system used is presented in the data analysis. The interview aimed to discuss the possibility of adopting of organic farming in the study area, which included perception, potential, barriers, and the government policy.
Aman Company Manager (IPM products)	A visit was made to the company in June 2004 Amman Central Vegetables Market. A face to face interview was carried out with Aman manager. It was found that the name of the company was <i>Aman</i> Company for the IPM Products. The visit aimed to look at the history of the company, the idea behind the company, products sold at the company, current economic situation, barriers and future planning.

Appendix E: Decision makers-people interviewed from the MoA

People interviewed	Aim			
Organic Farming Unit	The main aims of the unit and its organisational structure,			
(OFU) staff	If the unit has involved farmers in the concept of organic farming,			
	If so, has the unit investigated the idea and the perception of organic			
	farming,			
	If the unit has established a certified organic farming system,			
	If the unit has an inspection system,			
	If the unit has established organic farming standards for Jordan,			
	Future planning, strategy and barriers			
Secretary General of	What could the ministry provide farmers with to convert to organic			
the MoA	farming			
	What are the regulation and legislation have been made to establish organic			
	farming system in Jordan, and authorised body in Jordan to put the			
	national organic standards			
	Definition of organic farming in Jordan			
	Involvement of farmers in establishment of organic farming system in			
	Jordan			
Head, Agricultural	Perception and definition of the organic farming			
Policy Unit - MoA	Whether the organic farming has been addressed within the agricultural			
	policy or not			
	Adaptation of organic farming by farmers			
	Authorised body in Jordan to establish national organic standards			

Appendix F: Information about researched farms List of Farmers Interviewed

Farmer's							
number	Farmer's town	Farm's site	Age	Family	Family		Farm type
				size	type	Land total	
						area ha	
1.	SABHA	SABHA	55	20	Extended	42	Mixed
2.	SABHA	SABHA	34	30	Extended	50	Mixed
3.	SABHA	SABHA	60	50	Extended	55	Mixed
4.	IRBID	SABHA	35	22	Extended	35	Vegetables
5.	SABEASEAR	SABEASEAR	56	25	Extended	40	Vegetables
6.	AMMAN	SABHA	55	12	Nuclear	120	Fruit
7.	IRBID	KOMARRAF	43	32	Extended	50	Mixed
8.	AMMAN	SABHA	32	25	Extended	45	Vegetables
9.	SABEASEAR	SABEASEAR	40	35	Extended	40	Vegetables
10.	SABHA	SABHA	55	27	Extended	20	Vegetables
11.	SABHA	SABHA	65	30	Nuclear	30	Fruit
12.	SABHA	SABHA	40	25	Nuclear	65	Vegetables
13.	SABHA	SABHA	56	27	Extended	20	Vegetables
14.	KOMARRAF	KOMARRAF	25	15	Nuclear	25	Fruit
15.	SABHA	SABHA	60	22	Nuclear	28	Vegetables
16.	SABEASEAR	SABEASEAR	45	40	Extended	27	Vegetables
17.	KOMARRAF	KOMARRAF	40	50	Extended	57	Fruit
18.	SABHA	SABHA	55	15	Nuclear	40	Vegetables
19.	KOMARRAF	KOMARRAF	55	12	Nuclear	20	Fruit
20.	SABHA	SABHA	70	60	Extended	400	Mixed
21.	SABHA	SABHA	60	25	Extended	40	Mixed
22.	SABHA	SABHA	51	20	Extended	30	Vegetables
23.	AMMAN	SABHA	35	30	Extended	21	Vegetables
24.	SABEASEAR	FAISALIAH	55	32	Extended	30	Vegetables
25.	FAISALIAH	FAISALIAH	60	35	Extended	20	Mixed
26.	SABHA	FAISALIAH	65	30	Extended	25	Vegetables
27.	SABHA	SABHA	50	38	Extended	30	Mixed
28.	SABHA	FAISALIAH	52	30	Extended	20	Vegetables
29.	SABHA	SABHA	53	34	Extended	60	Mixed
30.	AMMAN	SABHA	40	20	Extended	40	Mixed
31.	DAFYANEH	DAFYANEH	60	25	Extended	30	Vegetables
32.	AMMAN	ZOMLAH	65	10	Nuclear	35	Mixed
33.	DAFYANEH	DAFYANEH	50	21	Nuclear	20	Vegetables
34.	AMMAN	FAISALIAH	65	15	Nuclear	25	Fruit
35.	AMMAN	ZOMLAH	71	15	Nuclear	75	Fruit
36.	AMMAN	ZOMLAH	55	10	Nuclear	20	Fruit
37.	FAISALIAH	FAISALIAH	40	14	Extended	35	Fruit
38.	SABHA	DAFYANEH	43	24	Nuclear	20	Vegetables
39.	SABEASEAR	SABEASEAR	65	45	Extended	60	Mixed
40.	AMMAN	SABEASEAR	45	25	Nuclear	50	Vegetables
41.	SABHA	SABHA	48	10	Nuclear	25	Vegetables
42.	ZOMLAH	ZOMLAH	38	30	Extended	25	Vegetables
43.	SABHA	SABHA	45	23	Extended	18	Fruit
44.	SABHA	SABHA	36	21	Extended	100	Vegetables
45.	SABHA	DAFYANEH	45	35	Extended	60	Vegetables
46.	DAFYANEH	DAFYANEH	64	25	Extended	30	Vegetables

