

Under the European Union's ENPARD (European Neighborhood Programme for Agriculture and Rural Development)  
Initiative in Egypt



## EUROPEAN UNION – JOINT RURAL DEVELOPMENT PROGRAMME (EU-JRDP)

# Capitalisation 2: Introduction of Ad-hoc Technologies for High Yielding Crops for Marketing Purposes

Mario Margiotta (Team leader EU-JRDP), January 2021

   Italian Development Cooperation  
Ministry of Foreign Affairs  
and International Cooperation

I am learning how to  
make my land produce  
more with less water

Spreading awareness among farmers on water management  
and new cultivation techniques is a top priority of EU-JRDP



Funded by the European Union



DISCLAIMER

The opinions expressed in this document represent the authors' points of view which are not necessarily shared by the European Commission or by the authorities of the concerned countries.

## Table of Contents

### *Acronyms and Abbreviations*

<b>Executive summary</b> .....	1
<b>Background information</b> .....	4
<b>Scope and objectives of the study</b> .....	5
<b>Axes of intervention</b> .....	6
<b>Methodology of the study and data analyses</b> .....	10
<b>Results of the study/conclusions: driving forces for each axis of intervention</b> .....	11
<b>Lessons learnt (positives and negatives) per each driving force</b> .....	21
<b>Recommendations for scaling up</b> .....	22



## Acronyms and Abbreviations

ACF	Action Contre la Faim
ACs	Agricultural Cooperatives
ACSAD	Arab Center for the Studies of Arid zones and Drylands
ADBS	Association of Development of Barki Sheep
AEA	Agriculture Extension Agents
AGS	Agristudio Consultancy firm
AICS	Italian Agency for Development Cooperation
APRI	Animal Production Research Institute
ARC	Agricultural research Centre
CBOs	Community-Based Organizations
CEDARE	Centre for Environment and Development for the Arab Region and Europe
CEOSS	Coptic Evangelical Organization for Social Services
DRC	Desert Research Centre
EAFRD	European Agricultural Fund for Rural Development
ECs	Elected Committees
EGP	Egyptian Pound
EIAS	Environmental Impact Assessment Study
ENPARD	European Neighbourhood Programme for Agriculture & Rural Development
ENPI	European Neighbourhood and Partnership Instrument
EU	European Union
EUD	European Union Delegation, Egypt
FAO	Food and Agriculture Organisation
FFS	Field Farmers Schools
GAP	Good Agricultural Practices
GI	Geographical Indication
GIMC	Geographic Indication of Matrouh Committee
ICARDA	The International Center for Agricultural Research in the Dry Areas
IGA	Income Generating Activities
IPP	Integrated Production and Protection practices
JRDP	Joint Rural Development Programme
M	Million
M&E	Monitoring and Evaluation
MADAD	Matrouh Association for Desert Agriculture Development
MALR	Ministry of Agriculture and Land Reclamation

MFAIC	Italian Ministry of Foreign Affairs and International Cooperation
MIP	Monitoring System of Public Investment (as per the Italian legislation)
MoIC	Ministry of International Cooperation
MoLD	Ministry of Local Development
MTR	Mid-Term Review
MWRI	Ministry of Water Resources and Irrigation
NGO	Non-Government Organisation
NWCW	North West Coastal Zone of Egypt
NWCZ	North West Coastal Zone
OFs	Organic Fertilisers
PMU	Programme Management Unit
PRA	Participatory Rural Appraisal
SAMSIMIFA	Sustainable Agricultural Mechanization System Improvement in Minya and Fa-youm
SDCMR	Sustainable Development Center for Matrouh Resources
SEDNWCE	Social Economic Development of North West Coast of Egypt
SFA	Small Farmers' Association
SFOs	Small Farmer Organizations
SISAW	Sustainable Investment in Solid and Agricultural Waste in Fayoum and Minya
WFA	Women Farmers' Association
WUAs	Water Users Associations

-----

<i>Feddan</i>	<i>0.42 Ha</i>
<i>Meskas</i>	<i>Tertiary canals</i>
<i>Marwas</i>	<i>Irrigation canal at farmers' field level (furrows)</i>
<i>Wadi</i>	<i>Hydrographic basin formed by the seasonal rainwater floods</i>
<i>Tonnes</i>	<i>Metric tons</i>
<i>t</i>	<i>Tonnes</i>
<i>Fed</i>	<i>Feddan</i>

## Executive summary

The European Union – Joint Rural Development Programme (EU-JRDP) is an “area-based” initiative taking place in three governorates, namely Matrouh, Minya and Fayoum and implemented by the Italian Ministry of Foreign Affairs and Cooperation and Development, through the Italian Embassy in Egypt with the technical assistance of the Italian Agency for Cooperation (AICS). The said action is funded by the European Union (€ 21.9 M) under the European Neighbourhood Programme for Agriculture and Rural Development (ENPARD) and co-funded in parallel by the AICS (€ 11.0 M) through: i) the “Sustainable Agricultural Mechanization System Improvement in Minya and Fayoum Governorates” (SAMSIMIFA) and ii) the “Social Economic Development of North West Coast of Egypt (SEDNWCE) in Matrouh. The main Egyptian Authorities are the MALR (Lead Ministry), the MWRI and MoLD. The Ministry of International Cooperation is the National Coordinator.

In connection with the capitalisation “*Introduction of ad-hoc technologies for high yielding crops for marketing purposes*”, EU-JRDP funded, during the period 2016-2020:

- three initiatives implemented in rain-fed areas of Matrouh by i) DRC (provision of agricultural service to farmers under *wadis* rehabilitation), ii) FAO (increasing sustainable production, home gardening) and iii) CEDARE (promotion of Geographical Indications) and,
- three initiatives implemented in the irrigated old lands of Minya and Fayoum by i) FAO (scaling out<sup>1</sup> Good Agricultural Practices - GAPs for sustainable improvement of the quality and quantity of horticultural production in Fayoum), ii) ICARDA (improving on-farm irrigation in Minya and Fayoum) and iii) CEOSS (promoting rural resilience in Minya).

In the in rain-fed areas of Matrouh:

- DRC provided agricultural services to farmers cultivating inside all *wadis* rehabilitated by EU-JRDP (49) aiming at improving income by scaling out ad-hoc agricultural practices adapted to rain-fed areas.
- FAO: scaled out ad-hoc agricultural practices in 35 *wadis* (out of the 49 rehabilitated by EU-JRDP), distributed improved seeds (barley and wheat), established demonstration sites/pilot farms, established home gardening/drip irrigation plots to the benefit of 70 women’ groups.
- CEDARE: promoted Good Agricultural Practices aiming at improving the value addition of traditional crops through the promotion of Geographical Indications (GIs).

In the irrigated old lands areas of Minya and Fayoum:

- FAO: scaled out GAPs in Fayoum for sustainable improvement of the quality and quantity of horticultural production under protected environment (e.g., introduction of high-yielding hybrids, new techniques for seedlings, integrated pest management).
- ICARDA: enhanced in both Minya and Fayoum water productivity by improving on-farm irrigation management (e.g., laser levelling and raised bed cultivation of main cereals, practices improving soil fertility and reducing salinity).
- CEOSS: established in Minya new replicable and measurable rural development models to increase small farmers income (e.g., application of the territorial approach, promotion of the value chain concepts).

---

<sup>1</sup> Scale out means “scaling horizontally” the results that proved to be successful to cover wider geographical areas for greater outreach at micro-level (e.g., gradual rollout of activities in similar areas).

