

## **5. Technical Issues**

### **5.1 Participatory Research and Extension**

#### **5.1.1 Demonstration and Agricultural Research Farm (DARF) based Extension Approach**

The DARFs can be a platform for the stakeholders; (1) place for researchers, SMSs and extension agents to gather once a week, (2) opportunity for the Demo-farmers and Key-farmers to share farming experiences, and learn research results and (3) tool to convey technical information to farmers in surrounding farms through direct observation. Thus, Farmer to Farmer information dissemination is possible by the DARF based extension approach.

Demo-farmers are encouraged to manage and maintain the DARFs in a condition acceptable to the taskforce through their own initiatives and provision of some inputs by the Project as a partial incentive. The farming activities in DARFs serve as models to follow for Key-farmers and other farmers. Therefore, Demo-farmers play an important role as a starting point for disseminating technical information from the DARFs. The Key-farmers also play an important role. They come from the surrounding farmlands and are closely associated with the work carried out by the Demo-farmers. They function as messengers who deliver newly obtained technical know-how to their neighbors.

#### **5.1.2 Mobile Extension Approach**

Mobile extension is carried out by extension agents who reach out to surrounding farmers in order to give them technical advice in Jericho district. Training tools and equipment and other necessities for training sessions are also provided to extension agents for this purpose as and when necessary. Through this activity, it is anticipated that technical information from the DARFs is delivered to surrounding farmers.

#### **5.1.3 Tools for Participatory Research and Extension**

##### **(1) Field Day**

According to the Guidelines for Research and Demonstration Activities in DARFs, Field Days are relatively informal opportunities which demonstrate production methods or results from adaptive research. Its purpose is to introduce new ideas in farming, promising crops and varieties, and recommendable technologies for stimulating interests of as many farmers as possible. The DARFs provide an ideal location to the Field Days for showing impacts of the newly introduced technologies. As for livestock, technical disseminations have been also made outside of the DARFs. On the occasions of Field Days, researchers, SMSs and extension agents disclose their knowledge and skill to farmers and they are good opportunities of On-the-Job Training.

##### **(2) Training Programs**

It should be noted that the Project puts stress on trainings to improve and strengthen collaboration between research and extension. They include Training Course for Agricultural Extension Methodology (in 3 Modules) and Training of Trainers (TOT) (in 2 Modules). Additionally, Training Program of Report Writing targeting the extension staff and Report Writing Workshop for researchers of NRAC should be underlined

among others. Training of Demo- farmers and Key-farmers on principles of farm level leadership and a continuing program on farm record keeping are also noted.

Since the training programs have been already experienced by stakeholders of the Ministry of the Agriculture, the training planning and preparation, implementation and evaluation should be totally transferred to the MoA by standardizing documents; (1) training concept for differentiated targets, (2) simplified modules, (3) syllabus of each topic, and (4) simplified evaluation document of training program for improvement.

### (3) Lectures, Workshop, Seminars and Site Visit

Lectures, workshops, seminars and site visits are occasions for message delivery to the beneficiaries and for on-the-job trainings of researchers and extension staff themselves to apply and reconfirm ability as well.

### (4) Evaluation of the Tools

The extension tools mentioned above are categorized in group extension activities. Meanwhile individual level extension activities have been also carried out in the Project by using of such extension tools as on-the-job training.

In order to measure the effectiveness of those tools for group extension, the evaluation team conducted a questionnaire survey which requested extension staff to rate them in terms of (1) effect of technology dissemination and (2) farmers' response. The rating is as follow; 5: Very high, 4: High, 3: Fair, 2: Low, 1: Very low, 0: Unknown. It can be understood from the next Table that technical training is the most effective tool among others, followed by field days.

Table 5-1 Evaluation of extension tools for group extension

Tools	Effect on technology dissemination	Farmers' response
Field Day	3.9	3.8
Lectures	3.1	3.2
Technical Training	4.5	4.0
Workshop	3.6	3.5
Seminars	3.3	3.2

Note: Rating is the average value of 17 respondents from SMSs and extension agents.

#### 5.1.4 Materials for Operation of DARF

There are four materials for operation of DARF. Degree of use of materials for operation of DARFs is summarized in the next Table.

Table 5-2 Degree of use of materials for operation of DARFs

Materials	Degree of use
Guidelines for Research and Demonstration Activities and DARFs	<ul style="list-style-type: none"> <li>The Guidelines provides a consolidated guide for managing DARFs activities; thus, all the stakeholders use it from planning till monitoring.</li> </ul>

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A Reference Manual	<ul style="list-style-type: none"> <li>• The manual is the main material for training program for extension staff.</li> <li>• It is binder type so that any updating of information or adding new information is easy.</li> </ul>
Farm Record	<ul style="list-style-type: none"> <li>• The Demo-and Key-farmers keep the record.</li> <li>• Some of them faced difficulty to fill in and it took some time to get used to it.</li> <li>• The farmers at An Nassariya and Ein el Beida DARFs have realized importance of keeping the record, knowing expenditures; seeds and seedlings, land preparation, fertilizers, chemicals, and harvesting and revenue from products.</li> <li>• Keeping record makes farmers cost conscious in production process.</li> <li>• Ten (10) out of seventeen (17) respondents of questionnaire for extension staff suggested that the record format should be simpler.</li> </ul>
Farmers Information Leaflets	<ul style="list-style-type: none"> <li>• Fifteen (15) technical information leaflets were compiled.</li> <li>• The leaflets will be distributed to farmers free of charge in various extension occasions.</li> <li>• The farmers will be able to remember what they learn by referring to the leaflets.</li> </ul>

## 5.2 Field Technology for Farm Management

### 5.2.1 Irrigation and Soil Conservation

#### (1) Water Resources

Utilization of surface water for agricultural purposes is difficult because the target area is categorized as dry area and Jordan River is a sole permanent river in the target area. Annual precipitation is about 200mm; thus, water supply depends much on ground water and rain fed water.

Well-drilling is restricted by Israel; therefore, new water resource is hardly developed. Thus, drip irrigation is the solution for efficient use of limited available water. Water utilization plan with water balance calculation hasn't been made yet because of some reasons; no basic data exists in Palestine and resources to plan and implement it are lacking.

#### (2) Use of Drip Irrigation System

Water saving by use of drip irrigation is effective. However, farmers use it without proper training, instead duplicate what others do. This has resulted in individual water management system and low water utilization efficiencies.

Adoption of rotational irrigation system through strong water sharing groups and improvement of irrigation technique will save more water. Verification experiment was conducted in DARF to improve irrigation technique

#### (3) Water Saving by Tensiometer

At every DARF, use of densitometers has helped to save the quantity of water used for crop irrigation substantially. According to the farmers and extension agents, water can be saved by scheduling irrigation in responding to the crop water requirement and soil water situation measured by the tensiometers. One unit of tensiometer costs 150 US dollars. If the devise can reduce the cost of production and increase profit, the farmers may take up the technology.

#### (4) Soil Conservation

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Soil conservation measures are necessary to prevent soil degradation caused by incorrect use of fertilizer and agricultural chemicals. Excessive use of fertilizers and pesticides to the root zone of the crops and their persistence in the soil are major reasons for soil degradation.

In the target area, multiplication of soil born pathogens is promoted by presence of residual of fertilizer and some chemical causing crop damage, particularly when drip irrigation is practiced in dry condition. To overcome the problems of soil born pests and disease, practices such as soil solarization, reduced use of fertilizer and chemicals, have been introduced through DARFs.

#### (5) Soil Solarization

The practice of soil solarization was successfully demonstrated in the DARFs, where the incidence of a number of important pests and diseases such as nematodes and fusarium has been reduced significantly. Majority of the farmers have adopted the method as an economical and effective alternative to use of more expensive chemicals for control of soil born pests and diseases.