Farmer's	Number of farms	Farm's GPS Coordinates		Land	Farm type		
number			Ν		Ε	total area ha	
1.	1	32	21.264	36	30.725	42	Mixed
2.	1	32	21.023	36	29.658	50	Mixed
3.	1	32	19.294	36	30.616	55	Mixed
4.	1	32	20.82	36	31.939	35	Vegetables
5.	1	32	20.698	36	28.213	40	Vegetables
		32	18.387	36	32.765		
6.	3	32	20.931	36	31.086		Fruit
		32	20.615	36	30.756	120	
7.	1	32	21.214	36	28.165	50	Mixed
		32	19.105	36	29.049		
8.	2	32	20.323	36	32.622	45	Vegetables
9.	1	32	20.047	36	28.173	40	Vegetables
10.	1	32	20.704	36	28.823	20	Vegetables
11.	1	32	17.792	36	30.402	30	Fruit
10		32	17.304	36	30.689		
12.	2	32	18.418	36	30.385	65	Vegetables
13.	1	32	19.795	36	31.509	20	Vegetables
14.	1	32	21.768	36	27.056	25	Fruit
15.	1	32	18.942	36	29.649	28	Vegetables
16.	1	32	20.718	36	27.636	27	Vegetables
		32	21.979	36	26.813		
17.	2	32	21.322	36	26.694	57	Fruit
		32	17.844	36	31.29		
18.	2	32	17.142	36	33.769	40	Vegetables
19.	1	32	21.608	36	27.79	20	Fruit
		32	19.335	36	31.741		
	3	32	16.615	36	31.388		
20.		32	18.073	36	32.787	400	Mixed
21.	1	32	19.782	36	30.562	40	Mixed
22.	1	32	20.675	36	30.063	30	Vegetables
23.	1	32	19.438	36	29.459	21	Vegetables
24.	1	32	17.873	36	28.124	30	Vegetables
25.	1	32	18.024	36	28.295	20	Mixed
26.	1	32	17.449	36	29.227	25	Vegetables
27.	1	32	18.347	36	31.222	30	Mixed
28.	1	32	17.57	36	29.853	20	Vegetables
29.	1	32	20.988	36	32.111	60	Mixed
30.	1	32	20.394	36	32.109	40	Mixed
31.	1	32	18.668	36	33.35	30	Vegetables
32.	1	32	16.854	36	30.39	35	Mixed
33.	1	32	19.029	36	34.267	20	Vegetables
34.	1	32	16.8	36	29.79	25	Fruit
	2	32	15.88	36	32.644		
35.	<u> </u>	32	15.824	36	32.113	75	Fruit
36.	1	32	15.354	36	29.662	20	Fruit
37.	1	32	16.339	36	31.898	35	Fruit
38.	1	32	19.772	36	33.234	20	Vegetables
	1	32	19.955	36	26.657		
39.		32	19.99	36	27.2	60	Mixed
40.	1	32	19.952	36	25.635	50	Vegetables