To capitalise the three initiatives implemented by DRC, FAO and CEDARE in Matrouh and the three initiatives implemented by FAO, CEOSS and ICARDA in Minya and Fayoum, the following two axes of interventions were identified:

- Axis 1: introduction of new technologies in the rain-fed areas of Matrouh
- Axis 2: introduction of new technologies in the irrigated old lands of Minya and Fayoum

The results of the study/conclusions are listed here below:

- *First axis: introduction of new technologies in the rain-fed areas of Matrouh*

The services provided by DRC and FAO contributed to decrease the agricultural production costs by 40% and increased crops' productivity by 30%. The fruit quality improved. Said services had an impact on the social and economic conditions of the farmers. The distribution of olive seedlings is by far the most relevant activity.

The proposed technologies had a positive environmental impact in terms of maintaining soil fertility, improving the control of weeds and diseases, reducing the use of chemicals.

The active engagement of beneficiary communities, combined with hands-on capacity building, is bringing sustainable results.

The establishment of home gardens proposed by FAO along with necessary irrigation systems and field training tailor-made to women improved the nutrition status of local people.

The promotion of GIs proved to have a direct impact on i) improving market access, ii) adding value to existing products, iii) bringing an exclusive territorial benefit to all actors, iv) preserving traditional knowledge and production methods and, v) creating job opportunities at local level<sup>2</sup>.

- *Second axis: introduction of new technologies in the irrigated old lands of Minya and Fayoum*

The farmers who adopted the technologies proposed by FAO in horticulture production under protected environment, increased their income drastically (e.g., doubled or even tripled depending on the crop) while cultivating on the same piece of land. The income mainly increased because of: i) the introduction of improved agricultural practices (28%), ii) the use of improved seeds, iii) the adoption of integrated production and protection methods (18%).

For ICARDA, the intervention led to water saving of 20/25% and to yield increase of 25% for the typical crops in the project areas (wheat in winter and maize in summer). Further, the increase in yield and income resulted in enhancing general well-being of participating families

CEOSS succeeded in building the capacity of small farmers to work collectively (creation of farmers' groups/CBOs, elected committees, and community cadres) and to increase female participation in the farmers' groups and their representation in the elected committees. The improvement of marketing agreements between CBOs and local traders resulted in increased income of farmers.

---

<sup>2</sup> For more information cf. EU-JRDP Capitalisation 6: The promotion of Geographical Indications - a practical approach for boosting local products and culture.



Meanwhile, weak market chains between farmers and exporters are still present. Limited credit facilities for small farmer's agricultural business might affect farmers adoption of crop varieties.

The main recommendations per each axis of intervention are listed here below:

- *First axis: introduction of new technologies in the rain-fed areas of Matrouh*

To scale out the technologies proposed by DRC and FAO aiming at improving income by extending the proposed agricultural practices adapted to rain-fed areas. These technologies shall be applied together.

To extend to the rest of the governorate, the promotion of GIs. GIs shall involve more women in capacity building programs since women are responsible for processing and post harvesting operations.
- *Second axis: introduction of new technologies in the irrigated old lands of Minya and Fayoum*

To scale out the technologies proposed by FAO for sustainable improvement of the quality and quantity of horticultural production under protected environment. These technologies shall be applied together.

To scale out the technologies proposed by ICARDA enhancing water productivity by improving on-farm irrigation management. These technologies shall be applied together.

To enhance CBOs and rural communities of farmers in future interventions as recommended by CEOSS in Minya or by FAO in Fayoum.

To encourage finance and micro-finance institutions to open specific credit facilities for small farmers since the proposed technologies from FAO and ICARDA demand fresh investments.

To build the capacity of current farmers' federations, organizations, and farmers' groups, by empowering them in service provision of technical and financial nature.

To diversify the role of farmers' organisations for them to be more actively involved with marketing and negotiations with buyers and input/service providers. These organisations shall be equipped with marketing tools and shall receive qualified continuous training.

To continue to deliver refresh training courses to AEA staff to further strengthen the role of these cadres.

To scale out the EU-JRDP approach based on continue qualified technical assistance for supporting small farmers and on continue capacity building with trainings, dissemination, and awareness campaigns.

To provide means of access to soil amendments provided by the project in the future, as most beneficiaries indicated that no mechanism is in place for that.

To reinforce management capacity of WUAs that could make more readily available and better maintain raised bed machines and harvesters than the Agriculture Department.

To strength the relationship between farmers and exporters and to facilitate access of farmers to micro-finance and ad-hoc credit lines.

## Background information

The European Union – Joint Rural Development Programme (EU-JRDP) is an “area-based” initiative taking place in three governorates, namely Matrouh, Minya and Fayoum and implemented by the Italian Ministry of Foreign Affairs and Cooperation and Development, through the Italian Embassy in Egypt with the technical assistance of the Italian Agency for Cooperation (AICS). The said action is funded by the European Union (€ 21.9 M) under the European Neighbourhood Programme for Agriculture and Rural Development (ENPARD) and co-funded in parallel by the AICS (€ 11.0 M) through: i) the “Sustainable Agricultural Mechanization System Improvement in Minya and Fayoum Governorates” (SAMSIMIFA) and ii) the “Social Economic Development of North West Coast of Egypt (SEDNWCE) in Matrouh. The main Egyptian Authorities are the MALR (Lead Ministry), the MWRI and MoLD. The Ministry of International Cooperation is the National Coordinator.

In connection with the capitalisation “*Introduction of ad-hoc technologies for high yielding crops for marketing purposes*”, EU-JRDP funded, during the period 2016-2020:

- three initiatives implemented in rain-fed areas of Matrouh by i) DRC (provision of agricultural service to farmers under *wadis* rehabilitation), ii) FAO (increasing sustainable production, home gardening) and iii) CEDARE (promotion of Geographical Indications) and,
- three initiatives implemented in the irrigated old lands of Minya and Fayoum by i) FAO (scaling out<sup>3</sup> Good Agricultural Practices - GAPs for sustainable improvement of the quality and quantity of horticultural production in Fayoum), ii) ICARDA (improving on-farm irrigation in Minya and Fayoum) and iii) CEOSS (promoting rural resilience in Minya).

In Matrouh, the new technologies for rain-fed agriculture of DRC, FAO and CEDARE were implemented in the North West Coastal Zone (NWCZ) in the areas from Fuka in the East to Salloum in the West; four districts were targeted, namely Ras El Hekma, Marsa Matrouh, Negila and Sidi Barrani.

In Minya and Fayoum the new technologies for irrigated old lands were promoted i) by FAO in five villages of Fayoum located in two districts (Fanos, Dar Al Salam and Menshat Al Gama all in Tamia District and Kasr Al Gebaly and Qaroon Waly in Yousef El Sedik District), ii) by CEOSS in four districts of Minya targeting six rural communities: Abo Korkas (Ebyouha), Matay (Bardanouha, Menbaal), Benny Mazar (Abo Gerg), Minya (Saft EI Laban, EI Porgayah) and, iii) by ICARDA inside the command areas rehabilitated by EU-JRDP (Biahmou and Awlad Mohamad in Fayoum and Hafez El-Sharkia in Minya).

