

Fresh Cut Herbs for Export in Jordan

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Abstract

Jordan is a small country in the Eastern part of the Mediterranean region with limited water and land resources. Medicinal herbs and aromatic plants (MHAP) possess higher water use efficiency, relatively higher economic returns per unit area compared to conventional crops, and the potential to add value through processing and marketing. Utilizing the unique climate and diverse agro-ecosystems of Jordan allows production of MHAP on large and small-scales across all seasons of the year. Production and export of fresh herbs is very feasible in Jordan. Meeting and consistently maintaining quality standards is fundamental to the capture of any market share. Jordan has realized the need to promote horticultural exports including fresh herbs and launched several integrated efforts supported by national and international funding. This paper describes steps that were undertaken to promote MHAP with a specific focus on export of fresh herbs from the country.

Keywords; Jordan, fresh herbs, medicinal plants, aromatic plants.

Introduction

The demand for medicinal herbs and spices increased world wide during the last decade. The total market volume for fresh herbs is difficult to quantify because no specified trade statistics are available. The distinction between herbs and spices is often vague. For the American Spice Trade Association (ASTA), the term "spices" also covers herbs and aromatic seeds. In Europe, the term "herbs" denotes whole plants or/and plant parts (leaves, stems and flowers) used, fresh or dried, for food seasoning. However, the total world production of herbs and spices amounted to 378,000 tons with a value of €5.62 billion in 2003. The majority of these herbs and spices are consumed in the developed countries (Pharmaplant 2005; Euro stat; ITC 2003)

The most important culinary fresh herbs are parsley (*Petroselinum sativum*/var. *crispum*), basil (*Basilicum ocimum*), coriander/cilantro (*Coriander sativum*), celery (*Apium graveolens*), onion chives, (*Allium schoenoprasum*), dill weed (*Anethum graveolens*), spearmint (*Mentha spicata*), peppermint (*Mentha piperitum*), chervil (*Anthriscus cerifolium*), rosemary (*Rosmarinus officinalis*), thyme (*Thymus vulgaris*), oregano (*Origanum vulgare ssp. hirtum*; *Origanum syriacum*), French tarragon (*Artemisia dranaculus*), sage (*Salvia officinalis*), sweet marjoram (*Origanum majorana*), French sorrel (*Rumex acetosa*), garden cress (*Lepidum sativum*), water cress (*Nasturtium officinalis*), and garlic chives (*Allium tuberosum*).

Fresh herbs are leafy crops with low water requirements. They generate high returns and when exported there is less virtual water lost. Comparing these advantages to traditional vegetable crops in Jordan makes for an interesting assessment. This paper describes a case study on why and how production and export of fresh herbs has been promoted in Jordan.

Country profile: human and natural resources

Human Resources

Jordan's total population is around 5.48 million (m) and the population growth rate is 2.8% per year. Around 30% of the population is dependent on subsistence agriculture (Department of Statistics, 2003).

Land resources

Jordan has limited agricultural resources; the area of Jordan is around 89.3 thousand square kilometers of which around 0.51 m ha are suitable for agricultural production. 0.222 m ha are under rainfed cultivation and 0.083 m ha are under irrigation, the rest of the area is either left as fallow or not planted due to lack of water. Moreover, the holding size is very small and continuously decreasing. Over 50% of the land holdings are less than 0.4 hectares, where mechanization is constrained by the small area planted by each farmer. Most of the farmers are still growing traditional crops possessing a low economic return.

Water Resources

Jordan is one of the ten water-poorest countries in the world. The water resources of Jordan consist of (1) ground and fossil water, which extends in aquifers in different depths throughout Jordan, (2) surface water flows from precipitation in the river basins, (3) an increasing amount of treated wastewater effluent, and (4) non-conventional water resources such as brackish water.

The renewable fresh water resource is around 780 million cubic meters (MCM) of which 505 MCM coming from surface water and 275 MCM from underground water.

Irrigated agriculture is the major water consumer and accounts for 66% of the water consumed in year 2000. It is expected that the demand on fresh water from different sectors will grow fast, due to high population growth and the increase due to industrial and tourist demands. Therefore, irrigated agriculture will face serious problems in the future. As a result, there is a need to introduce new technologies, taking advantage of crops and cropping patterns that will maximize the benefit from each unit of water. Introduction of medicinal herbs can save water and maximize the return from water. A comparative study (Batikhi 2001) proved that one cubic meter of water generates one US dollar when irrigating tomato while it generates 4-6 US\$ when used to produce herbs such as oregano.