Farms that were workin	g during	the field work

41.	1	32	18.869	36	31.985	25	Vegetables
42.	1	32	19.952	36	25.635	25	Vegetables
43.	1	32	20.254	36	30.21	18	Fruit
	2	32	20.082	36	31.09		
44.	2	32	18.053	36	29.815	100	Vegetables
	2	32	17.68	36	33.648		
45.		32	18.096	36	33.433	60	Vegetables
46.	1	32	20.855	36	32.977	30	Vegetables
47. *	1	32	19.852	36	30.469	50	Fruit
TOTAL	58						

*Refused to be interviewed

Farmer's number	Number	Fa	urm's GPS	Coordi	nates			
	01 1411113	N		Ε		REASON		
48.	1	32	18.774	36	30.778	System collapsed		
49.	1	32	20.1	36	29.695	Financial		
50.	1	32	20.59	36	31.357	Financial		
51.	1	32	18.256	36	29.263	System collapsed		
52.	1	32	29.456	36	21.657	System collapsed		
53.	1	32	20.021	36	29.048	Financial		
54.	1	32	20.477	36	29.623	Financial		
55.	1	32	19.876	36	32.462	System collapsed		
56.	1	32	20.602	36	33.492	Financial		
57.	1	32	18.303	36	32.254	System collapsed		
58.	1	32	19.611	36	34.607	Financial		
59.	1	32	17.813	36	32.892	System collapsed		
60.	1	32	16.619	36	30.833	System collapsed		
61.	1	32	19.048	36	32.784	System collapsed		
62.	1	32	21.314	36	28.765	Financial		
63.	1	32	21.228	36	31.325	System collapsed		
64.	1	32	18.352	36	30.465	System collapsed		
TOTAL	17							

Farms that were not working during the field work

Farm's type and area

		Farm's type		
Data	Fruit	Mixed	Vegetable	Total
Number of				
owners	10	12	24	46
Number of				
farms	14	14	29	57
Percentage	24	26	50	100
Cultivated area				
ha	395.5	542.2	550.9	1488.6
Total land area				
ha	425.0	882.0	846.0	2153.0

					Area h	a		
Crop	Farmers	Farmers	Fruit	Mixed	Vegetable	Sum	Mean	%
	\mathbf{N}	º⁄o						
Tomato	35	76.1	0	165.5	327.0	492.5	14.07	33.1
Stone fruit	14	30.4	269	66.0	0.0	335.0	23.93	22.5
Olive	24	52.2	116.0	207.5	7.0	330.5	13.77	22.2
Watermelon	30	65.2	0.0	59.5	104.0	163.5	5.45	11.0
Cauliflower	7	15.2	0.0	8.0	42.0	50.0	7.14	3.4
Melon	12	26.1	0.0	6.5	27.9	34.4	2.87	2.3
Cabbage	8	17.4	0.0	7.5	16.0	23.5	2.94	1.6
Eggplant	7	15.2	0.0	8.5	12.5	21.0	3.00	1.4
Grape	8	17.4	10.5	8.2	0.0	18.7	2.34	1.3
Beans	3	6.5	0.0	0.0	14.5	14.5	4.83	1.0
Cactus	2	4.3	0.0	5.0	0.0	5.0	2.50	0.3
Total			395.5	542.2	550.9	1488.6		100