In the in rain-fed areas of Matrouh:

- DRC provided agricultural services to farmers cultivating inside all *wadis* rehabilitated by EU-JRDP (49) aiming at improving income by scaling out ad-hoc agricultural practices adapted to rain-fed areas.
- FAO: scaled out ad-hoc agricultural practices in 35 *wadis* (out of the 49 rehabilitated by EU-JRDP), distributed improved seeds (barley and wheat), established demonstration sites/pilot farms, established home gardening/drip irrigation plots to the benefit of 70 women’ groups.
- CEDARE: promoted Good Agricultural Practices aiming at improving the value addition of traditional crops through the promotion of Geographical Indications (GIs).

---

<sup>3</sup> Scale out means “scaling horizontally” the results that proved to be successful to cover wider geographical areas for greater outreach at micro-level (e.g., gradual rollout of activities in similar areas).

In the irrigated old lands areas of Minya and Fayoum:

- FAO: scaled out GAPs in Fayoum for sustainable improvement of the quality and quantity of horticultural production under protected environment (e.g., introduction of high-yielding hybrids, new techniques for seedlings, integrated pest management).
- ICARDA: enhanced in both Minya and Fayoum water productivity by improving on-farm irrigation management (e.g., laser levelling and raised bed cultivation of main cereals, practices improving soil fertility and reducing salinity).
- CEOSS: established in Minya new replicable and measurable rural development models to increase small farmers income (e.g., application of the territorial approach, promotion of the value chain concepts).

In Matrouh, the small farmers benefitted of trainings and advices, inputs, and small equipment. The agricultural services in the *wadis* provided by DRC and the GAPs proposed by FAO and CEDARE, the promotion of the concepts of GIs proposed by EU-JRDP, had a positive impact on the quality and quantity of the main crops. All interventions contributed to have huge impact on local economy considering the importance of the selected crops (figs, olives, grapes) on the territory<sup>4</sup>.

In Minya and Fayoum, the small farmers who adopted the crop diversification model and the Integrated Production and Protection (IPP) practices proposed by FAO or the new replicable and measurable rural development models proposed by CEOSS, increased their income, reduced their costs of production, and produced crops of better quality; post-harvest losses decreased due to proper harvest and better post-harvest handling and packing. For ICARDA, the intervention led to water saving and to yield increase.

## Scope and objectives of the study

The Operational Capitalization Study is aiming at:

- Selecting best practices that proved to improve sustainability.
- Providing solutions for implementing similar projects in the future.
- Capitalizing experiences and knowledge for the implementation of similar projects in the future.
- Addressing a list of lessons learned (positives and negatives).
- Recommending actions to be undertaken in the future which will serve to improve the sustainability.

This Operational Capitalisation represents therefore a formalised way to document, analyse and archive, best practices, lessons learned and recommendations and to make use of them when drafting similar projects.

---

<sup>4</sup> Matrouh in fact produces 136,000 tonnes of figs (Teen Sultani) which is 82% of Egypt's production over 46,163 feddans; Egypt being the second fig producer in the world with 15% of the world's total production. Although Egypt is the second producer, it only exports 1% of figs if compared to Turkey which produces 24% and exports about 41% of raw figs and 58% of dried figs. Olive production (17,400 feddans) also definitely need intervention because it experiences large productivity loss ranging between 25% to 50%, due to poor collection methods, improper packaging, and transportation. The intervention on grapes in Barrani (2,360 feddans) is also justified because Barrani's grapes are unique.

The final goal of this Operational Capitalisation study is therefore to improve future project sustainability at policy, regulatory, legislative, and environmental levels.

This Operational Capitalisation study shall be provided to competent governmental entities as well as to interested development partners.

## **Axes of intervention**

To capitalise the three initiatives implemented by DRC, FAO and CEDARE in Matrouh and the three initiatives implemented by FAO, CEOSS and ICARDA in Minya and Fayoum, the following two axes of interventions were identified:

- Axis 1: introduction of new technologies in the rain-fed areas of Matrouh
- Axis 2: introduction of new technologies in the irrigated old lands of Minya and Fayoum

### **First axis - Introduction of new technologies in the rain-fed areas of Matrouh**

#### Definition:

- Scale out and scale up: Scale out means “scaling horizontally” the results that proved to be successful to cover wider geographical areas for greater outreach at micro-level (e.g., gradual rollout of activities in similar areas). Scale up means “scaling vertically” the successful concepts to cover broader impact through improved institutionalization, legislation, policies, development plans, improving the business environment.
- Good Agricultural Practices: GAPs are "practices that address environmental, economic and social sustainability for on- farm processes, and result in safe and quality food and non-food agricultural products" (FAO COAG 2003, GAP paper). The concept of GAPs may serve as a reference tool for deciding, at each step of the value chain process, on practices that are environmentally sustainable and socially acceptable. When promoting/adopting GAPs, the capacities of rural associations, both farmers and non-farmers, should be reinforced.
- North West Coastal Zone (Matrouh Governorate): is an area of Matrouh Governorate from Fouka in the East to El-Salloum in the West, for a depth of 40 km from the coastline.
- Wadi: it represents the bed or valley of a stream that is usually dry except during the rainy season.
- New wadi means that the targeted areas were not cultivated before the project intervention, but there was a potential to be developed and were brought into production.
- Existing wadis are wadis already cultivated in the past were dykes (made in the past) were damaged over the time by the rain and crop production is deteriorated.
- Geographical Indications (GIs) “determine the origin of a commodity in an area primarily due to its geographical origin and enjoy a good reputation and quality gained from the prevailing climatic conditions in that region” (ITDA). GIs include i) PDO: Protected Designation of Origin and ii) PGI: Protected Geographical Indication.
- Geographical Indications System: A GIs system consists of steps to be followed for registering and protecting GIs products. These steps are: i) Identify potential GIs; ii) Draft verification process at administrative level; iii) List administrative requirements, iv) Set up control measures, v) Enforce administrative rules for protection, vi) Provide ad-hoc laws, vii) Draft rules avoiding that protected names become generic in the territory.

### Implemented works

In connection with the first axis (*introduction of new technologies in the rain-fed areas of Matrouh*):

DRC:

- Provided the following services, free of charge, to farmers producing olives, figs, grapes and watermelons in the *wadis*: i) levelled (with bulldozers) and ploughed (with tractors) the lands in both new and existing *wadis*, ii) distributed and planted fruit crop seedlings (e.g., 23,500 olive seedlings, 1,000 plants of figs and 1,000 almond planting materials), iii) delivered fertilisers (e.g., 22.5 t of chemical fertilizers + 100 t of compost). Total concerned farmers 1,876.
- Organised trainings on GAPs (e.g., theoretical, and hands-on training) and offered technical support to farmers. Total concerned farmers 1,876.

FAO:

- Distributed improved seeds for 853 *feddans* of barley and 200 *feddans* of wheat.
- Promoted GAPs on 35 *wadis* rehabilitated by DRC.
- Established 70 home gardens along with necessary irrigation systems and field training tailor-made to women (70 women groups).
- Established 125 demonstration fields with modern facilities (drip irrigation system) for olives, figs and almonds and 199 demonstration sites were with improved genetic resources of wheat and barley. Total concerned farmers 1,727.
- Provided agricultural inputs to 702 farmers (e.g., organic fertilizers, insecticides, small equipment such as pruning tools).
- Distributed 14 tonnes of organic fertilizers and pesticides.