### 5.2.2 Crop Cultivation, Livestock and Cycle-oriented Agriculture

#### (1) Crop Cultivation

Adaptive experiment and demonstration of crops, cultivars, recommended technologies, livestock, and cycle-oriented agriculture are practiced in / around the DARFs. The evaluation team questioned the JICA expert about degree of establishment of technology.

The rating for the evaluation is as follows; Very high: subject of crop, variety, and technology is ready for dissemination, High: subject of crop, variety, and technology is satisfactorily level but are still needed little verification, Fair: Subject of crop, variety, and technology is satisfactorily level but still needed more verification, and Low: subject of crop, variety and technology is not satisfactorily level yet. The result is shown in the Table 5-3.

Table 5-3 Degree of establishment of crops, varieties, and technologies

		Degree of establishment
Variety		
Squash		High
Cucumber		High
Crops		
Iceberg lettuce		Fair
Fennel		Very high
Thyme		Very high
Sage		Very high
Cluster Tomatoes		High
Cherry Tomatoes		High
Strawberry		Low
technology		
Training and pruning	Paprika	High
	Cucumber	High
Planting density	Grafted Watermelon	Fair

Triple cropping	Squash	High
Cultural pest control	Grafted watermelon	Fair
Cultural pest control	Grafted Cucumber	Fair
IPM (Reduction of chemical use)		High
IPM (Soil Solarization)		Very high
Global GAP		Fair

Source: Questionnaire results by the evaluation team.

The study team conducted direct observation of the DARFs and interviewed extension agents, Demo-farmers and Key-farmers to extract promising crops and varieties and technologies in vegetable production. The followings are major findings:

#### Strawberry

Strawberry is not cultivated in this Jordan River Rift Valley. Trial cultivation was performed in 2008; however, rainfall damaged it. Some data acquisition is still needed. If the cultivation technology is established, the crop will be promising one.

#### Fennel

Fennel has been already adopted by some farmers around the DARFs because of ease of cultivation and demand from the markets.

#### Soil solarization

Soil solarization does not use chemical to control soil born pest and diseases and thereby minimize the hazards and costs associated with pesticides use. It is one of the soil conservation technologies.

#### A cultivar of squash

One cultivar was identified as the best variety of squash by the Demo and Key farmers in the 4 DARFs because of its resistance against diseases, high yield, and good in shape and color. It is a promising variety.

#### A cultivar of cluster tomato

One cultivar of cluster tomato gives promising yield by proper training and pruning technology in greenhouses.

#### Training and pruning technology

Training and pruning technology developed on some vegetables like tomato, paprika and cucumber is promising. Stakeholders of the DARFs started adjusting relationship between training, pruning and planting distance to find out their good combination.

#### Grafted watermelon seedlings

Though the further experiment is still needed, it was found that the grafted watermelon seedling has high potential for wide adoption by farmers because of its resistance against diseases and high marketability. Watermelon has not been grown in the Jordan River Rift Valley lately due to high incidence of root born diseases, and bulk of the consumer demand in the area is met with Israel imports. The Project introduced grafting technology using a resistant cucurbit rootstock to produce good quality watermelon seedlings. The grafting technology has been duplicated by some participants of technical trainings from private sectors.

#### Commercialization of grafted seedlings and selection of rootstock

It is highlighted that several commercial nurseries have produced and sold grafted seedlings. They include 3 nurseries in Bethlehem, Tulkarem, and Hebron. In addition, a few others, one each in Jericho and Tubas, are preparing to produce grafted seedlings as well. Meanwhile, the researchers of NARC will start experiment on selection of suitable local wild variety of cucurbit to use as rootstock, which will reduce the cost of some vegetable production.

#### Greenhouse / Net-house

Most of the vegetables in DARFs are cultivated in greenhouse or net-house to control environment and protect crops from insect showing advantages comparing with on-field cultivation; however, the farmers' concern may be the cost for investment in the facilities.

## **(2) Livestock and Cycle-oriented Agriculture**

Same kind of evaluation by using questionnaire was done in the field of livestock and cycle-oriented technologies. Rating criteria is as same as the previous one. The answers from the expert are tabulated below.

Table 5-4 Livestock related and cycle-oriented agriculture

	Degree of establishment
Compost making	Low to Fair
Feed management	High
Breeding technology	Fair
Feed crops cultivation	Fair
Grass silage making	Low
Grass silage feeding	High
Feed block making	Need more verification

Source: Questionnaire results.

#### Compost making

The Bedouin people dispose droppings of sheep and manure is fed back to farms, therefore, there is potentiality to conduct cycle-oriented agriculture. Compost is the one of the examples. Compost making and use with manure of ruminant animals still need to do test trial for use in a certain economic scale.

#### Grass silage making and feeding

Grass silage will be promising silage if it can replace imported feed. The reason why the rating of grass silage feeding is high but low for grass silage making in the Table above is that an economic scale of production for silage has not been verified yet. Raw material like corn and vegetable residue are available from the farmers and thus local material can be utilized to produce low cost silage and thereby reduce cost of feed.

#### Self-sufficient feed for small ruminant animal

Self-sufficient feed will help in reducing cost of feed for small ruminant animals. According to the estimation for feeding 10 heads of sheep, the feed mixed with alfalfa, silage and purchased concentrate reduced about 650 US\$ compared to feed composed of purchased roughage and concentrate. Silage will be available around a year. The specialist in livestock in MOA stressed importance of self-made Total Mix Ration. Through conjunction of fodder production in the farm and reserved technology such as silage, the amount and dependent period of using purchased feed can be reduced and shortened, which draws an interest of the farmers.

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#### Feed crops production

Alfalfa is high potentiality to be used as roughage mixed with silage and concentrate for small ruminant animal. Alfalfa crop can be harvested 10 times a year and the total yield is ranged between 30 and 40 tons.

#### Improved Awasi sheep

The improved Awasi sheep are expected to give high efficiency milk production even in hot summer condition in the Jordan River Rift Valley.

### **5.3 Supportive Technical Fields for Farm Management**

#### **5.3.1 Agro-produce Distribution and Marketing**

Though activities of agro-produce and marketing were vague in PDM, relevant activities were carried out; (i) providing market price information as pilot project, (ii) Training on marketing, (iii) data accumulation and analysis of market information, and (iv) analysis of exporting agro-produce. In this part, providing whole sale market price information is focused on.

The wholesale price at Jericho is gathered by a hired person every morning except Thursday and is provided to the Project office which releases the information to web site of an enterprise called MAAN. Finally, radio station broadcasts the price information. As a result, Palestinian Garden, an exporter of Auja, started referring to the information when it negotiates with producers for buying. For the farmers, alternatives of selling destination increased; Jericho market or the exporter. Price competition among them was created. Therefore, the farmers can judge which wholesale they can deal with. Thus, it is an impact for the producers. This pilot project shows a good example of minimum intervention of government to improve marketing circumstances for the producers without disturbing market economy. Question is who will pay the cost of information delivery system to sustain the output of the pilot project in the future.

#### **5.3.2 Livelihood Improvement / Agro-processing**

Livelihood improvement /Agro-processing activities were not indicated clearly in the PDM. Relevant activities were carried out. In the field of livelihood improvement, there are two activities; (i) conducting base line survey and compiling Report on Baseline Survey for Livelihood Improvement in Jordan River Rift Valley, and (ii) introducing some Japan's experiences of livelihood improvement.

Though there are needs for income generation through agriculture among the beneficiaries, the base line survey extracted health / medical and educational issues. The Project has to discuss how the issues can be addressed in extension activities.

