Conservation Guideline

FOR Medicinal AND Aromatic Plants (MAPs) In Lebanon

Cultivation feasibility based on *Origanum syriacum* "oregano" cultivation demonstration plots

Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAPs) Production Processes Project in Lebanon

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CULTIVATION FEASIBILITY BASED ON *Origanum syriacum* "OREGANO" CULTIVATION DEMONSTRATION PLOTS

GEF-UNDP-LARI, 2013. Cultivation feasibility based on *Origanum syriacum* "Oregano" cultivation demonstration plots**.** Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAPs) Production Processes in Lebanon Project. Funded by the Global Environment Facility, implemented by the United Nations Development Program (UNDP) and Lebanese Agricultural Research Institute (LARI), Beirut.

BACKGROUND

This technical document was produced with the framework of the project "Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAPs) Production Processes in Lebanon", funded by the Global Environment Facility, and executed by the Lebanese Agriculture Research Institute and the UNDP, in coordination and cooperation with the Lebanese Ministry of Agriculture. The project objective was to integrate conservation objectives into gathering, processing and marketing of globally significant medicinal and aromatic plants (MAP).

The project worked on both a macro level (national scale) and a micro level (pilot sites scale). On the national front the project actively sought to develop and strengthen the enabling environment for sustainable use of MAPs. The project identified regulatory gaps and constraints that had implications for sustainable utilization and value chain of MAP resources. Accordingly, several strategic interventions were implemented on the institutional framework. On the pilot site level, the project worked in four sites (Medjel-Akkar, Assia-Batroun, Hsarat-Jbiel and Mrusti-Chouf). These four pilot sites were considered as experimental sites for developing sustainable harvesting standards, for developing and implementing value-added processing and product improvement, for MAP based product marketing and sales and for certification and branding. The pilot sites informed the regulative framework (through scientific findings with respect to sustainable harvest standards), informed MAP business development at the national level and they showcased how to increase the profitability of commercial MAP products.

The project focused on seven target MAP species: *Salvia fruticosa, Origanum syriacum, Origanum ehrenbergii, Althaea damascena, Cyclotrichium origanifolium, Viola libanotica* and Clinopodium libanoticum. The species were selected based on their endemism (regional or national), estimated volume of commercial trade (domestic and international), and perceived decline in wild-collected populations.

In addition to the extensive work undertaken on sustainable wild harvesting, the project established seven oregano cultivation demonstration plots across Lebanon. Established seven *Origanum syriacum* cultivation demonstration plots across Lebanon. The cultivation plots served as good examples of cultivating a nontraditional new crop in areas where either oregano does not exist in the wild or the quantity in the wild is insufficient to be a commercial viable source of living. Cultivation cannot completely replace wild harvesting but it is a viable option to complement wild harvesting practices in Lebanon; therefore, it was vital to assess its viability in various geographic and climatic conditions. The project provided each of the farmers with a comprehensive data sheet to be regularly filled out covering many important topics such as cost, revenue, irrigation, weeding, pest management, diseases etc. The project team conducted regular follow up and monitoring visit to each plot with presence and close collaboration of the Ministry of Agriculture regional extension service centers which will also serve to build their staff capacity to provide technical support and guidance for these plots as well as additional cultivation initiatives in their region of coverage beyond the project's duration.

This document outlines in Part 1 the methodology adopted to identify suitable locations to establish the demonstration plots and in Part 2 the data sheet developed by the project to be filled out by the farmers for each plot.

PART 1: METHODOLOGY

The UNDP MAP project undertook site visits to all the proposed demonstration locations in the presence of a representative from the Ministry of Agriculture. The objective of the initial site visits was to assess the availability of land, its condition and suitable for *Origanum syriacum* cultivation, the availability of water for proper irrigation as well as the willingness and commitment of the proposed farmers. The minimum requirements to be considered as appropriate location to establish the demonstration plot included: One dunum of suitable and protected land, commitment to provide all required labor for land preparation, cultivation, weeding, irrigation, pruning and harvesting and availability of abundant, accessible and continuous water supply for irrigation.