CEDARE:

- Established 6 pilot demonstration fields for GIs (2 for olives, 2 for figs, and 2 for grapes).
- Provided one refrigerated truck and one olive mill to MADAD (farmer association). The agricultural Directorate is monitoring the operation for effective management.
- Provided services to MADAD's members to promote GIs products. Total concerned farmers 165.
- Organised trainings on GAPs including on integrated pest management (IPM) to the benefit of 30 households.

### **Second axis – Introduction of new technologies in the irrigated old lands of Minya and Fayoum**

Definitions:

- Scale out and scale up: Scale out means “scaling horizontally” the results that proved to be successful to cover wider geographical areas for greater outreach at micro-level (e.g., gradual rollout of activities in similar areas). Scale up means “scaling vertically” the successful concepts to cover broader impact through improved institutionalization, legislation, policies, development plans, improving the business environment.

- Good Agricultural Practices: GAPs are "practices that address environmental, economic and social sustainability for on- farm processes, and result in safe and quality food and non-food agricultural products" (FAO COAG 2003, GAP paper). The concept of GAPs may serve as a reference tool for deciding, at each step of the value chain process, on practices that are environmentally sustainable and socially acceptable. When promoting/adopting GAPs, the capacities of rural associations, both farmers and non-farmers, should be reinforced.
- Old lands: The old lands of Egypt are those located in the narrow green valley and in the Nile Delta. The old lands are home to more than 90% of Egypt's population. Land ownership is fragmented, with average land tenure around 1 *feddan* (0.42 hectare). Subsistence farming is practiced in most areas.
- A Water Users Association (WUA) is a non-profit organization that is initiated and managed by the group of water users along one or more hydrological sub-systems canals regardless of the type of farms involved (IWMI).
- Meskas and marwas: the *meska* is a distributor irrigation canal (tertiary canal) serving a WUA while the *marwa* is an irrigation canal at farmers' field level (furrows). Whereas a *meska* serves an area of about 100 to 350 *feddans*, a *marwa* typically serves an area of 3 to 5 *feddans*. As *meskas* represent a higher level of irrigation channels than *marwas*, improvement of *marwas* should follow *meskas* improvement.
- Raised bed technology: a technology developed by ICARDA to reduce water losses and to increase crop water productivity. ICARDA adapted a seed drill to prepare raised beds and sow different crops with adjustable seed rates.
- Laser land levelling: it means that the farmers' fields are levelled within certain degree of desired slope using a guided laser beam throughout the field. The aim is to achieve water application uniformity avoiding having parts of the soils with water logging and parts with water stress. Laser land levelling helps in reducing water losses through reduced farm water run-off.
- Soil quality improvement: to improve soil quality (in the project areas the soils are heavy clay and, in some areas, are affected by salt) by applying soil fertility and salinity amendment.

#### Implemented works

In connection with the second axis (*introduction of new technologies in the irrigated old lands of Minya and Fayoum*):

FAO (Fayoum):

- Introduced sustainable soil fertility management practices (e.g., soil analysis and recommendations to farmers on soil management practices).
- Provided demonstrations services on Integrated Pest Management (IPM) and raised farmers' awareness on the use of biofertilizers and compost for food safety and human health, leading to a reduction in the use of agrochemicals.
- Established 10 demonstration fields for the application of GAPs in horticultural production and trained 990 farmers on GAPs, 1,000 farmers on IPP, 200 farmers on Natural Resource Management (NRM). 176 farmers received (in addition to training) seedlings of high-yielding horticultural crops.

- Introduced plastic greenhouses and low tunnels crop technologies to produce high-yielding horticultural varieties under protected environment.
- Proposed crop diversification options to encourage small-scale horticultural growers to produce higher value horticultural cash crops instead of the lower value traditional ones.
- Carried out laser levelling and deep ploughing of 76 *feddans* and supplied composts and gypsum for farmers.
- Prepared and distributed simple guidelines/business fact sheets on GAPs for main horticultural crops grown in the area.
- Established Small Farmers' Association (SFA) in each of the five target villages and one Women Farmers' Association (WFA).

ICARDA (Minya and Fayoum):

- Carried out laser levelling and deep ploughing for 600 *feddans* and supplied composts and gypsum for 941 *feddans*.
- Provided agricultural machineries (6 enhanced raised bed + 4 wheat harvesters) to Agricultural Research Centre (ARC) of Minya (5) and Fayoum (5) for the benefit of local farmers. Ad-hoc training were provided to key personnel.
- Established mechanized raised-bed demonstration fields (1,200 units). The implementation of mechanized raised-bed package included: i) Planting within the optimum sowing date (15-30 November); ii) Planting on 130 cm wide raised beds in rows 14 cm apart on 7 rows on each bed; iii) Applying recommended rates of NP fertilizers (75 kg N/*feddan*, 17 kg P<sup>2</sup>O<sup>5</sup> /*feddan*); iv) Applying optimized irrigation schedule according to growing stages; v) Applying optimum pest and weed control methods.
- Established 729 demonstration fields in both Minya and Fayoum.

CEOSS (Minya):

- Built the capacity of small farmers to work collectively (e.g., creation of farmers' groups, of elected committees, and of community cadres) and increased gender participation in the farmers' groups and in the elected committee's composition.
- Trained 1,386 farmers on GAPs and 1,481 farmers on applied value chain concepts.
- Established 6 Field Farmers Schools (FFS) for application of GAPs on 7 crops (maize, wheat, soybeans, garlic, potatoes, coriander, and marjoram).
- Established 100 demonstration fields on compost production.

## Methodology of the study and data analyses

The Capitalisation was carried out as follows:

- Analysis of annual and evaluation reports (FAO, CEOSS, ICARDA, DRC and CEDARE).
- Analysis of interviews conducted by DRC’s consultant with beneficiaries in Matrouh in 2017 in connection with DRC’s Environmental Impact Assessment (EIA) study<sup>5</sup>.
- Analysis of interviews conducted by DRC’s consultant with beneficiaries in Matrouh in 2019 in connection with the DRC’ capitalisation study<sup>6</sup>.
- Analysis of interviews carried out by EU-JRDP in January 2021<sup>7</sup> in connection with GIs in Matrouh (30 questionnaires).
- Analysis of the surveys carried out by the EU-JRDP’s capitalisation expert with beneficiaries in Minya and Fayoum in connection with EU-JRDP irrigation and waste management works<sup>8</sup>.
- Analysis of data collected from the AGS’s surveys carried out in the three governorates (88 interviews in Matrouh, 93 in Minya and 114 for Fayoum)<sup>9</sup>.
- Analysis of reports and data processing from surveys carried out by EU-JRDP’s consultant in GIs (2017-2020)<sup>10</sup>.
- Analysis of results obtained from baseline, group discussions and surveys carried out by the grantees.
- Field assessments made by EU-JRDP staff in the three Governorates.
- Analysis of “EU GI Guide Worksheets” prepared by EU (Cf. also the EU-JRDP’s Capitalisation 6 – Promotion of Geographical Indications).

---

<sup>5</sup> Environmental Impact Assessment Study (EIAS) of DRC interventions in connection with EU-JRDP operations. DRC, April 2017.

<sup>6</sup> Operational capitalization study of DRC interventions in connection with EU-JRDP. DRC, July 2019.

<sup>7</sup> Surveys carried out by Ramadan Ali, EU-JRDP.

<sup>8</sup> Capitalization of environmental impact of the EU-JRDP’s irrigation and waste management intervention (Mohamed Abdelhamid Eizeldin Elsayed, January 2021).