Crops cultivated and their areas

Participants in	the Workshop	
Number	PARTICIPANT	POSITION
1.	ABAID SHOBAIL	FARMER
2.	AHMAD ALWAN	FARMER
3.	ALI ABDO	FARMER
4.	ALI HUWAIL	FARMER
5.	AYED ALI	FARMER
6.	GHNIM ABU RABEEA	FARMER
7.	RESEQ BATAYNEH	FARMER
8.	SAMI JBARAT	FARMER
9.	TAREQ ALLOWZI	FARMER
10.	ZAIED ARAB	FARMER
11.	NHAIER ADOBAISE	FARMER
12.	ENG. MAZEN KHASAWNEH	FARMER
13.	KHALED KHABBAS	FARMER
14.	KHALEEL ABU SERHAN	FARMER
15.	MUGHAREBY	FARMER
16.	JAMAL MAGABLEH	PRESIDENT, FARMERS UNION
17.	DR. AZMY ABURAYAN	JU
18.	DR. KHALED AL-SHRAIDAH	SECRETARY GENERAL, HIGHER
		COUNCIL FOR SCIENCE AND
		TECHNOLOGY
19.	ENG. MOHAMMAD SHAHBAZ	PRESIDENT, BRDC
20.	ENG. MAZEN AL-MEHASEN	MOA MINISTER
21.	ALA ALREFAAI	MOA
22.	MAHMOOD MAHARMEH	MOA
23.	MOHAMMAD AL-FAWAEER	MOA
24.	DR. NEMER HADADEEN	MOA
25.	FALAH AWAMLEH	MOA
26.	RAED HAMARNEH	OFU
27.	ABDELLATEF ALAZAYEDEH	JORDAN RADIO
28.	BASSAM ALSHOUBAKI	NCARTT
29.	DR. MARWAN ABDELWALLI	NCARTT
30.	DR. MOEEN ALQARUTI	NCARTT
31.	EMAN ABUDHAIM	NCARTT
32.	ENG. AHMAD ALOMOUSH	PLANT PROTECTION OFFICER, NORTH
		BADIA AGRICULTURAL DIRECTORATE
33.	ENG. RYADH BAQAEEN	DIRECTOR, NORTH BADIA
		AGRICULTURAL DIRECTORATE
34.	HALAH ALKHAIAT	ALGHAD NEWSPAPER
35.	HANI ALNOORI	JOFS
36.	ISLAM MAGHAIREH	AEA
37.	KANAKO TSUBA	OFU/NICCOD/JICA
38.	MAHA ARABIEAT	JEDCO
39.	MOHAMMAD AYESH	JOFS
40.	MUNAH HABAEBIEH	JISM
41.	OMAR ABU EID	EU MISSION TO JORDAN
42.	RASHA ALUSTAH	JORDAN RIVER FOUNDATION

Appendix G1: about the workshop Participants in the Workshop

	<u>.</u>	A 1 * 11				
Procedure	Aim	Achieved by				
Contact the MoA Minster by	Brief the MoA Minister about the	The BRDC President				
phone to arrange for the	workshop and ask him for a					
workshop	convenient time to conduct the					
	workshop under the patronage of					
	his Excellency					
Prepare a timetable for the	Give an overview of topics to be	The researcher				
workshop	covered					
Write an official invitation	Inform the MoA Minister about	The BRDC President and				
letter enclosing the	the workshop title and themes to	the researcher				
timetable to the MoA	be discussed in the workshop					
Minster						
Choose a convenient	To enable the stakeholders to	The researcher and BRDC				
location and time for the	attend the workshop	public relationship staff unit				
workshop						
Contact three hotels	Give proposals to choose one of	BRDC public relationship				
	them to conduct the workshop,	staff unit and the researcher				
	time, date, number, costs					
Prepare invitation letters	Invite the stakeholders and brief	Signed by the BRDC				
	them about the workshop	President and sent by the				
		researcher. The invitation				
		letters were sent by fax to				
		people who had fax				
		machines and delivered by				
		hand but only delivered by				
		hand to those who had no				
		fax machines				
Follow up	Ensure that the stakeholders will	The researcher				
1	participate in the workshop and to					
	answer if they have any queries					
Contact the media	To cover the workshop	The MoA public relationship				
	1	and the BRDC public				
		relationship				
A visit to the workshop	Ensure that the place is suitable	The researcher and the				
place one day before the	and all tools (laptop, data show	BRDC public relationship				
workshop date	and flipchart board to take notes)	1 1				
1	needed are there					
Сол	nduct the workshop at Holiday Inn H	otel				
	Techniques used in the workshop					
The workshop was	A PC and data show were Medi	a: Jordan TV and newspapers				
conducted in a U-shape	used to present the empirical were	invited to cover the				
which gave participants the	results and the diagrammatic work	shop activities and to raise				
feeling that they were equal	overview using a power aware	eness regarding organic				
and their voices and	point, a flipchart was used to farmi	ng movement in Iordan				
opinions were heard	take notes and comments					
opinions were neare	made by stakeholders a					
	badge for every stakeholder					
The	workshop closing: Lunch for stakeho	lders				
The works	hop report was sent to the minister for	or approval				
	Feedback on the report	-rr				