In the field of agro-processing, the Project supported two (2) women's groups; Women's Agricultural Cooperative Society, Jericho and Jiftlec Food Processing Cooperation, to strengthen their activities by introducing market-oriented agro-processing business as a pilot project through training and direct instruction by the JICA expert. The extension staff received OJT, being involved in the pilot effort, on facilitation for market oriented business enterprises.

Some improvements were seen in management and technical know-how for production in the group of Jiftlec Food Processing Cooperation and it plans to be accredited for PSI (Palestine Standard Institute). However, still some issues such as record keeping, work standardization for sale promotion, and collection of

market information are arisen for the group to establish sustainable management.

### **5.3.3 Microfinance**

In the field of microcredit, study, seminar and workshop were performed with MoA in the Project area and finally implications and recommendation on microfinance came out as follow.

- Improvement of Farmers Understanding on the Financial Management
- Overcoming the Issue of Collaterals
- Package of Credit and Agricultural Supports
- Linking Microfinance with the Income Generating Activities
- Promotion of Protected Agriculture Enhances Credit Opportunities
- Toward Healthier Environment on Agricultural Finance

Moreover, possibility for the beneficiaries to access to finance scheme of IFAD was disclosed.

### **5.3.4 ISO Standards**

Soil and Water Analysis Laboratory at NARC Jericho is targeted at ISO 17025 standard accreditation which is supported by the Project. According to the technician of the laboratory, the procedure to obtain ISO accredited by PSI (Palestine Standard Institute) is; (1) classification and arrangement of documents and formats, (2) arrangement and labeling of analytical apparatus, (3) dividing the laboratory space into sample preparation, chemical analysis, and physical analysis, (4) following ISO standard analytical process, and (5) 2 more technicians are allotted.

At this moment, remaining issues among them are; (i) dividing the laboratory space into sample preparation, chemical analysis, and physical analysis and (2) 2 more technicians are allotted.

### **5.3.5 Record Keeping for Sound Farm Management**

The Project introduced 'Farm Record' and the Demo- and Key-farmers were facilitated to maintain the data and inputs used such as machinery, labors, fertilizers, chemical and their cost and products sold in quantity and monetary value. Thus, the farmers would be cost conscious, leading to consider how they can reduce production cost by adopting improved technology or reallocation or replacing some inputs to maximize outputs. Economic balance using promising crops and new varieties and recommended technologies generating from DARFs is not verified yet beside technical feasibility.

## **6. Results of the Evaluation**

### **6.1 Relevance**

The aim of the Project has coincided with Policy of Ministry of Agriculture in Palestinian National Authority, local needs in target area, and Japanese development policy and program, as explained bellow. Therefore, the relevance of the Project is high.

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### **6.1.1 Policy of Palestinian National Authority**

According to “Palestinian Reform and Development Plan (PRDP) 2008-2010”, MoA continues to focus on agriculture/agro-industry development, which contribute economic recovery in the short term as well as enhancing food security. In addition, “Agricultural Medium Term Development Plan 2006-2008” has focused the followings issues; (1) improve rural livelihood, (2) promoting and strengthening the institutional structure and the legislative framework of the sector, (3) optimal exploitation of agricultural and natural resources, (4) increase and improve agricultural production in the market, and (5) enabling the private sector to contribute development of agricultural sector. Therefore, the aim of the Project, to strengthen the agricultural sector through establishing effective agricultural extension system by direct linkage between research and extension aligns with the Policy of Palestinian National Authority.

### **6.1.2 Local Needs in Target Area**

According to the result of interviews to farmers in the Project area, they had received very poor extension services to improve farming techniques to increase production. However, since the Project started, farmers have realized that extension agents often visited farms, and have supported to improve their farming conditions. Farmers are satisfied with and appreciate the services rendered by extension agents. Therefore, the needs for agricultural extension services are very high and the needs are consistent with the aim of the Project activities.

### **6.1.3 Japanese Development Policy and Program**

In year 2006, Government of Japan proposed the concept “the Corridor for Peace and Prosperity” in cooperation with Palestinians, Israelis and Jordanians. The concept is to work collaboratively to materialize projects that promote regional cooperation for the prosperity of the region, such as establishing an agro-industrial park in the West Bank and facilitating the transportation of goods. The Project is one of the interventions under this initiative which is consistent with the policy of Japanese Government.

As a result of the study undertaken by JICA on “the Jericho Regional Development Program”, a sector plan on “Agricultural and Agribusiness Development Program” was developed. The Project is under one of the sub-program of this program, and play important role to improve agricultural production through strengthening extension service of MoA.

## **6.2 Effectiveness**

The aim of the Project is “To establish a basis for the effective agricultural extension system through direct linkage between research and extension.” Through the Project activities, five DARFs have been established as platform to strengthen linkages and centers of efficient extension service. In each DARF, newly introduced varieties by efficient use of water have been demonstrated by farmers. The role and the function of stakeholders to organize efficient and effective extension service have been realized. In this point of view, the effectiveness of the Project is high.

### **6.2.1 Expectation to Reach the Project Purpose and Role of the Project**

Through several training of stakeholders and implementing activities, researchers from NARC, SMSs from

GDERD, extension agents from DoA, Demo-farmers, and Key-farmers have cooperated with each other and have been motivated to introduce new technologies and methods for improvement of farming in target area.

Consequently, stakeholders of research and extension have effectively shown their performances including the followings, which were not found before the Project started.

- (1) Researchers from NARC: They have been able to meet the farmers and grasp their farming problems and issues of farming in occasions of field visits and field days. Through this process, they have been able to coordinate with extension staff and contribute to planning, implementation and monitoring, and reporting.
- (2) SMSs from GDERD: They have recognized improvement of their knowledge and skills for communication with farmers effectively. Further, they have cooperated with researchers, especially in supervision and management assistance for DARFs from planning to implementing and monitoring, and finally joint reporting to taskforce.
- (3) Extension agents: They have enhanced communication skills to farmer and learnt farming methods such as variety selection experiment, adaptive experiment of crops, land preparation, soil solarization, soil analysis, and use of tensiometers among others. They have had confidence in the appropriate skills acquired to communicate with farmer.
- (4) Demo-farmers and Key-farmers: Demo-farmers have been practicing several new farming technologies and adapting new promising varieties as well. And, Demo-farmers and Key-farmers have realized importance of keeping record, knowing expenditure such as seeds and seedlings, land preparation, fertilizers, chemicals, and harvesting and revenue from sales of agro-produce.

### 6.2.2 Remaining Issues in the Project

Through operation and management of DARFs, researchers and extension staff in MoA have gathered much experience to work together, understand problems and issues, find solutions and facilitate farmers to improve their farming situation. However, the platform established to realize the objectives is still on the trial stage. Therefore, official arrangement to maintain continuance of participatory research and extension should be sought within MoA.

Additionally, although capacity of stakeholders has been improved through operation of DARFs, they still need to improve some skills and knowledge for effective operation of extension services. As for giving technical advices and guidance to farmers, researcher, SMSs and extension agents should exercise more coordination and understanding in order to avoid confusing instructions that may arise from individual opinion on some issues. Also, skills of researchers and extension staff on writing and presenting technical and field reports need improvement. On the other hand, the effectiveness of Demo-farmers and Key-farmers in mobilizing the other farmers around the DARFs must be enhanced. They are expected to play a major role in farmer to farmer extension and perform as leaders in the area

Marketing services for farmers are yet to be fully examined except providing market information on radio programs and web site as a pilot project.

### 6.3. Efficiency

Inputs for the Project provided by both the Palestinian and the Japanese sides have been generally

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appropriate and well utilized in order to accomplish the expected Outputs, particularly on the activities at DARFs. In this context, the Project was efficiently implemented.