<sup>9</sup> AGS developed a methodological approach for data collection based on the use of open-access tools and software such as: i) field forms/questionnaires: specific field forms and questionnaires have been developed, based on the identified indicators; five thematic field forms have been produced for the Governorate of Matrouh and three for Minya and 3 for Fayoum; ii) Geopaparazzi: this user-friendly, highly customisable app is the software where the field forms are uploaded. All answers are automatically saved and georeferenced, reducing the chances of mistakes; iii) QGIS: one of the most widely used GIS open-source software, QGIS allows to produce highly customised maps from a variety of datasets. In Matrouh, in total 480 respondents have been interviewed out of which 88 are directly related with this axis of intervention. 362 and 420 respondents have been selected respectively for the Governorates of Minya and Fayoum out of which 93 for Minya and 114 for Fayoum are directly related with this axis of intervention.

<sup>10</sup> Monique Bagal (EU-JRDP short term consultant during the period January 2017-January 2019. Main deliverables: i) Phase 1: Review and design of EU-JRDP strategy in GI, ii) Phase 2: Training of local and national stakeholders in GI, iii) Phase 3: Monitoring and supervision of the EU-JRDP strategy in GI



## **Results of the study/conclusions: driving forces for each axis of intervention**

### **First axis - Introduction of new technologies in the rain-fed areas of Matrouh**

#### **Results**

Results from the interviews with DRC's beneficiaries carried out by the capitalisation's consultant of DRC's action<sup>11</sup>. The intervention:

- Increased the crops' productivity by 30%.
- Decreased the production costs by 40%. The production costs decreased because i) the tree density increased, ii) new inter-cropping methods were introduced, the land was levelled with bulldozers.
- Improved the quality of the main crops cultivated in the areas (e.g., vegetables, olives, grapes and figs).
- Generated job opportunities.
- Increased the level of confidence of local communities vis-à-vis of local institutions.

Results from the interviews with FAO's beneficiaries carried out by the final evaluation's consultant of FAO's action<sup>12</sup>. The intervention:

- Increased the yields of about 20% in figs and 30% in olives.
- Increased the yields for wheat and barley (percentages of increase were not indicated).
- Increased the incomes of women groups and the nutritional status of their family thanks to the introduction of homestead gardens.

Results from the interviews with CEDARE's beneficiaries carried out by the final evaluation's consultant<sup>13</sup> of CEDARE's action:

- All interviewees believe that the GIs are important, crucial, and suitable to the nature of agriculture in Matrouh.
- All interviewees feel that the Governorate of Matrouh is the best platform to start GIs in Egypt.
- 25 interviewees (out of 27) think that local producers are nowadays convinced of the GIs and are ready to join.
- 23 interviewees (out of 27) are extensively trained and they know now what to do with GIs.

---

<sup>11</sup> Cf. also Capitalization 4: Best Water Harvesting Practices in the Drylands of North West Coastal Zone of Egypt – axis 3.

<sup>12</sup> Source: FAO external evaluation. Gebril Mahjoub Osman, February 2020.

<sup>13</sup> Source: EU-JRDP external evaluation of CEDARE's initiative. Hanan Elguindy, September 2020.

Results from the interviews with CEDARE’s beneficiaries that applied the GAPs in the demonstration farms carried out by CEDARE<sup>14</sup>.

- The yields of figs increased by about 40% (from 3.5-4 to 5.6/6 tonnes per *feddan*), of olives by about 30% (3.5 to 4.5 tonnes per *feddan*), of grapes by about 30 % (1.8 to 2.4 tonnes per *feddan*).
- The fruit quality improved in terms of: i) increased fruit size and the Total Soluble Solids-TSS (e.g., in figs the TSS increased by about 8%); ii) decreased acidity for olive oil (from 11% - oils obtained by using manual mills, to 1.5% -oils obtained by using the newly introduced mechanically operated mills).
- The fertilization program contributed to increase yields and to better control pests (e.g., fig-stem borer, the olive fruit fly-the main olive pests, the sucking piercing pests, and the leaf-wing lesions of the vineyards).
- The income of concerned farmers increased by 30%, the crop selling prices for the three products registered under GIs increased by 65% while the costs of production decreased by 40%.
- The marginal profits of the producers increased. With the truck provided by the project in fact, farmers have direct access to markets and do not have to pay commissions to middlemen.

Results from the interviews with CEDARE’s beneficiaries carried out by EU-JRDP<sup>15</sup>.

- All farmers are practicing organic agriculture and integrated pest control methods.
- All farmers are using the GI logos and selling their products directly to consumers including in Cairo.
- Almost 80% of the farmers are participating to the GIs initiative for figs, grapes. and olives.
- The products from Matrouh are of better quality because of the dry weather conditions and the nature of the soils.
- The consumers are aware of the GI origin of the products.

Results from the interviews with DRC and FAO’s beneficiaries carried out by AGS<sup>16</sup>.

*Availability of farm equipment and machinery in the wadis (average 88 interviews):*

Availability of farm equipment and machinery	Before Project	After Project	
		Rented	Owned
Agricultural tractor equipped with its components	0	6	2
Water trailer	1	6	1
Loader	0	1	0
Well digger	0	1	0
Fruit collectors	0	1	0
Spray motor	1	3	2

<sup>14</sup> Source: CEDARE final report April 2020

<sup>15</sup> Surveys carried out by Ramadan Ali, EU-JRDP. (Cf. also the EU-JRDP’s Capitalisation 6 – Promotion of Geographical Indications).

<sup>16</sup> Surveys carried out by Ramadan Ali, EU-JRDP. (Cf. also the EU-JRDP’s Capitalisation 6 – Promotion of Geographical Indications).

*Degree of satisfaction of farmers cultivating lands inside the wadis (average 88 interviews):*

Degree of satisfaction	Satisfied to some extent %	Very satisfied %	Not satisfied %
Training in agricultural production	33	67	0
Water availability for agriculture	11	67	22
Agricultural job opportunities available in the wadis	0	100	0

*Degree of confidence vis-à-vis of services provided (88 interviews):*

The level of confidence	% Confidence Before	% Confidence After
Technical support units of the sustainable development center	0	78
Agricultural services in the district or the governorate	0	11

### **Conclusions**

The services provided by DRC and FAO contributed to decrease the agricultural production costs by 40% and increased crops' productivity by 30%. The fruit quality improved. Said services had an impact on the social and economic conditions of the farmers. The distribution of olive seedlings is by far the most relevant activity.

The proposed technologies had a positive environmental impact in terms of maintaining soil fertility, improving the control of weeds and diseases, reducing the use of chemicals.

The active engagement of beneficiary communities, combined with hands-on capacity building, is bringing sustainable results.

The establishment of home gardens proposed by FAO along with necessary irrigation systems and field training tailor-made to women improved the nutrition status of local people.

The promotion of GIs proved to have a direct impact on i) improving market access, ii) adding value to existing products, iii) bringing an exclusive territorial benefit to all actors, iv) preserving traditional knowledge and production methods and, v) creating job opportunities at local level<sup>17</sup>.

Meanwhile:

- The trainings provided by DRC were below expectation; the time of distribution of olive seedlings need to be improved. The sustainability of providing free services to farmers needs to improve.
- The knowledge and skills of the beneficiaries in weed, diseases and insect resistance and control still need to be improved.
- Some of distributed olive seedling have been exposed to infection with diseases and insects especially in the first year of cultivation.
- Women empowerment is not to a significant level yet, and this is related to the culture, customs and habits of the Bedouin people living in the region.