Climate

The climate in Jordan is Mediterranean with long dry summers and short winters. The temperature is strongly affected by topography and latitude. The mean annual minimum temperature ranges between 5°C in the mountains and 20°C in Aqaba on the Red Sea Coast) while the mean annual maximum ranges between 20°C in the mountains and 30°C in the Jordan Rift Valley (400 m below sea level). These values significantly vary from year-to-year and from season-to-season, where the temperature may drop to below zero in the coldest month (January) with frost formation in mountainous areas and it may reach 50°C in locations such as the Jordan Rift Valley. Jordan Rift Valley, where most of the irrigated area is located, provides a unique advantage for agricultural production for winter production of fresh herbs.

Role of Agriculture in National Economy

Agriculture contributes approximately 2% to the gross domestic production (GDP). This small contribution can be attributed to limited resources but also to low efficiency and inattention to generation of added value. The crucial discrepancy lies in the fact that 30% of the population is dependent on the direct and indirect contribution of agriculture in the GDP (Table 1).

Table 1: Contribution of Agriculture to Gross Domestic Production (GDP) of Jordan in selected years over the period 1990 - 2005.

Year	GDP. US\$ (m)	Agricultural Production US\$ m	Contribution of Agriculture GDP %	Index
1990	3,865	266	6.88	
1995	6601	213	3.69	- 0.09
2000	8385	169	2.02	- 0.30
2002	9378	188	2.01	- 0.11
2005	11113	221	1.99	- 0.17

Source: Department of Statistics, 90-05

Status of production and export of fresh vegetables

Jordan is producing in average more than 1.3 million tons annually of fresh vegetables including fresh herbs (Table 2). Produced vegetables are traded mainly at 3 main local wholesale markets in the major cities of Amman, Irbid and Zarka. The marketed amount at the main

wholesale markets is estimated to represent 70% of the total traded fresh vegetables in the country (Karim Corp. 2002). However, the marketed amount makes around 50% of the total estimated production (Table 2). The unmarketable amounts are the result of many reasons connected with quality, crop management, post harvest, packaging and marketing constraints. Vegetables are traded locally with low freshness and quality characteristics. The marketing channels are characterized by short transport without refrigeration and short product shelf lives.

Jordan exported around 0.5 m tons of fresh vegetables including herbs in 2004. More than 98% of the exports go to neighboring Arab countries, especially Gulf States. Exports to non-Arab countries, mainly to the EU, are relatively small reaching 10,900 tons in 2004 (Table 2). Vegetable exports showed no obvious increasing trend in the last 8 years (1997 - 2004) due to quality and packaging constraints. Note that exports to Europe supply mainly niche markets. Vegetables are exported to Arab countries by refrigerated trucks with low quality standards, while exports to Western Europe are being shipped using airfreight and to East Europe mainly by refrigerated trucks. These methods help maintain higher quality standards.

The horticultural products exported to the Gulf States do not undergo any post-harvest processing or advanced packaging and are sold at wholesale wet markets in destination countries.

Table (2): Produced and traded fresh vegetables including herbs in Jordan during 1997 - 2004 (thousands of tons)

Marketing & Export	1997	1998	1999	2000	2001	2002	2003	2004
Vegetables traded at 3 main wholesale Markets ; (actual *)	856	555	526	446	497	571	574	621
Estimated Total Vegetables marketed (actual * x 1.3)	1,113	722	684	580	646	742	746	807
Vegetables exported to Non-Arab Countries/EU (actual)	7	9	14	6	11	7	6	11
Vegetables exported to Arab Countries (actual)	576	302	314	340	371	371	485	498
Total Country vegetable production (estimated)	1,812	1,317	1,214	1,500	1,340	1,482	1,454	1,376

Source: Ministry of Agriculture (Database Unit, 97-04); (actual*x 1.3) calculated after estimation of Karim Corp. 02.

Status of production and export of fresh herbs

Fresh herbs can be produced around the year in Jordan due to the multiple eco-systems in the country but particularly because of warm conditions in the Jordan Valley during the winter. "Fresh herbs" are often mis-categorized as "vegetables" in trade statistic, leading to their underestimation. Fresh herbs are often not disaggregated to the larger variety of plants being grown and marketed. Table 3 shows the list of crops traded in local markets: eight crops – mint, parsley, sage, oregano, fennel, purslane and coriander are the most prevalent. The demand for fresh herbs is generally increasing. The amount of herbs marketed reached 15,000 tons in 2004. Herbs and vegetables are traded locally but they are often lack freshness so are considered of low quality. The marketing channels are characterized by transport without refrigeration; hence, products have short shelf lives.