### 6.3.1 Inputs by Japanese and Palestinian Sides

The planned inputs from the Japanese side were properly put into the Project in quantity and expertise on time. A wide range of Palestinian counterparts were appointed from GDERD, NARC and DoA in target area, who worked effectively to establish and operate DARFs in target the Project area.

However, delay of the installation of equipment for 4 DARFs other than Jericho DARF was pointed out in the Mid-term evaluation. Even though DARFs play various important roles, following issues and constraints were also observed. First, the working distances between MoA HQ, NARC and the Project office impeded frequent contact between the JICA experts and the Palestinian counterparts as the institutes are located far apart from each other. Second, military check-points hampered smooth travel of counterpart as well as other project related personnel in the Project activities. And third, the embargo on fertilizer and chemicals by Israel posed a serious problem in carrying out the activities of DARFs. However, despite of these obstacles, cooperation of stakeholders in the Project succeeded to produce the desired Outputs.

It is also noted that activities on supportive technical fields for farm management produced considerable results, which can provide important information for improving agricultural production. Although they have not been fully utilized yet within the Project, it is hoped that the results will be referred to in the future efforts.

### 6.3.2 Project Management

Regarding the management of the Project, official dialogues between the Palestinian counterparts and the JICA experts have been kept well. Six Joint Coordinating Committee Meetings were held so far, where important issues were discussed for smooth implementation of the Project. Taskforce was organized to manage each DARF and stakeholders have regularly discussed issues of adaptive research, extension services and agricultural techniques. In addition, Technical Committee was organized to deal with technical issues between researchers and SMSs for advising extension agents on technical issues.

## 6.4 Impact

The Overall Goal described in the PDM is placed on a very high level, and thus it would be rather difficult to achieve it within a few years after the Project Purpose is attained. It will be pursued from now on by the Palestinian side, but is expected to take further time. Nevertheless, some positive impacts of the Project shown bellow were found in some provinces, but no negative impact was identified.

### 6.4.1 Prospect of Achieving the Overall Goal

“To improve agricultural productivity of peasants/small farmers in order to realize “the Corridor for Peace and Prosperity”

Indicator1: Quality and Quantity of agricultural products of peasants/small farmers are improved.

Indicator2: Farm incomes of peasants/small farmers increase.

According to the result of interviews to extension agents, the number of farmers around DARFs who had interests on activities carried out by Demo farmers and Key farmers increased over the seasons. The number of farmers who tried one or more of the techniques demonstrated at DARFs is estimated as, more than 15 in Jericho, more than 30 in Ein el Beida, 20 in Jifolec, 15 in An Nassariya and more than 10 in Auja. However, these figures have not been examined for correctness by the Project. .

On the other hand, the Project has promoted farming methods for production of high quality and safe crops. Expansion of such production would be able to contribute to enhancement of the level of agricultural production of small farmers in the West Bank as stated in “the Corridor for Peace and Prosperity”.

#### **6.4.2 Other impacts**

##### **(1) Positive impact**

The following positive impacts were found;

- 1) Growing of watermelon using grafted seedlings has high potential for adoption because of its resistance against soil born diseases and a possible reduction in cost by using of local cucurbit root stock. Presently, almost all of watermelon is imported from Israel to Palestine. It is highlighted that some private nurseries have already started commercial production of grafted vegetable seedlings after being trained on the grafting techniques through seminars and workshops conducted by the Project.
- 2) An exporter of Auja has referred to and been conscious about the market price information before negotiating with farmers, because the exporter recognized the information already known to farmers through the Project sponsored radio program. It means that farmers have improved their market options and bargaining power when selling their products.
- 3) Some technical know-how has been expanded to several districts in the West Bank beyond the Project target area. For example, an extension agent in Tulkarm has introduced hygienic cheese making by following the training and demonstrations programs organized and conducted by the Project
- 4) A women’s cooperative named Jifolec Food Processing Cooperative which has been supported by the Project participated in the food processing exhibition in Hebron in July 2009. Their products such as Macdous and boiled white cheese were highly evaluated by other participants. Their products were sold out and received inquiries from a super market in Ramallah and a retailer in Hebron.

##### **(2) Negative impact**

No negative impacts were found during this terminal evaluation.

#### **6.5. Sustainability**

Through operating DARFs by researchers, SMSs, extension agents and farmers, an effective agricultural extension system has emerged at present. However, the practices of DARFs have not yet become an established official operational mechanism in MoA. Therefore, appropriate arrangement by MoA is still expected to sustain continuing role and function of the effective agricultural extension system.

##### **6.5.1 Policy and Institutional Aspect**



As mentioned in “6-1 Relevance”, “Agricultural Medium Term Development Plan 2006-2008” and “Palestinian Reform and Development Plan (PRDP) 2008-2010” of PNA recognized strengthening extension service is essential for enhancing food security in Palestine. In addition, new mid-term agricultural strategy named as “Shared Vision for Agricultural Sector Development” is being prepared, in which improving support services for farmers and agricultural sector institution is focused. In this regard, the outcome of the Project will be kept and followed in the framework of Agricultural Policy of PNA.

### **6.5.2 Organizational and Financial Aspects**

Effective coordination between research and extension in MoA has worked out in one framework through operation and management of DARFs as platform of stakeholders in the Project. However, such platform is still based on the practice. Therefore, official arrangement with adequate budgetary allocation to enable activities of participatory research and extension should be sought within MoA.

For Demo- and Key-farmers of DARFs, initial costs for farming were spent by the Project. On the other hand, dissemination of farming practices developed at DARFs to ordinary farmers may remain partial, because costs for full duplication requiring capital items such as tensiometers, greenhouses, etc., and inputs such as planting materials, fertilizers and pesticides are beyond their financial capacity.

### **6.5.3 Technical Aspect**

Researchers in NARC, SMS in GDERD, and extension agents in DoA have sustained their skills and knowledge which were acquired through activities in the Project. However, there exists the gap in recognitions between Palestinian counterparts and JICA experts about achievement level of such knowledge on farming. Therefore, it is necessary to clarify how to fill in the gap by the end of Project

Demo-farmers in the five DARFs are expected to maintain current skills and knowledge for their farming. Continual dialogue and support by extension agents would help to keep their performances. On the other hand, Key-farmers still need to absorb those skills and knowledge to be leading farmers who are expected to perform as leaders of the farmer to farmer extension. It is strongly hoped that effective extension services would be continued for them to catch up the level of Demo-farmers.

### **6.6 Conclusion**

Since the Project has introduced the DARF as a platform for participatory research and extension, the stakeholders concerned with extension system such as researchers from NARC, SMSs from GDERD, extension agents from DoA, Demo-farmers and Key-farmers have been given opportunities to work together and learn from each other in a cooperative manner in order to find out solutions of actual obstacles on the farms. Constant communications have drastically changed their behaviors and relationships among them in agricultural extension. Series of their practices at DARFs to be characterized by group approach as well as bottom up approach have already resulted in some promising improvements of agricultural techniques. Moreover, relevant information supporting agricultural production including marketing and finance has been accumulated by Project activities for dissemination to farmers. From these view points, it is concluded that the Project Purpose “To establish a basis for the effective agricultural extension system through direct linkage between

research and extension” is expected to be achieved by the end of the cooperation period.

However, to sustain and intensify such direct linkage between research and extension for effective extension system and to make it help improvement of livelihood of farmers in the Project area are further challenges. Capacities of the concerned stakeholders need to be more developed and a realistic and workable system of extension needs to be elaborated and institutionalized as a policy measure of MoA.