Appendix G2: Procedures used to conduct the work	shop

Appendix H: Annual agricultural calendar

Vegetable	farms	cultivation	calendar
regulable	1411113	cultivation	carcinuar

Activity	01	02	03	04	05	06	07	08	09	10	11	12
Decide where to grow												
Buying seeds												
Sawing seeds in nurseries in Jordan												
valley												
Sawing seeds in nurseries in the Badia												
Buying plastic mulch and irrigation												
materials												
Use boulders to clean the land												
Ploughing the soil												
Buying manure from poultry farms												
Moving the manure to the farms												
Planning the farm												
Add the manure to the soil												
Set up the drip irrigation system												
Trial irrigation												
Put the plastic mulch												
Pre transplanting irrigation												
Transplanting												
Irrigation												
Pest control												
Fertilisation												
Harvesting												
Selling the product												
Re transplanting ^{CR}												
Removing plant residues												
Removing the plastic and the drip												
irrigation system												
Sawing wheat seeds												
Ploughing the land to cover the wheat												
seed												
Harvesting the wheat												

Fruit farms cultivation calendar

Activity	0	0	0	0	0	0	0	0	0	1	1	1
	1	2	3	4	5	6	7	8	9	0	1	2
Decide where to grow												
Decide what trees to grow												
Buying the rootstocks and leave												
them at the nursery for one year												
Buying the drip irrigation system												
Use boulders to clean the land												
Ploughing the soil												
Plan the farm site including roads												
and dig holes for the trees												
Growing the trees in their holes												
Set up the drip irrigation system												
Add the manure												
Irrigation												
Fertilisation												
Pest control												
Scion drafting												
Pruning												
Harvesting 3 years after planting												

Appendix I:

Growing cactus or the Indian fig (Opuntia spp):

Two farmers had cactus or the Indian fig (*Opuntia* spp); one had 4 ha and the other one had just 1 ha in their conventional farms. The one who had 1 ha reported it was a new trial (2 years) to judge the results. The one who had 4 ha had a good experience for more than 5 years about cactus, which encouraged the researcher to visit this farmer more than three times to document this experience. The advantages of the farmer's experience were no extra cost for synthetic inputs, low cost of irrigation, healthy product; also, another advantage noticed during the field observations was that the vegetation and diversity were greater than other farms as is shown in Figure I. There were three disadvantages (a) there was no separate market for such a natural product, (b) consumers did not distinguish between this product and conventional products; the most important thing for them was the price and the shape of fruit, and (c) there was no encouragement from the government. It was noticed from the field observations that sheep manure was used for both crops. The sheep were fed on conventional feed. It was also noted that the cactus drip irrigation system was connected to the farm's main conventional irrigation system, which meant that some of the fertiliser residues might go to the cactus plants during the irrigation process.