Table 3: Fresh herbs traded at main wholesale markets in Jordan during 1997 - 2004 (tons).

Herbs	1997	1998	1999	2000	2001	2002	2003	2004
Mint & Parsley	2,257	3,035	2,940	2,328	1,965	2,951	4,642	8,115
Sage	591	491	589	532	957	798	1310	1004
Oregano	201	378	301	228	256	310	388	336
Fennel	248	225	226	207	257	345	335	364
Eruca/Roca	43	50	88	33	108	106	237	927
Purslane	78	54	91	10	125	30	26	723
Coriander	22	41	20	8	81	179	390	266
Celery	75	58	62	74	79	77	72	98
Mustard	6	0	24	66	16	69	29	63
Chamomile	48	55	21	38	40	4	81	40
Chicory/Endive	34	31	39	13	20	30	21	47
Garlic Chive	15	12	9	10	7	13	6	32
Curly dock	15	13	12	15	12	32	30	7
Cress	8	7.9	5	3	4	4	5	18
Cyclamens	2	2	2	2	1	2	1	34
London Rocket	20	14	0	1	0	0	0	8
Arum	2	4	2	0	0	0	0	0
Sum actual marketed	3,667	4,469	4,430	3,567	3,928	4,950	7,573	12,082
Estimated total herbs marketed locally (*)	4,584	5,586	5,537	4,459	4,911	6,188	9,466	15,102

Source: Ministry of Agriculture (Database Unit, 97-04); (*) total herbs marketed locally calculated (sum actual marketed x 1.3) after estimation of Karim Corp. 02.

Table 4 exported herbs to Arab and non-Arab (EU) countries during 1997 - 2004 (tons)

Herbs	1997		1998		1999		2000		2001		2002		2003		2004		Total	
	countries		countries		countries		countries		countries		countries		countries		countries		countries	
	A	NA	A	NA	A	NA	A	NA	A	NA	A	NA	A	NA	A	NA	A	NA
Mint	3	5	2	13		2	4	28	2	46	3	65	3	40	1	53	18	252
Parsley	975	3	1,146	8	1,211	23	1,728	21	3,101	36	2,973	12	1,680	4	975	4	13,789	111
Sage	1		2			10	7		4		9				1		24	*10
Oregano	5		3	2	50		26		23	1	52	16	34	1	18	4	211	24
Fennel						3		5		1			2	1	2		*4	*10
Eruca/Roca								9		3	9	1					*9	*13
Coriander	3	2	2	2	3	3	9	20	3	4	2	9		10	1	42	23	87
Celery						3		55		1	1		1	1		1	*2	61
Chicory											2	1				1	*2	*2
Garlic Chive								1				2	1	1		1	*1	*5
Lemon Grass		6		8		10		1		2		8		23		12		70
Arum		3		4		6		1		5		3		6		14		42
Amaranthus		1		1		1		1		2		2		1		1		*10
Basil						1		4		1		4		1		2		*13
Purslane												1				1		*2
Dill		1				1						1				1		*4
Cress												1		1		1		*3
Curly Dock						1				1						1		*3
Cyclamens				1						1		1		1		1		*5
LondonRocket						1				1		1		1		1		5
total	987	21	1,155	39	1,266	65	1,773	146	3,134	105	3,043	128	1,723	92	998	140	14,083	722

Source: Ministry of Agriculture (Database Unit, 97-04); (*) Included test shipments in small amounts to different countries.

A= Arab Countries

NA= Non-Arab Countries

Fresh herbs are commonly exported to traditional markets in the Gulf States. The variety of exported crops is limited and consists of four main crops: parsley, oregano, sage and mint (Table 4). Most demand is for parsley with an amount ranging between 1,000-3,000 tons per year during 1997 – 2004. Fresh herb exports to the Gulf States are being transported by refrigerated trucks in bulk without any post-harvest processing or advanced packaging and are sold as bulk produce at wholesale markets, thus, no attention is given to adding value.

Since 1996 integrated efforts have been undertaken to promote production and export of fresh herbs with higher quality. As a result Jordanian fresh herbs could enter the most competitive markets in western and eastern European countries, Israel and Turkey. The variety of crops exported to these countries is larger than those exported to Arab states. The herbs exported to non-Arab countries amount to 100 tons per year on average during recent years (Table 4). This amount might be under-estimated. Producers and exporters are trying to expand their exports hence some of the exported lots to Arab as well as to non-Arab countries consist of test shipments of herbs with better quality and/or new varieties.