## **7. Recommendation and Lessons Learned**

### **7.1 Recommendation**

#### **7.1.1 Recommendation for Actions to be Made by the End of the Project**

(1) Technology transfer of know-how of planning, implementation and evaluation of training program to MOA

The Project planned, implemented and evaluated the series of lots of training and it developed training materials as well. The know-how of management for the series of training should be transferred to counterpart organization in efficient manner to sustain continuous capacity development of research and extension.

(2) Calculation of economic balance of introduced technology of DARFs

It is necessary to provide the farmers with information of profitability of the new promising varieties and recommended technologies to judge their potential from technical and economic point of view. The Project should focus more on stabilizing farmers’ economic condition and their well being. In this regard, farm record is regarded as an effective tool. In order that farmers feel it easier to keep farm records, it is recommended that the format should be scrutinized and unnecessary parts should be excluded for its simplification.

(3) Compiling the guidelines for managing participatory research and extension

Role and function of stakeholders to operate and manage participatory research and extension was articulated through the experience of DARFs. For sustaining the result of the experience by stakeholders, the guidelines for managing participatory research and extension are necessary.

(4) Organizing dissemination seminar to share the experience with other concerned stakeholders

The Project produced several outcomes throughout the activities to realize participatory research and extension in target areas. Therefore, it is recommended to share the experience of the Project through dissemination seminars with stakeholders interested in agriculture in Palestine.

(5) Distribution of Farmers Information Leaflets

The Project has prepared the Farmers Information Leaflets. They should be distributed to farmers immediately in the Project activities.

#### **7.1.2 Further Organizational Arrangement for Strengthening Relation between Research and Extension**

(1) Maximizing NARC’s contribution

Researchers’ contribution to operate DARFs is appreciated. It is realized that adaptive research is necessary before dissemination of technology to the farmers. Therefore, it is recommended to give

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encouragement to researchers and reasonably evaluate their role for maximizing NARC's contribution to extension.

(2) Mechanism assuring effective extension based upon the achievement of the Project

DARFs have been able to strengthen relationship among all the stakeholders by providing them with face-to-face working opportunities. Sustaining the existing five DARFs and expanding them to other regions may be one option for MoA to improve overall extension system of PNA. If the option will be taken up, MoA is highly recommended to allocate necessary financial as well as human resources for that purpose. In case that MoA cannot afford to maintain DARFs approach, another kind of feasible mechanism should be sought out and institutionalized in MoA. It should be stressed that firm commitment of all the concerned stakeholders within MoA, including General Directorate of Technical Issues and thoughtful tactics are needed in the process of designing such a mechanism.

(3) Measures to reinforce extension system

The Project has touched upon such issues which can multiply effects of improved extension system as market information dissemination, livelihood improvement and micro-credit. Those issues are regarded as enabling environments for better agricultural production of farmers. It is recommended to take appropriate measures to follow those issues by fully utilizing experiences and reports of the Project.

**7.1.3 Consideration for Future Support to Follow up the Project by Japanese Side**

Attention should be paid to the fact that the Project has merely created "a basis for the effective extension system". To develop that basis and to elaborate useful devices for effective extension system so that recommended technologies can reach end farmers still remains a substantial challenge. Improved extension services have not been widely distributed yet. Bearing such current conditions in mind, it is strongly recommended that the Palestinian official request for further technical cooperation will be seriously considered by the Japanese side.

**7.2 Lessons Learned**

- 1) Because the Project adopted "Fast-track system", details of the Project were not strictly defined at the launching time. This has granted flexibility and rooms for maneuvers to the Project for producing achievements within a short time of period. On the other hand, basic documents such as Project Design Matrix and Plan of Operations failed to reflect in time realities of the Project and thus monitoring and evaluation of the Project have faced certain confusion. It should be noted that "Fast-track system" may create positive as well as negative effects and close attention is necessary for appropriate project management by minimizing such negative effects.
- 2) Since the beginning, the Project has clearly exhibited its strategy, that is "participatory research and extension", and two approaches namely "group approach" and "bottom-up approach" has been applied for attaining the strategy. The fact that the unshakable strategy and its approaches have been repeatedly presented throughout the Project operation has contributed a lot to fostering teamwork among multiple

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stakeholders from different organizations and to producing substantial results in a short time.

- 3) One of the most remarkable inventions of the Project is a setting-up of DARFs as a platform where concerned stakeholders jointly work on the ground for the sake of the beneficiaries. The experiences made them notice their own roles in extension and learn importance to supplement each other. This very unique and Japanese, in a sense, measure has been effective. Although operation of DARFs itself may have difficulties to be sustained and continued in a long run due to several reasons, the device can not be under-evaluated because it certainly generated quick impacts. As such, interim measures may be worth consideration to achieve project purpose in some specific circumstances.



## Schedule of the Terminal Evaluation

Date	Day	Time	Activity	Place
Dec. 1	Tue.		Departure from Japan	
Dec. 2	Wed.	10:20 14:30	Courtesy Call on JICA Palestine Office, Briefing from JICA Palestine Office Move to ASAP PJ Office, Meeting with ASAP team	JICA Tel Aviv Office ASAP PJ Office
Dec. 3	Thu.	8:20 14:00	Meeting with ASAP, Collecting Questionnaire and Additional Documents, Interview ASAP Experts Visiting MoA, Interview to Project Director and Project Manager	ASAP PJ Office MoA in Ramallah
Dec. 4	Fri.	8:20	Interview ASAP Experts, Collection of data and documents	ASAP PJ Office
Dec. 5	Sat.	8:30~17:00	Field Visit for five DARFs (An Nassariya, Ein El Beida, Jiftlik, Auja, and Jericho), Interview to Demo farmers & Key Farmers	An Nassariya, Ein El Beida, Jiftlik, Auja, Jericho
Dec. 6	Sun.	9:00 10:00 13:30	Courtesy Call on MoA in Ramallah, Deputy Minister, Dr. Azzam / (Confirmed) Meeting with Joint Eva. PNA Team Meeting with CP (MoA), (DARFs Supervisors (5), Mr. Mustafa / Mr. Said / Mr. Imad / Mr. Bassem) Meeting with CP (MoA), (Mr. Osama / Ms. Reem / Ms. Saffa / Dr. Shwaika)	MoA HQ in Ramallah MoA Ext. Meeting Room MoA Ext. Meeting Room
Dec. 7	Mon.	10:00~ 14:00	Meeting with CP (NARC), (Dr. Tawfiq / Dr. Aziz / Dr. Iyad / Mr. Ahmed / Mr. Ammar)	NARC HQ in Kabatia
Dec. 8	Tue.	9:20 9:40 13:00	Visit NARC Jericho Lab. (ISO17025) Visit Nursery (Grafting) Visit Field Day (Silage Evaluation) Visit Livelihood Activity	NARC Jericho Jericho Auja Jiftlik
Dec. 9	Wed.	8:00 10:00 13:30	Visit Jericho Market Visit Visit Agro-Process Activity Visit Field Day (Compost Making)	Jericho Market Ein El Beida Tubas North, Fasayel
Dec. 10	Thu.	9:00 11:00	Interview CP (Furuta) Report Making at ASAP PJ Office	Jericho Int. Hotel ASAP PJ Office
Dec. 11	Fri.	9:00	Report Making at ASAP PJ Office (Other Japanese member: Departure from Japan)	Jericho Int. Hotel ASAP PJ Office
Dec. 12	Sat.	12:00 12:30	Meeting with JICA Team and ASAP Internal Meeting	Jericho Int. Hotel JICA Jericho FD Office
Dec. 13	Sun.	9:00 10:00 12:00	Courtesy Call on MoA in Ramallah (Deputy Minister) Meeting with Joint Eva. PNA Team Meeting with JICA Team (Palestine Office)	MoA HQ in Ramallah MoA Ext. Meeting Room JICA Ramallah FD Office
Dec. 14	Mon.	9:30 10:00 14:00	Field Visit for Auja DARF Meeting with MoP Meeting with EoJ (at Ramallah FO)	ASAP PJ Office Ramallah FD Office
15	Tue.	10:00 12:00	(Team 1) Meeting with NARC HQ Field Visit for two DARFs	East Jerusalem Ramallah ASAP PJ Office
		10:00	(Team 2) Visit and Interview to FAO, Interview Donor (DANIDA) Report Making	An Nassariya, Ein El Beida, Jiftlik, Auja, Jericho
16	Wed.	10:30	Report Making and Additional Interview CP	ASAP PJ Office
17	Thu.	9:00	Interview to JICA experts	ASAP PJ Office
18	Fri.	9:20	Report Making and / or Internal Meeting	ASAP PJ Office
19	Sat.	9:20	Report Making and / or Internal Meeting	ASAP PJ Office
20	Sun.	10:00 15:00	Meeting with Joint Eva. PNA Team (MM Discussion) Report Making and / or Internal Meeting	MoA Ext. Meeting Room ASAP PJ Office
21	Mon.	10:00 12:00 15:00 16:30	JCC Meeting, (ASAP+JCC Members +Joint Eva. PNA Team) Signing MM Report to JICA Palestine Office Report to EoJ	Hotel in Ramallah JICA Tel Aviv Office EoJ, Tel Aviv
22	Tue.	8:15	Leaving to Japan (AF2221)	