<sup>17</sup> For more information cf. EU-JRDP Capitalisation 6: The promotion of Geographical Indications - a practical approach for boosting local products and culture.

## Second axis – Introduction of new technologies in the irrigated areas of Minya and Fayoum

### Results

Results from the group discussions conducted by the FAO's evaluation consultant<sup>18</sup> (5 groups for a total of 60 small holders and 5 CDAs).

The farmers who adopted the technologies proposed by FAO in horticulture production under protected environment, increased their income by 338% for tomato, by 225% for cabbage, and by 332% for the cucumber as follows:

Crops	Net income (EGP/feddan) Before	Net income (EGP/feddan) After	% increase
Tomato	6,200	20,998	+ 338
Cucumber	7,200	23,884	+ 332
Cabbage	5,000	11,233	+ 225

What are the main reasons for income increase? (average of 5 groups discussions):

Reasons for farmers' income increase	%
Improving agricultural practices	28
Using improved seedlings/planting in tray	20
Improving pest and disease control methods	18
Improving fertilization system	13
Improving irrigation systems	12
Cultivating new varieties	9
Improving product marketing systems	0
<b>Total</b>	<b>100</b>

Which activity are you mainly satisfied with? (average of 60 answers):

Activity and degree of satisfaction	% of answers
Marketing support	84
Seedlings/planting in tray	20
Trainings on post-harvest transaction	10

Results from the interviews with ICARDA's beneficiaries carried out by the EU-JRDP's capitalisation expert<sup>19</sup>(84 interviews).

What are the main benefits from ICARDA intervention? (84 interviews)

Main benefits	Total interviews	Total replies	%
Mechanized raised bed	84	84	100
Saving the irrigation costs per feddan	84	81	97
Soil quality improvement	84	45	54
Laser land levelling	84	45	54
Water user associations trainings	84	44	52
Marwas rehabilitation	84	43	51
Open field drains maintenance	84	28	33

<sup>18</sup> Final Evaluation. Tarek Shata, February 2020

<sup>19</sup> Capitalization of environmental impact of the EU-JRDP's irrigation and waste management intervention (Mohamed Abdelhamid Eizeldin Elsayed, January 2021).

What are the main benefits related to irrigation at field level? (84 interviews)

Benefits related to irrigation at field level	Number of interviews	Number of replies	%
Better irrigation management	84	84	100
Easier irrigation accessibility	84	84	100
Increase water productivity	84	84	100
Decrease the amount of wasted water	84	84	100

Can you list the positive and negative effects of the mechanized raised bed technology? (84 interviews)

Positive impact	Number	%	Negative impact	Number	%
Increased water productivity, irrigation efficiency, saving cost, time and crop productivity at field level	84	100	Not targeting the introduction of these machines to all lands on the developed <i>meskas</i>	28	33
Reduced water losses and weed growth at field level	69	82	These machines require specialized labour for operation and maintenance, and conditions are not available	36	43
Improved farmers' general health	47	56	N/A	0	0

Can you list the positive and negative effects of the proposed technology on soil quality improvement? (45 interviews)

Positive impact	Number	%	Negative impact	Number	%
The soil condition improved, its fertility increased, and the salinity adjusted, resulting in lower costs and lower chemical fertilizer addition	45	100	The high price of soil and water analysis for most farmers has limited the demand for it	17	38
Having a detailed soil and water assessment, determining soil quality and fertilizer requirements, reduced exposure to chemical fertilizers, increased agricultural productivity, and improved public health.	36	80	N/A	0	0

Can you list the positive and negative effects of the proposed laser land levelling technology? (45 interviews)

Positive impact	Number	%	Negative impact	Number	%
Reducing water losses	45	100	The unavailability of laser levelling machine has reduced the demand for it	27	56
Reduced irrigation time at field level, which positively saved time and farmers effort and improved farmers' health in general.	40	89	N/A	0	0

Can you list the positive and negative effects of the proposed open field drains maintenance? (28 interviews)

Positive impact	Number	%	Negative impact	Number	%
Reduced pollution rate and improved agricultural soil efficiency	28	100	The high costs of open field drains maintenance have limited the works	19	68
Improved agricultural soil efficiency and farm productivity.	24	86	N/A	0	0

Results from the calculations made by the capitalization consultant of the ICARDA's action<sup>20</sup>:

The consultant calculated that the new technologies introduced by ICARDA (e.g., laser levelling, raised bed cultivation, practices improving soil fertility and reducing salinity) in average:

- Increased water accessibility at field level by 87 %.
- Decreased the amount of wasted water by 80 %.
- Increased water management at field level by 79 %.
- Increased water productivity by 65 %.
- Reduced the time for irrigating one *feddan* from 4.6 hours to 1,7.

Results from the interviews with ICARDA's beneficiaries carried out by AGS<sup>21</sup>.

The assessment carried out by AGS shows that, inside the irrigation rehabilitated areas:

- There was an increase of crop intensification of 31.25% during the summer and 10% during the winter.
- Yields of main crops increased as indicated in the following tables:

Fayoum: yields of main crops before and after intervention (average of 114 interviews).

Main crops	Yields (t) Before (2016)	Yields (t) After (2020)	%
Corn	2.5	3.2	+ 21.8
Sugar cane	25.5	31.7	+ 19.6
Onion	8.2	10.0	+ 18.0
Wheat	2.6	3.3	+ 21.8

<sup>20</sup> Capitalization of environmental impact of the EU-JRDP's irrigation and waste management intervention. Mohamed Abdelhamid Eizeldin Elsayed, February 2021.

<sup>21</sup> Surveys carried out by Ramadan Ali, EU-JRDP. (Cf. also the EU-JRDP's Capitalisation 6 – Promotion of Geographical Indications).

*Minya: yields of main crops before and after intervention (average of 93 interviews).*

Main crops	Yields (t) Before (2016)	Yields (t) After (2020)	%
Soyabeans	1.56	N/A	N/A
Sugar cane	24.2	N/A	N/A
Maize (Shamia)	5.0	N/A	N/A
Wheat	2.7	3.4	25.9

*N/A means that yields are not available mainly because at the time of the interviews the cropping cycle after the rehabilitation was not completed yet.*

*Did your income increase?*

Did your income increase?	Total interviews Number	Total replies Yes	%
Fayoum	114	112	98
Minya	93	88	95

*Can you list the main reason for family income increase? (Minya) (88 interviews)*

Reasons for income increase family	%
Increase crop yield	61
More irrigation water available	31
Better farming technology thanks to technical assistance for innovation	25
Costs reduction	22
Development of new successful IGAs	10
Better market prices or marketing conditions	4

Results from the interviews with ICARDA's beneficiaries carried out by ICARDA.

The assessment carried out by ICARDA shows that the introduced technologies:

- Led to water saving of 20/25%.
- Increased yields of main crops of average 25%.

Results from the calculations made by ICARDA.