Learning process to promote fresh herbs in Jordan

Agriculture in Jordan is facing serious problems because of water shortage and land fragmentation. Furthermore, horticultural production generally lacks quality standards, which makes Jordanian products less competitive in foreign markets. Jordan has realized the crucial need to promote the horticultural exports and launched several integrated efforts supported by national and international funding. In 2002 a World Bank loan in the amount of approximately US\$5 million was awarded to the government of Jordan to promote horticultural exports. Nationally and internationally funded studies showed also that medicinal herbs and aromatic plants (MHAP) are promising because of their higher water use efficiency, relatively higher economic returns per unit area compared to conventional crops, and the potential to add value through processing and marketing. Utilizing the unique climate and diverse agro-ecosystems of Jordan allowed for production of MHAP during all seasons of the year. Following main steps were undertaken to develop MHAP including fresh herbs in the country.

Technical and socio-economic preparatory efforts

Early in March 1997 a national workshop was conducted at the National Center for Agricultural Research and Technology Transfer (NCARTT) to discuss issues related to MHAP. The workshop was conducted in the framework of the World Bank "Regional Initiative for Dryland Management" that has devoted special support to MHAP resources development in the country. This workshop was the first to tackle this issue in Jordan. During the workshop studies and discussion papers were presented on various topics concerning national MHAP resources. Discussions and recommendations characterized the potential and constraints of the MHAP sector and provided general guidance for subsequent development.

Supported by the Regional Initiative for Dryland Management NCARTT conducted various research and development activities. Promising results led to an expansion of the activities in early 2000 through a planning grant from the Global Environment Facility (GEF) under the supervision of the World Bank. In the preparation for an integrated project document three baseline studies were conducted to better understanding the MHAP sector in Jordan.

An inventory study was conducted by the Royal Society for the Conservation of Nature (RSCN, 2001). The study assessed the local MHAP plant biodiversity in terms of conservation and potentials for utilization.

Another study prepared by Haddad and Turk (2002) examined the feasibility of growing around 80 domestic and exotic MHAP in the different agro-ecosystems of the country. The study outlined the constraints connected with research and development and the need for concerted efforts among concerned institutions. The study has helped in identifying (a) feasible crops, (b) target farmer groups and target production areas, (c) the scattered capacities and facilities available in the country, and (d) the lack of know-how, experience and the need for human capacity building.

The third study prepared by the Karim Corporation (2002) analyzed the socioeconomic characteristics associated with the MHAP sector in Jordan. The study assessed the demand, supply, internal marketing chain and potential export markets for MHAP products including fresh herbs. The study concluded that Jordan is importing many MHAP commodities that could be produced locally and when produced in Jordan they should be oriented for export at higher quality in order to generate maximum added value and income for farmers.

As a subsequent part of the preparations for the project document a national 2-day workshop was held in 2002. This workshop involved relevant stakeholders such as herbalists, horticulturists, traders and exporters of medicinal herbs and aromatic spices. It also involved scientists and decision makers. The workshop identified the strategy for promotion of the MHAP sector and the role of the different stakeholders. It stressed the need for the private sector to be part of the project.

Based upon findings of the baseline studies, workshops and other preparatory activities the project document was prepared with the title "Conservation of Medicinal and Herbal Plants of Jordan" supported by the GEF with a grant of US\$5 m to last for 5 years, while the contribution of the government of Jordan amounted US\$9.2 m (in cash and in-kind). The Grant Agreement was signed in May, 2003 between the two implementing agencies; the World Bank and the Ministry of Planning and International Cooperation (MOPIC).

The project has two main objectives: (a) to develop models for conservation and sustainable use of local MHAP resources for national and global interest and (b) to promote production of MHAP as feasible tool to improve income of farmers and rural communities. To achieve such objectives the project comprised activities that can be grouped into four main components; (i) *in-situ* conservation, (ii) promotion of production including research and development of best agricultural practices, (iii) capacity building for human resources including awareness, higher education and training and (iv) commodity promotion including intellectual property rights standards and specifications, legislations, and marketing.

In terms of linking producers to markets, the project is aiming to promote three main lines of production: (a) production and export of fresh cut herbs, (b) production and export of essential oils, and (c) production of medicinal crops that are in demand by the pharmaceutical industry.

Providing awareness and specific training to beneficiaries

Awareness-building started early in 1996. Up until now, a number of seminars and workshops were conducted and information conveyed to interested groups about MHAP and their socioeconomic issues concerned with uses, common health properties, potentials for income improvements etc. NCARTT practices a wide range of extension and demonstration activities on farmer's fields to demonstrate the feasibility of growing certain MHAP crops. Mass media

campaigns were also launched, focusing on agribusiness trade shows and meetings in the country. This has drawn the attention of producers and consumers as well, and mobilized financiers to think about investing in the sector.