Project Design Matrix (PDM)

The Project on Strengthening Support System Focusing Sustainable Agriculture in Jericho and the Jordan River Rift Valley (ASAP)  
 Project Area: Jericho and the Jordan River Rift Valley, Target Groups: Extension Subject Matter Specialists (ESMS), Extension Agents, Researchers of NARC and The Peasants/Small Farmers in the project area, Project Period: 2007 to 2010 (3 years)

	Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions (Externalities)
<b>Overall Goals</b>	To improve agricultural productivity of peasants/small farmers in order to realize "the Corridor for Peace and Prosperity".	<ul style="list-style-type: none"> <li>- Quality and Quantity of agricultural products of peasants/small farmers are improved.</li> <li>- Farm incomes of peasants/small farmers increase.</li> </ul>	<ul style="list-style-type: none"> <li>- Socioeconomic survey (reports)</li> <li>- Agricultural statistics of MoA</li> </ul>	<ul style="list-style-type: none"> <li>- Political situation of Palestinian National Authority (PNA) will not be changed.</li> </ul>
<b>Project Purpose</b>	To establish a basis for the effective agricultural extension system through direct linkage between research and extension.	<ul style="list-style-type: none"> <li>- The demonstration and agricultural research farms are operated by both researchers and extension agents.</li> <li>- Variety and number of extension activities are increased as the result of a wide range of research and through the collaboration between research and extension</li> </ul>	<ul style="list-style-type: none"> <li>- Progress reports and records of activities of NARC, Extension and rural development dept, related branch offices of MoA</li> <li>- Annual reports of NARC, Extension and rural development dept, related branch offices of MoA,</li> </ul>	<ul style="list-style-type: none"> <li>- Policy of PNA remains unchanged.</li> <li>- Assistance of PNA to the project will not discontinue.</li> <li>- Farmers in the project area are ready to receive technologies transferred by extension agents.</li> </ul>
<b>Outputs</b>	1. The research for cycle-oriented agriculture, water saving agriculture and soil conservation are practiced in consideration of the technology suitable for indigenous conditions.  2. The extension activity by ESMS and Extension Agents brisk up.  3. The peasants/small farmers in the project sites start executing cycle-oriented agriculture, water saving agriculture and soil conservation.	<ul style="list-style-type: none"> <li>- The number of research themes which are carried out by MoA and NARC increases.</li> <li>- The number of research reports and papers published by MoA and NARC increases.</li> <li>- The number and quality of technology based on the research results of MoA and NARC, which are applicable for agricultural extension are improved.</li> <li>- The frequency of extension activities increases.</li> <li>- The number of extension agents who can extend the results of research increases.</li> </ul>	<ul style="list-style-type: none"> <li>- Research reports and research papers of NARC</li> <li>- Annual reports of NARC</li> <li>- Interview to researchers</li> <li>- Follow-up reports of extension activities of MoA</li> <li>- Annual reports of MoA</li> <li>- Interview to farmer</li> <li>- Interview to ESMS and extension agent</li> <li>- Evaluation of ability of staff (paper examinations and practical tests)</li> <li>- Interview to farmers (oral examinations)</li> <li>- Questionnaire survey to farmers</li> <li>- Field survey</li> </ul>	<ul style="list-style-type: none"> <li>- Counterparts turnover will not be critical.</li> </ul>

Activities	introduce recommended technologies increases.	[Palestinian Side]	Demand of agricultural commodities and quality of products in the markets will not be varied drastically. Prices of agricultural products will not be significantly dropped.
<p>0)-1 Formulate the taskforce/committees for the project implementation while paying attention to collaboration between research and extension.</p> <p>0)-2 Review the past and existing research and extension activities in the project sites.</p> <p>0)-3 Conduct base line surveys in the project sites.</p> <p>0)-4 Prepare a detailed plan of operation.</p> <p>0)-5 Select farmers for demonstration and agricultural research for new technologies and crops</p>	<p>Input [Japanese Side]</p> <p>Japanese Experts:</p> <p>(1) Long term experts</p> <p>1) Team Leader / Field Irrigation / Water Management</p> <p>2) Farm Management / Extension</p> <p>(2) Short term experts</p> <p>Short term experts will be dispatched when necessity arises for the smooth implementation of the project.</p> <p>Trainings:</p> <p>(1) Trainings abroad</p> <p>1) Trainings of Palestinian personnel in Japan (researchers and extension agents)</p> <p>2) Training of Palestinian personnel in the third countries (researchers and extension agents)</p> <p>3) Training of Palestinian personnel in Palestine and neighboring countries (farmers)</p> <p>(2) Workshops and seminars</p> <p>Workshops and seminars will be held when necessity arises for the smooth implementation of the technology transfer and information sharing.</p> <p>Equipments</p> <p>(1) Equipment for conducting research as follows; cycle-oriented agriculture, saving water</p>	<p>(1) Appointment of Counterparts of Japanese experts</p> <p>(2) Offices and other necessary facilities for the Japanese experts</p> <p>(3) Other facilities mutually agreed upon as necessary</p>	<p>-</p> <p>-</p>
<p>1)-1 Research new crops of which introduction to the project site is promising.</p> <p>(1)-2 Propose the above mentioned new promising crops.</p> <p>(1)-3 Research cycle-oriented agricultural technology and systems.</p> <p>(1)-4 Propose the above mentioned technology and systems.</p> <p>(1)-5 Research the technology and systems for the water saving agriculture and soil conservation.</p> <p>(1)-6 Propose farming methods based on the above.</p> <p>(2)-1 Identify needs and themes in terms of extension activities.</p> <p>(2)-2 Improve education and training curriculums for extension agents and reinforce a system for a implementation of them.</p> <p>(2)-3 Modify and improve the existing guidelines.</p>			

ANNEX 2

<p>manuals and extension materials.                  (2)-4 Train extension agents.                  (3)-1 Offer the technology and know-how necessary for peasants/small farmers through extension activities (OJT) and training, which include operation of demonstration and agricultural research farms.                  (3)-2 Improve functions of "the system of extension from farmer to farmer" and "the farmer's field school" through the extension activities (OJT) including operation of demonstration and agricultural research farms.                  (3)-3 Conduct small scale production activities focusing on women, who are concerned with demonstration and agricultural research farms.                  (3)-4 Support acquisition of available micro credit.</p>	<p>agriculture, Soil conservation and introduce new promising crops                  (2) Equipment for conducting extension and training activities                  (3) Vehicles                  (4) Other equipment mutually agreed upon as necessary</p>	<p>Pre conditions                  - Implementation (related structure government organizations) will remain unchanged.                  - Budget for Project will be allocated as planned.</p>
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## Plan of Operation (PO)