Mechanized raised bed versus traditional practices: the water requirements (calculated for wheat) decreased and water productivity increased as follows:

Mechanized raised bed versus traditional practices in wheat production	Fayoum		Minya	
	Traditional practices (Before)	Mechanized raised bed (After)	Traditional practices (Before)	Mechanized raised bed (After)
Water requirements (m <sup>3</sup> /feddan)	3,007	2,283	2,675	2,320
Water productivity (case of wheat) kg/m <sup>3</sup>	0.79	1.43	0.95	1.47

Laser levelling versus traditional practices: applied water and irrigation time (average Minya and Fayoum calculated for wheat)

Laser levelling versus traditional practices in wheat production	Traditional practice (Before)	Laser levelling (After)	Difference	
Applied water (m <sup>3</sup> /feddan)	2,841	2,349	- 492 m <sup>3</sup> /feddan	- 21 %
Irrigation time (hour/feddan)	2.29	1.94	- 0.35 hour/feddan	-18 %

#### Results from the calculations made by CEOSS.

- The value of collective work was promoted through the creation of CBOs, Elected Committees (ECs) and Territorial Committees (TCs) aiming at better organising farmers and better connecting them with Ministry of Agriculture, suppliers and buyers. The women participation in the farmers' groups and their representation in the ECs promoted their role within their communities and provided them with the opportunity to access their rights.
- Farmers increased their income from 27,021 EGPs to 39,632 EGPs/feddan; the costs of production decreased by 15-20%, the quality of the crops improved, and post-harvest losses decreased by 20-30% due to the proper harvest, post-harvest handling and packing.

#### Conclusions

The farmers who adopted the technologies proposed by FAO in horticulture production under protected environment, increased their income drastically (e.g., doubled or even tripled depending on the crop) while cultivating on the same piece of land. The income mainly increased because of: i) the introduction of improved agricultural practices (28%), ii) the use of improved seeds, iii) the adoption of integrated production and protection methods (18%).

For ICARDA, the intervention led to water saving of 20/25% and to yield increase of 25% for the typical crops in the project areas (wheat in winter and maize in summer). Further, the increase in yield and income resulted in enhancing general well-being of participating families

CEOSS succeeded in building the capacity of small farmers to work collectively (creation of farmers' groups/CBOs, elected committees, and community cadres) and to increase female participation in the farmers' groups and their representation in the elected committees. The improvement of marketing agreements between CBOs and local traders resulted in increased income of farmers.

Meanwhile, weak market chains between farmers and exporters are still present. Limited credit facilities for small farmer's agricultural business might affect farmers adoption of crop varieties.

#### **The main driving forces per each intervention axis**

The main driving forces for each axis of intervention (cf. also table 1 in the following page), are summarised here below:

- First axis: Introduction of new technologies in the rain-fed areas of Matrouh  
The provision of services to farmers were instrumental for increasing crop productivity in both old and new wadis and are facilitating the re-introduction of traditional crops and therefore are preserving biodiversity and encouraging farmers to register their crops as GIs.



The promotion of GIs is:

- ✓ Contributing to the development in rural areas by linking the value-added of an origin-designated product to the geographical place.
  - ✓ Valorising local products, their origins and the “story behind the product”.
  - ✓ Improving incomes and the livelihood conditions at family level.
  - ✓ Enhancing social stability, increasing local community participation, enhancing the confidence of beneficiaries toward local authorities...
- Second axis – Introduction of new technologies in the irrigated areas of Minya and Fayoum

The promotion of GAPs for sustainable improvement of the quality and quantity of horticultural production under protected environment (e.g., introduction of high-yielding hybrids, new techniques for seedlings, integrated pest management) is:

- ✓ Tripling incomes.
- ✓ Facilitating the participation of women in IGAs (e.g., seedlings and post-harvest activities).

The enhancement of water productivity by improving on-farm irrigation management (e.g., laser levelling and raised bed cultivation of main cereals, practices improving soil fertility and reducing salinity) is.

- ✓ Improving agricultural soil efficiency and reducing pollution rate.
- ✓ Improving the agricultural soil environment, soil fertility, reducing the degree of soil salinity, reducing irrigation time per *feddan*, increasing agricultural productivity, and increasing farmers' income.
- ✓ Reducing the quantities and costs of adding chemical fertilizers to the agricultural soil environment

The establishment of new replicable and measurable rural development models is increasing small farmers income (e.g., application of the territorial approach, promotion of the value chain concepts).

Table (1): Driving forces per each intervention axis

Sector	Axis 1 - Introduction of new technologies in the rain-fed areas of Matrouh	Axis 2: Introduction of new technologies in the irrigated areas of Minya and Fayoum
Agricultural impact	<p>Services to farmers are facilitating the re-introduction of traditional crops and preserving biodiversity and encouraging farmers to register crops as GIs</p> <p>GIs are increasing crops net revenues, crop productivity and reducing production costs for the benefit of local small farmers.</p> <p>GIs are valorising the distinctive features and traits of those products from oasis and dry-land areas.</p>	<p>The proposed technologies are increasing yields, improving soil fertility and land productivity in horticulture (FAO) and cereals productions (ICARDA).</p> <p>The yields of horticultural crops under protected environment tripled.</p> <p>The mechanised raise-bed technology is effective in saving irrigation water and increasing land and water productivity.</p> <p>Laser land levelling helps in reducing water losses through reduced farm water run-off.</p>
Economic Impact	<p>Services to farmers are increasing crops net revenues, crop productivity and reducing production costs</p> <p>GIs are contributing to: i) create and maintain jobs in rural areas, ii) boost local economy, iii) support tourism, iv) protect diversity and heritage. These performances are expecting to have a huge impact on local economy considering the importance of the selected crops on the territory.</p>	<p>Household income increased thanks to i) more irrigation water available, ii) better farming technologies, iii) increased crop yield, iv) better market prices or marketing conditions, v) cost reduction.</p>
Social Impact	<p>The promotion of GIs in dry lands had a clear social impact at local level.</p> <p>Local community participation increased.</p> <p>Confidence of beneficiaries toward local authorities enhanced.</p> <p>Woman empowerment increased especially in the harvesting and processing of figs and olives and through the development of ad-hoc value chains.</p>	<p>Local community participation increased.</p> <p>Confidence of beneficiaries toward local authorities enhanced.</p> <p>Woman empowerment increased especially in horticultural work (works in greenhouses are particularly suitable for women) and in seedlings production.</p>
Environmental Impact	<p>Plant health improved.</p> <p>Sustainable management of land improved</p> <p>Traditional farming with its potential positive contributions to the landscape maintained.</p> <p>Favourable habitats for biodiversity and soil preserved.</p> <p>Soil infection reduced by removing weeds and plant residuals</p> <p>Biodiversity sustained by cultivation of local adapted varieties</p>	<p>The reduced use of chemicals and the increased use of compost as well as the adoption of integrated pest management best practices are having a beneficial effect on the environment.</p> <p>Soil analysis, maintenance of open field drains, laser levelling is reducing the use of chemical fertilizers, the rate of pollution and improving the efficiency of the soils for agricultural production.</p>

## **Lessons learnt (positives and negatives) per each driving force**

Capitalization of lessons learned (positives and negatives) are important to amend legislations and regulatory framework and improve sustainability at policy, regulatory, legislative, and environmental levels.

### **First axis - Introduction of new technologies in the rain-fed areas of Matrouh**

Positive lessons learnt (positive issues coming up):

- The cultivation of local adapted varieties (cf. olives Shmalay and figs Sultany) leads to prevent deterioration of biodiversity and promotes local culture.
- The cultivation of summer crops (cf. watermelon) as cash crop in *wadis* leads to improving soil characteristics and helps in social stability.
- The provision of services to farmers can contribute to increase income, reduce soil erosion and land degradation and enhance economic and social aspects (e.g., jobs creation).
- If GIs are promoted in dry-land areas (and oasis) of Egypt, the value of traditional crops as well as the benefits to all actors in the territory increase.
- The development of GIs is facilitated when the products are promoted by local associations, consortiums, and producers' groups.
- The development of GIs can secure jobs at local level and facilitate the stay of local people in the production area. The GIs can also facilitate the re-introduction of traditional crops.