Training is fundamental since specific experience and know-how in terms of production and post-harvest are lacking. The project allocated big portion of its funding for specific training and human capacity building. A number of specialized training workshops for beneficiaries are being conducted and a training schedule in different topics is in place. The project provided research grants for students to be trained in MHAP topics: 12 MSc and 4 PhD students working on graduate research topics identified by the project.

Study tours provide opportunities to learn from the experiences of other countries. A group of interested farmers and technical staff participated in study tours organized by the project to Syria, Egypt, Israel, Holland and Denmark. Other study tours are planned for specific purposes.

Export of fresh herbs, especially to the EU, is a challenging agribusiness, which implies certain measures starting from planting throughout post-harvest, transportation and distribution in order to ensure the product reaches the end consumer in good condition. To capture market share, herbs must be delivered with a consistently high quality and freshness and a competitive price. Major quality standards are EUREPGAP (EU retail and production good agricultural practice) and HACCP (Hazard Analysis Critical Control Point). Horticultural producers and exporters are aware of these standards – seven producers are already in compliance and more than ten are preparing their facilities to achieve them.

Providing initial technical support and promotions

The structure for fresh herbs production is similar to that used for producing fresh vegetables. Although the same facilities can be used, fresh herbs are more sensitive and require more precautions, special pre- and post-harvest techniques and machinery.

In order to encourage producers of fresh herbs and minimize initial risks the project was ready to provide specialized machinery and proper plant materials for use by pioneer producers and exporters. The project has also provided the producers with specialized consultancies. A German firm PHARMAPLANT was hired to provide a consultancy for fresh herbs growers. Moreover, an individual consultant (from Israel) is being hired to train and supervise farmers on day-to-day production techniques for export of fresh herbs.

Establishing linkages between producers/farmers, aggregators and exporters

Building of partnership between small, medium and large producers, exporters and processors of MHAP is crucial for a functioning marketing. The project has established a consortium of agribusiness companies to (i) develop a pilot demonstration farm in key locations to apply advanced production techniques, (ii) establish a production, processing and export business based on contract farming system for the benefit of other small and medium producers. Pioneer producers from the consortium receive special technical support and promotion from the project.

Nevertheless, the project is focusing on a broader spectrum of beneficiaries to enhance contract farming and collaborations between different growers and exporters.

Outcomes

Fresh herbs are produced and retailed locally with improved quality. Supermarkets started to devote shelf space to a wider variety and higher quality of fresh cut herbs. Export to Europe has started and is increasing in volume and variety, which has in turn provided producers with improved income.

Growers can be classified into three groups: (1) those who have already begun to produce fresh herbs for export; (2) farmers who are preparing themselves for the coming season to establish their own production, and (3) those who are watching the trials and errors of fellow farmers. Their biggest worries are the saturation of the market with these new fresh cut herbs and inability of infrastructure to channel new production volumes into the export chain.

Lessons Learned

1. Fresh herbs are very sensitive commodities that require special care to maintain quality along the market chain leading to the final consumer
2. Measures for quality and standards should be taken very early and during every step of the value chain. For example, solarization may be employed to reduce later herbicide and pesticide application or hydroponics can be used to increase efficiency of production
3. Precise management of pre- and post harvest operations are prerequisites in the successful establishment of a fresh herb business to anticipate and meet the stringent requirements needed for export
4. Specialized training and awareness sessions are necessary to mobilize and commit the target producer groups, including farmers, supervisors, laborers, middlemen, and transport expeditors to the standards of performance necessary to ensure that initial export quality will be maintained until reaching the consumer
5. Willingness is the most important characteristic in farmer selection. Financial capacity and readiness to invest in a new idea are often not enough to make the export of fresh cut herbs successful. Unfortunately, willingness is not easily quantified or screened; therefore, contractual agreements are needed to insist on the stringent requirements of the export market. These requirements cannot be left to farmer discretion.

Next steps

1. Consolidation and follow up of successes thus far will be used to focus and redefine the technology transfer process to farmers
2. Promotion of essential oil production as a complement to fresh cut herbs will allow for the processing of seconds and lower quality product
3. Utilization of treated wastewater will be used to augment production of non-edible MHAP
4. Production of MHAP will be promoted for use as supplements prepared by pharmaceutical companies who will source their raw material through contracts with the farming community
5. Local genetic resources will be fed into domestication and improvement schemes to generate more crop options for Jordanian farmers

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