Activities	Expected Results	Time Schedule				Remarks (Objective)
		2007	2008	2009	2010	
1-1 Research new crops of which introduction to the project site is promising.						
1-2 Propose the above mentioned new promising crops.						
1-3 Research cycle-oriented agricultural technology and systems.						
1-4 Propose the above mentioned technology and systems.						
1-5 Research the technology and systems for the water saving agriculture and soil conservation.						
1-6 Propose farming methods based on the above.						
2-1 Identify needs and themes in terms of extension activities.						
2-2 Improve education and training curriculums for extension agents and reinforce a system for a implementation of them.						
2-3 Modify and improve the existing guidelines, manuals and extension materials						
2-4 Train extension agents.						
3-1 Offer the technology and know-how necessary for peasants/small farmers through extension activities (OJT) and training, which include operation of demonstration and agricultural research farms.						
3-2 Improve functions of "the system of extension from farmer to farmer" and "the farmer's field school" through the extension activities (OJT) including operation of demonstration and agricultural research farms.						
3-3 Conduct small scale production activities focusing on women, who are concerned with demonstration and agricultural research farms.						
3-4 Support acquisition of available micro credit.						

## Dispatch of JICA Experts

## 1) Long term experts

No.	Name of Expert	Field	Period of Assignment					Total
			From	To	2007	2008	2009	
1	Mr. Yoshihiko OGATA	Team Leader/Field Irrigation/Water Management	March 2007	March 2010	6.0	8.5	7.5	22.0
2-1	Mr. Hisayasu SATOH	Farm Management/Extension	April 2007	June 2007	2.0			2.0
2-2	Mr. Lalith DEVASIRI	Farm Management/Extension	Oct 2007	March 2010	2.0	8.0	7.1	17.1
2-3	Ms. Masae Sumikoshi	Institute Building and Capacity Development / Project Coordinator	Oct 2007	March 2010	2.5	12.0	12.0	26.5
								67.6

## 2) Short-term Japanese Experts

No.	Name of Expert	Field	Period of Assignment					Total
			From	To	2007	2008	2009	
1	Mr. Masayoshi ISSIKI	Protected Horticulture	Aug. 2007	Feb. 2008	3.5	1.0		4.5
2	Mr. Kunio INOUE	Protected Horticulture	Aug. 2008	March 2010		3.0	3.0	6.0
3	Mr. Iwami ORITA	Animal Husbandry	Aug. 2007	Sep. 2007	1.0			1.0
4	Mr. Naoki KOGA	Animal Husbandry	Jan. 2008	Dec. 2009		5.0	5.0	10.0
5	Mr. Yasunobu KUDO	Distribution/Marketing	Jul. 2007	Dec. 2009	1.0	3.0	5.5	9.5
6	Mr. Akeshi MORI	Income Generation/Livelihood Improvement	Jan. 2008	Dec. 2009		4.5	3.0	7.0
7	Ms. Mikiko TSURUI	Micro Credit	Feb. 2009	Jul. 2009			2.5	2.5
8	Ms. Tomoko NARAMOTO	Lecturer (Livelihood Improvement)	Jul. 2009	Aug. 2009			0.3	0.3
								40.8

## Provision of Equipment by Japanese side

No.	Date of Arrival	Description			Amount	Unit Price (US\$)	S-total (US\$)	Place of Storage
		Item	Manufacture	Model Number				
1	2008/5/4	Desktop Computer	Dell	Inspiron 530s	5	1,360	6,800	MoA of Ramallah, Jericho, Auja, Jiftlik, NARC Jericho
2	2008/5/4	PC Software (Photoshop)	Adobe	Design Standard	2	1,800	3,600	MoA Ramallah, NARC Jericho
3	2008/5/4	Color Inkjet Printer	HP	F2180	2	70	140	MoA Auja, Jiftlik
4	2008/5/4	Black Ink for Printer	HP		16	18	288	MoA Auja, Jiftlik
5	2008/5/4	Color Ink for Printer	HP		16	20	320	MoA Auja, Jiftlik
6	2008/5/4	A3/4 Black&White Laser Printer	HP	LaserJet 5200	2	1,585	3,130	MoA Jericho, NARC Jericho
7	2008/5/4	Toner for Laser Printer	HP		12	180	2,160	MoA Jericho, NARC Jericho
8	2008/5/4	LCD Projector with Screen	Canon	LV 7255	2	1,520	3,040	MoA Ramallah, NARC Jericho
9	2008/5/4	Fax Machine	Xerox	F110	2	270	540	MoA Jericho, NARC Jericho
10	2008/5/4	Toner for Fax Machine	Xerox		8	130	1,040	MoA Jericho, NARC Jericho
11	2008/5/4	UPS	Aplirex		5	200	1,000	MoA of Ramallah, Jericho, Auja, Jiftlik, NARC Jericho
12	2008/5/4	A4 Scanner	HP	5590	4	480	1,920	MoA of Ramallah, Jericho, Auja, Jiftlik, NARC Jericho
13	2008/5/4	Digital Camera with Carry Case	Canon	Power Shot A550	4	184	736	MoA of Jericho, Auja, Jiftlik, NARC Jericho
14	2008/5/4	Digital Video Camera with Carry Case	Canon	DC210	2	550	1,100	MoA Jericho, NARC Jericho
15	2008/5/4	Black&White Copy Machine	CANON	IR3025N	2	4,774	9,548	MoA Ramallah, NARC Jericho
16	2008/5/4	Generator	Robin		1	1,662	1,662	ASAP Office
17	2008/5/4	Tent			6	185	1,110	ASAP Office
18	2008/5/4	Megaphone	SHOW	ER-66SD	2	105	210	ASAP Office
19	2008/5/4	Wireless Microphone VHF	PRO	WM-757	1	140	140	ASAP Office
20	2008/5/4	Wireless Microphone UHF	PRO	UHF-02	1	200	200	ASAP Office
21	2008/5/4	Sound System for Wireless Microphone	ProTech		1	700	700	ASAP Office
22	2009/2/24	Desktop Computer	Dell	Inspiron 530s	2	1,420	2,840	MoA Tubas, An Nasariya
23	2009/2/24	Anti Virus Software			2	40	80	MoA Tubas, An Nasariya
24	2009/2/24	Inkjet Color Printer A4	HP	F2180	2	75	150	MoA Tubas, An Nasariya
25	2009/2/24	Black Ink	HP		16	21	336	MoA Tubas, An Nasariya
26	2009/2/24	Color Ink	HP		16	22	352	MoA Tubas, An Nasariya
27	2009/2/24	UPS	Partner	pc Prpc 1550	2	220	440	MoA Tubas, An Nasariya
28	2009/2/24	ScannerA4	HP	5590	2	520	1,040	MoA Tubas, An Nasariya
29	2009/2/24	Digital Camera	Canon	Power Shot A550	2	210	420	MoA Tubas, An Nasariya
30	2008/3/	Desktop Computer	Dell	Inspiron 530s	1	1,360	1,360	ASAP Office
31	2008/3/	Laptop Computer	Dell	Inspiron 1520	2	1,745	3,490	ASAP Office
32	2008/3/	PC Software (Photoshop)	Adobe	Design Standard	1	1,800	1,800	ASAP Office
33	2008/3/	Color Laser PrinterA3/4	XEROX	Phaser7400	1	3,140	3,140	ASAP Office
34	2008/3/	Black Toner for Printer	XEROX		8	180	1,280	ASAP Office
35	2008/3/	Color Toner for Printer (Yellow, Cyan, Magenta)	XEROX		24	180	4,320	ASAP Office
36	2008/3/	A3/4 Black & White Laser Printer	HP	LaserJet 5200	1	1,565	1,565	ASAP Office
37	2008/3/	Toner for Laser Printer	HP		6	180	1,080	ASAP Office
38	2008/3/	LCD Projectorwith Screen	Canon	LV 7255	1	2,100	2,100	ASAP Office
39	2008/3/	Fax Machine	Brother	1360	1	170	170	ASAP Office
40	2008/3/	Cartridge for Fax Machine	Brother		4	50	200	ASAP Office
41	2008/3/	UPS	Aplirex		1	200	200	ASAP Office
42	2008/3/	A4 Scanner	HP	5590	1	515	515	ASAP Office
43	2008/3/	A3 Scanner	EPSON	GT-15000	1	1,730	1,730	ASAP Office
44	2008/3/	Digital Camerawith Carry Case	Canon	Powershot SX100is	1	380	380	ASAP Office
45	2008/3/	Digital Video Camerawith Carry Case	Panasonic	HDC-DX1	1	1,650	1,650	ASAP Office
46	2008/3/	Black&White Copy Machine	CANON	IR3025N	1	4,774	4,774	ASAP Office
47	2008/3/	Generator	Robin		1	1,662	1,662	ASAP Office
48	2008/3/	GPS Data Logger	GlobalSAT	DG100	2	499	998	ASAP Office
49	2008/3/	GPS	Garmin	eTrex Vista	2	734	1,468	ASAP Office
50	2008/3/	GPS	Garmin	Geko201	4	290	1,160	ASAP Office
51	2008/4/	Vehicle for Field Activity	MAZDA	BT-50	1	34,527	34,527	ASAP Office
52	2008/3/	Vehicle for Mobile Extension Activity	HYUNDAI	SANTAFé	1	32,000	32,000	ASAP Office
53	2008/3/	Improved Awasee Sheep (Ewes)			9	350	3,150	Jericho DARF
54	2008/3/	Improved Awasee Sheep (Rams)			1	400	400	Jericho DARF
55	2008/3/	Head Control	Netafim		1 set	13,222	13,222	Jericho DARF