Negative lessons learnt (what did not go as expected):

- When farmers are not well organized, it is very difficult to put in place common rules, ad-hoc market strategies and sustainable production practices.
- It is very difficult to upscale the registration of GIs if ad-hoc measures of control mechanisms and ad-hoc laws are not in place.
- When costs/benefits analysis for the services provided to farmers are not carried out, it is difficult to establish a mechanism for cost recovery of expenses.
- Since the GIs are collective instruments that are usually managed/owned by a collective group, their development depends on the existence of producers' associations.

### **Second axis – Introduction of new technologies in the irrigated areas of Minya and Fayoum**

Positive lessons learnt (positive issues coming up):

- Crop diversification and the adapted technologies to produce under protected environment leads to triple farmers' incomes.
- Marketing agreements between CBOs and local traders have a direct impact on income increase at smallholders' level.
- Awareness workshops and field demonstrations lead to behavioural changes and facilitate the adoption process by smallholders.

Negative lessons learnt (what did not go as expected):

- Lack of technical staff specialized in the maintenance of the introduced new technologies will lower the adoption rate.
- Limited credit facilities for small farmers affect the farmers' adoption rate.

## **Recommendations for scaling up**

### **First axis - development of new wadis and rehabilitation of existing wadis**

#### Specific recommendations:

To scale out<sup>22</sup>the technologies proposed by DRC and FAO aiming at improving incomes by extending the proposed agricultural practices adapted to rain-fed areas. These technologies shall be applied together. These are:

- Levelling (with bulldozers) and ploughing (with tractors) the lands in both new and existing *wadis*.
- Distributing and planting fruit crop seedlings.
- Delivering organic fertilisers and pesticides.
- Organising training on GAPs.
- Establishing home gardens along with necessary irrigation systems and provision of field training tailor-made to women.
- Establishing demonstrations fields with modern facilities (drip irrigation system).

The above shall be provided for free during the first year of production since it is part of the land reclamation process and require heavy machinery not available at small farmers' level.

To extend to the rest of the governorate, the promotion of GIs. GIs shall involve more women in capacity building programs since women are responsible for processing and post harvesting operations. This means:

- To make available analysis of laboratory information before promoting GIs.
- To extend participation in awareness raising campaigns and take into consideration other potential stakeholders outside of the direct beneficiaries only.
- To plan marketing campaigns to be early enough before the harvesting.
- To focus on advocacy for the GIs concept to facilitate the promotion of registration of other products.
- To ensure that the packaging tool and packages' boxes are made available for farmers early enough before harvesting.

### **Second axis – Introduction of new technologies in the irrigated areas of Minya and Fayoum**

#### Specific recommendations:

To scale out<sup>23</sup>the technologies proposed by FAO for sustainable improvement of the quality and quantity of horticultural production under protected environment These technologies shall be applied together. These are:

- Water and soil analysis.
- Composting.

---

<sup>22</sup> Scale out means “scaling horizontally” the results that proved to be successful to cover wider geographical areas for greater outreach at micro-level (e.g., gradual rollout of activities in similar areas).

<sup>23</sup> Scale out means “scaling horizontally” the results that proved to be successful to cover wider geographical areas for greater outreach at micro-level (e.g., gradual rollout of activities in similar areas).

- Deep ploughing and laser levelling.
- Cultivation in green houses and low tunnels.
- Introduction of high-yielding hybrids under protected environment.
- Scaling up the seedling techniques.
- Promotion of integrated pest management.
- Provision of qualified technical assistance.
- Building the capacity of small farmer associations' (CBOs).
- Strengthening the relationship between farmers and exporters and facilitating the access to microfinance services with ad-hoc credit lines.

To scale out the technologies proposed by ICARDA enhancing water productivity by improving on-farm irrigation management. These technologies shall be applied together. This means:

- To promote the rehabilitation of *marwas* envisaging i) the employment of local labour and the use local materials and equipment to generate job opportunities at local level. The rehabilitation of *marwas* should follow the rehabilitation of *meskas* (the *meskas* represent a higher level of irrigation channels than *marwas*).
- To improve soil quality by applying soil fertility and salinity amendment. The soil type of the command area in both Fayoum and Minya is a heavy clay soil and in some areas, there is a salt-affected soils and vulnerable to physical and chemical compaction and salinity build-up due to intensive agricultural practises.
- To level lands with laser for three cropping seasons. This is needed to achieve water application uniformity in the field to avoid having parts of water logging and parts of water stress. Laser land levelling helps in reducing water losses through reduced farm water run-off.
- To maintain the open field drains (case of Fayoum only).
- To disseminate the raised-bed technologies for three cropping seasons. The implementation of mechanized raised-bed package includes: i) Planting within the optimum sowing date (15-30 November); ii) Planting on 130 cm wide raised beds in rows 14 cm apart on 7 rows on each bed; iii) Applying recommended rates of NP fertilizers (75 kg N/*feddan*, 17 kg P<sup>2</sup>O<sup>5</sup> /*feddan*); iv) Applying optimized irrigation schedule according to growing stages; v) Applying optimum pest and weeds control methods.

To enhance CBOs and rural communities of farmers in future interventions as recommended by CEOSS in Minya or by FAO in Fayoum as follows:

- To establish Small Farmers' Association (SFA) and Women Farmers' Association (WFA).
- To enhance the creation of CBOs, Elected Committees (ECs) and Territorial Committees (TCs) aiming at better organising farmers and better connecting them with Ministry of Agriculture, suppliers, and buyers. The female participation in the farmers' groups and their representation in the ECs promoted their role within their communities and provided them with the opportunity to access their rights.
- To promote collaboration and networking among CBOs, ECs and TCs ensuring greater coordination and tight relations with officials and decision makers.

- To take advantage of the good relationships of community leaders and decision makers improving the level of services within partner communities.
- To encourage partner CBOs, SFAs and WFAs to rearrange their priorities to better meet community needs/women needs.
- To develop community-based mechanism from local leaders and government representative to better deal with farmers' disputes and to develop the basis for contract farming obligations.

To encourage finance and micro-finance institutions to open specific credit facilities for small farmers since the proposed technologies from FAO and ICARDA demand fresh investments.

To build the capacity of current farmers' federations, organizations, and farmers' groups, by empowering them in service provision of technical and financial nature.

To diversify the role of farmers' organisations for them to be more actively involved with marketing and negotiations with buyers and input/service providers. These organisations shall be equipped with marketing tools and shall receive qualified continuous training.

To continue to deliver refresh training courses to AEA staff to further strengthen the role of these cadres.

To scale out the EU-JRDP approach based on continue qualified technical assistance for supporting small farmers and on continue capacity building with trainings, dissemination, and awareness campaigns.

To provide means of access to soil amendments provided by the project in the future, as most beneficiaries indicated that no mechanism is in place for that.

To reinforce management capacity of WUAs that could make more readily available and better maintain raised bed machines and harvesters than the Agriculture Department.

To strength the relationship between farmers and exporters and to facilitate access of farmers to micro-finance and ad-hoc credit lines.