Figure I: Cactus grown naturally in the study area

Appendix I: Suggestions, comments and recommendations made by participants in the national workshop to develop an action plan for the adoption of organic farming in Jordan

Regulation and legislation

All participants emphasised that one of the main barriers for the adoption of organic farming in Jordan is the lack of national regulation. Therefore, all of them emphasised that there is a need to develop national regulation and legislation to:

- Have certification and inspection systems including certification bodies
- Provide financial subsidy and support to establish pilot projects for organic farming by establishing demonstration sites to train interested farmers, and to help farmers to establish organic farming society
- Establish a higher committee headed by the Minister of Agriculture or the Secretary General for the establishment of Jordanian organic farming, including the private sector
- Implement the regulation by authorised organisations (JISM and MoA)

Definition

All participants agreed that the organic farming is not clear to the majority of people in Jordan. Therefore, there is a need to establish an appropriate definition of organic farming, its objectives and its basic principles, in Arabic, which people in Jordan can understand. This would strengthen the concept of organic farming and make it clearer. The definition should target both producers and consumers through awareness campaigns and educational programmes

Website

All participants agreed that the website that has been designed is good, but it would be better if it could be more informative

Society group of farmers \ Administration

Participants suggested that establishing a cooperative society for a group of farmers to start up the organic farming would be helpful to motivate the adoption of organic farming. Also, enhance networking through the development of a national organic farming committee (Ad hoc committee) or an organic umbrella organisation including the private sector to manage, plan and advise the policy makers on organic farming

Regional and international cooperation to

Jordan does not have good experience about organic farming. Therefore, participants suggested combining the efforts of all forces in organic farming, through regional and international cooperation and knowledge sharing in the development of organic farming, which will help to overcome barriers found in this research and to ease the adoption of organic farming in Jordan. This would help to learn from other experience to develop regulations and markets, and also farmers could visit countries like Egypt to learn experience to solve technical problems (pest and diseases, soil fertility, compost production etc)

Awareness

Due to lack of information about organic farming, participants suggested to increase consumers' and producers' awareness and recognition of organic farming, organic products. Awareness should be that the quality of organic products and the environmental benefits matter more than price. To do so, it is recommended to use all means to increase the awareness, including media, schools, universities and hospitals. It has to be linked to the health issue, with many people accepting this idea especially from a health point of view

Extension

Organic farming is a new concept in Jordan, a complex system, and is incompatible with the current experience of Jordan's farmers. Therefore, is a need for extension work to provide farmers with enough information about organic farming since extension work is devoted to conventional farming. Extension should aim to provide farmers with easy access to information about organic farming methods. It is important that extension is to be funded and not demoralised. It can be done through establishing demonstration sites involving the private sector, establish sites at farmers' farms, simple extension methodology (new leaflets and brochures) and continuous training workshops of organic farming practices.

Continued

Research

There is a need for research which is a necessary step for organic farming development in Jordan to solve technical problems and to evaluate the socioeconomic impact of the adoption organic farming in Jordan. It is important to have national research institutions and research at field level with adequate collaboration between institutions having research agendas to meet the development of organic farming conditions in Jordan: technical, social, economic, marketing and environmental. To have good research, it is important that research must be funded from the public and private sector. Moreover, the results of the research should be delivered to farmers and other interest groups through the extension channels

Marketing and Economic

Participants emphasised for organic farming to be adopted, it is important for the government to find potential products and markets and conduct feasibility studies for organic products. It is also important that research should cover marketing and economic issues. It is recommended to find obstacles and barriers to organic product marketing and suggest reliable strategies to overcome these barriers. Establishing a network of marketing in which the MoA and other organisations help in marketing

Inputs

At present, organic farming production inputs are not available in Jordan. Therefore, regulation should inform producers what are the criteria of inputs and the best source for the inputs. In the meantime, cooperation between Jordanian organisations is required to produce inputs such as fertilisers, and to initiate projects to produce such inputs. Participants also emphasised that the MoA should advise farmers to deal with the lack of inputs and what strategies can be adopted

Academic

It was suggested to add an academic level to the plan. The suggestion is to have organic farming programmes at both graduate and postgraduate level. This will help to increase awareness, and solve some technical, social and economic constraints through conducting research, and also to provide development capacity