The project developed comprehensive data recording sheets that were disseminated and discussed with the farmers in each demonstration plot. The data recording sheets include comprehensive information to be regularly filled out by the farmer in order to provide sufficient data to monitor the overall situation on-site as well as to provide a yearly account of all inputs, costs, output, revenue and net profit as follows:

Investment cost

- Land preparation cost / du
- Plant material cost / du
- Cultivation labor cost / du
- Irrigation system cost / du

Production cost

- Land rental cost / du
- Irrigation cost / du
- Manual weeding cost / du
- Mechanical weeding cost / du
- Chemical weeding cost / du
- Organic fertilization cost/du
- Chemical fertilization cost/du
- Pest management cost/du
- Harvesting cost/du
- Defoliating cost
- Additional post harvesting cost
- Damage Cost/du

Production and Revenue

- Fresh marketable production (kg)
- Revenue from fresh marketable production (USD)
- Dry marketable production (Kg)
- Revenue from dry marketable production (USD)

The data sheet will achieve several objectives:

- Evaluate the feasibility of Oregano cultivation under different scenarios in terms of geographic location, climatic condition and degree of inputs such as water, weeding, fertilizers etc.
- Identify trends over many years
- Develop a comprehensive understanding of the exact inputs and outputs
- Calculate profit

PART 2: DATA COLLECTION FORMS AND ANALYSIS

GENERAL BACKGROUND DATA

PLOT INFORMATION	
Location	
Surface area cultivated	
Altitude	
Date of cultivation	
Expected final marketable product (dried, fresh, essential oil, distilled water, other specify)	
FAMER INFORMATION	
Farmer name	
Jobs (Farmer, Amateur farmer, worker)	
Land property right status (ownership, partnership, land rental)	
LAND INFORMATION	
Slope (0%, <10%, 10-20%, >20%,	
Terraces (Steep, flat, river side other specified)	
Previous occupation (wild, cultivation)	
If previous use cultivation then which crops	
Availability of irrigation water (yes/no)	
Water source / available amount (Spring, well, collection tank, river, drinking water other specify)	
Surroundings (irrigated orchards, non-irrigated orchards, forest, vegetables, residential or factories)	
Substrate (clay, sand, silt, other)	
Soil pH (basic, acid, neutral)	
Soil Fertility (high, medium, poor)	
CLIMATIC DATA	
Rainfall (duration & period)	
Rainfall Amount	
Snowy days per year (number & period)	
Ice days per year (number & period)	

Investment cost data

LAND PREPARATION COST				
	Date	Method	Duration	Total Cost L.L.
Ploughing 1				
Ploughing 2				
Ploughing etc.				
Total land preparation cost				
Land preparation cost / du				

PLANT MATERIAL COST			
Species scientific name			
Species common name			
Plants origin (seedlings, seeds etc.)			
Plants type (naked roots, trays, containers specify)			
	Plant Number	Unit Cost (L.L)	Total Cost
Plant material cost			
Total plant material cost			
Plant material cost / du			

CULTIVATION LABOR COST			
		Recommended	
Irrigation Method (drip, gravity)		Drip	
Distance between lines		60 cm	
Distance between plants on a line		40 cm	
Density per dunum		4000 plants/dunum	
Cultivation (unilateral, secondary , among other major cultivation (specify)			
	Number of days	Cost/day	Total cost
Cultivation labor cost			
Total cultivation labor cost			
Cultivation labor Cost / du			

IRRIGATION SYSTEM COST	
Drip system cost	
Water tank cost (10,000 liters)	
Total irrigation system cost	
Irrigation system cost/du	

Annual production cost data

LAND RENTAL COST			
	Unit (du)	Unit cost/ year	Total cost (L.L)
Rental fees			

IRRIGATION COST						
Period	Nb of times per week	Period duration (weeks)	Water quantity per week (m^3)	Total water quantity used (m^3)	Cost	Recommended irrigation amount
After planting (1-6 weeks)						10 min twice per day
Growth (6 weeks-production)						1 hour twice per week 1 du requires 16,000 L per irrigation event Each drip point provides 4 L/hour
Total						
Total irrigation cost						
Irrigation cost/du						

MANUAL WEEDING COST							
	Period	Plant phase (after planting, before flowering, after cutting etc.)	Number of days / week	Duration (weeks)	Total days per season	Cost/day	Total cost
1st weeding							
2nd weeding							
3rd weeding							
Total manual weeding cost							
Manual weeding cost/du							

MECHANICAL WEEDING COST							
	Period	Plant phase (after planting, before flowering, after cutting etc.)	Number of hours / week	Duration (weeks)	Total hours per season	Cost/hour	Total cost
1st weeding							
2nd weeding							
3rd weeding							
Total mechanical weeding							
Mechanical weeding cost/du							

CHEMICAL WEEDING COST												
				Labor cost					Martial cost			
	Herbicide brand name	Period	Plant phase	Number of hours / week	Duration (weeks)	Total hours per season	Cost / hour	Sub-total Labor costs	Quantity (L)	Unit cost	Subtotal Material cost	Total cost
1st weeding												
2nd weeding												
3rd weeding												
Total chemical weeding cost												
Chemical weeding cost/du												

ORGANIC FERTILIZATION COST												
				Labor cost					Material cost			
	Type & composition of fertilizer (manure/compost, factory residue etc)	Period	Plant phase	Number of day / week	Duration (weeks)	Total days per season	Cost /day	Sub-total Labor costs	Quantity (kg)	Unit cost (L.L)	Subtotal Material cost	Total cost
1st												
2nd f												
3rd												
Total organic fertilization cost												
Organic fertilization cost/du												

CHEMICAL FERTILIZATION COST												
				Labor cost					Material cost			
	Type & composition of fertilizer	Period	Plant phase	Number of hours / week	Duration (weeks)	Total hours per season	Cost/hour	Sub-total Labor costs	Quantity (kg/L)	Unit cost (L.L)	Subtotal Material cost	Total cost
1st fertilization												
2nd fertilization												
3rd fertilization												
Total Chemical fertilization cost												
Chemical fertilization cost/du												
Total chemical fertilization cost												
Chemical fertilization cost /du												

PEST MANAGEMENT													
					Labor Cost					Material cost			
Pest and diseases	When problem appeared	Damage level (high, medium, low)	Treatment type (chemical or other)	Pesticides used (name & concentration)	Number of day / week	Duration (weeks)	Total days per season	Cost /day	Sub-total labor costs	Quantity (kg)	Unit cost (L.L)	Sub-total material cost	Total cost
Insects (aphids, white fly…)													
Fungi (rust..)													
Accarose													
Other (specify)													
Total pest management cost													
Pest management cost/du													

Annual harvesting and post harvesting cost data

HARVESTING COST						
Harvest number	Period	Plant phase (green, full bloom)	Tools used (sickle, secateur)	Number of days	Cost/day	Labor costs
1						
2						
3						
Total harvesting cost						
Harvesting cost/du						

DEFOLIATING COST				
Defoliation number	Period	Number of days	Cost/day	Labor costs
1				
2				
3				
Total defoliating cost				
Defoliating cost/du				

OTHER POST HARVESTING COST				
Tasks number	Period	Number of days	Cost/day	Labor costs
1				
2				
3				
Total cost				
Cost/du				

OTHER DAMAGE					
	Period	Most parts affected from the plant	Level of damage Impact on production (%)	Solution (s) adopted	Solution Cost
Ice					
Salinity					
Fires					
Weeds					
Water stagnation					
Other (specify)					
Total damage cost					
Damage cost/du					

Yield calculation for entire season

Harvest number	Period	Total fresh weight (stems, leaves & inflorescence) (kg)	Marketable Weight after drying (leaves & flowers) (kg)	% dry marketable yield (Dry /fresh yield)	Drying Method used	Drying duration (days)	Final quality (good, poor or medium)	Quantity sold fresh (kg)	Quantity sold dry (kg)
1									
2									
3									
4									
Total									

Revenue calculation for entire season

	Fresh whole shoots	Dried pure flowers & leaves (kg)	Dried mixed	Total revenue
Quantity (kg)				
Quantity (bunches, each bunch 200g)				
Price per unit (kg or bunch)				
Total revenue (L.L)				

Cost calculation

Description	Season 1	Season 2	Season 3	Season 4
Investment cost				
Land preparation cost / du				
Plant material cost / du				
Cultivation labor cost / du				
Irrigation system cost / du				
Sub-total cost				
Production cost				
Land rental cost / du				
Irrigation cost / du				
Manual weeding cost / du				
Mechanical weeding cost / du				
Chemical weeding cost / du				
Organic fertilization cost/du				
Chemical fertilization cost/du				
Pest management cost/du				
Harvesting cost/du				
Defoliating cost				
Additional post harvesting cost				
Damage Cost/du				
Sub-total cost				
TOTAL COST				
Fresh marketable production (kg)				
Revenue from fresh marketable production (USD)				
Dry marketable production (Kg)				
Revenue from dry marketable production (USD)				
TOTAL REVENUE				
Net profit per dunum				

This publication is an output of the project “Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAPs) Production Processes in Lebanon” which aims to integrate conservation objectives into gathering, processing and marketing of globally significant medicinal and aromatic plants (MAPs). Project funded by the Global Environment Facility (GEF), implemented by the United Nations Development Programme (UNDP) and the Lebanese Agriculture Research Institute (LARI).

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