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56	2008/3/	Yellow Traps			360	2	540	DRAFS (Jericho, Auja, Jiftlik)
57	2008/3/	Magnifier			15	15	225	ASAP Office
58	2008/3/	Balance (capable of 250kg weight)			3	550	1,650	DRAFS (Jericho, Auja, Jiftlik)
59	2008/3/	pH Meter			3	150	450	DRAFS (Jericho, Auja, Jiftlik)
60	2008/3/	EC Meter			3	150	450	DRAFS (Jericho, Auja, Jiftlik)
61	2008/3/	Auger	AKFIF	WISCONSIM	6	50	300	DRAFS (Jericho, Auja, Jiftlik)
62	2008/3/	Mini Tension Infiltrrometer			3	700	2,100	DRAFS (Jericho, Auja, Jiftlik)
63	2008/3/	Tension Meter (Jetfill) 30cm	IRROMETER		21	120	2,520	DRAFS (Jericho, Auja, Jiftlik)
64	2008/3/	Tension Meter (Jetfill) 60cm	IRROMETER		21	140	2,924	DRAFS (Jericho, Auja, Jiftlik)
65	2008/3/	Manual Sprayer (15L)	Farmate		6	100	600	DRAFS (Jericho, Auja, Jiftlik)
66	2008/3/	Motor Sprayer (100L)			3	1,500	4,500	DRAFS (Jericho, Auja, Jiftlik)
67	2008/3/	Tunnel Galvanized Wires (2m, ID 3mm)			1,800	2	3,600	DRAFS (Jericho, Auja, Jiftlik)
68	2008/3/	Spade			3	150	450	DRAFS (Jericho, Auja, Jiftlik)
69	2008/3/	Desicator (ID 25cm)	PolyLab		1	597	597	NARC Jericho
70	2008/3/	Centrifuge	HERMLE	2300	1	3,200	3,200	NARC Jericho
71	2008/3/	Soil Dispersing Stirrer	ELGA	LA611	1	432	432	NARC Jericho
72	2008/3/	Hydrometer with Bouyoucos Scale	ASTM Soi Hydrometer	152H	1	95	95	NARC Jericho
73	2008/3/	Water Purification System with Filter			1	7,705	7,705	NARC Jericho
74	2008/3/	Micro Climatic Station	Netafim		2	6,000	12,000	Jericho DARF
75	2008/3/	Main Irrigation System	Netafim		27set	389	10,498	DARFs (Jericho, Auja, Jiftlik)
76	2008/3/	Drip Irrigation System	Netafim		27set	591	15,957	DARFs (Jericho, Auja, Jiftlik)
77	2008/3/	Fodder Chopper			1set	2,500	2,500	Jericho DARF
78	2008/3/	Hooves Trimming			3set	100	300	DRAFS (Jericho, Auja, Jiftlik)
79	2008/3/	Movable Milking Machine	KRAL		3set	1,500	4,500	DRAFS (Jericho, Auja, Jiftlik)
80	2008/3/	Suckling Machine			3set	1,000	3,000	DRAFS (Jericho, Auja, Jiftlik)
81	2008/3/	Stainless Steel Milk Bottle (30L)			6	75	450	DRAFS (Jericho, Auja, Jiftlik)
82	2008/3/	Applicator			3set	10	30	DRAFS (Jericho, Auja, Jiftlik)
83	2008/3/	Trimming Machine			3set	100	300	DRAFS (Jericho, Auja, Jiftlik)
84	2008/3/	Silage Holes			60	120	120	DRAFS (Jericho, Auja, Jiftlik)
85	2008/3/	Shack			1	1,100	1,100	Jericho DARF
86	2009/3/	Tensiometer with ceramic head and gauge readings 0-100 centibars			50	107	5,338	DRAFS (Jericho, Auja, Jiftlik, Nassarya, Ein Balda) Record Keenino Farmers
87	2009/3/	Manual Back Sprayer (16-18 L)			15	90	1,350	DRAFS (Jericho, Auja, Jiftlik, Nassarya, Ein Balda) Record Keenino Farmers
88	2009/3/	Sprinklers with Accessories			120	8	960	Auja DARF
89	2009/3/	Black HDPE Plastic Pipe (ID 50 mm)			1,100	2	1,815	Auja DARF
90	2009/3/	50 mm Starter			15	8	126	Auja DARF
91	2009/3/	75 mm/ 2"			15	40	607	Auja DARF
92	2009/3/	50 mm End			15	8	126	Auja DARF
93	2009/3/	Drill Bit 7.5 mm			2	-	-	Auja DARF
94	2009/3/	Galvanized Pipes 2*3.5 meter			100	15	1,500	Jiftlik DARF
95	2009/3/	Pipes (Base Cement Blocks)			100	6	580	Auja DARF
96	2009/3/	50% Net Mesh White (45 meter long and 40 meter wide)			3,600	1	3,960	Auja DARF
97	2009/3/	Steel Multi- Wire (Twisted ) 5 mm Cable			1,200	1	600	Auja DARF
98	2009/3/	Galvanized Wire 2.5 mm			100	2	200	Auja DARF
99	2009/3/	Steel Arms of 1.5 meter long			56	4	224	Auja DARF
100	2009/3/	Steel Cable Joints			200	1	200	Auja DARF
101	2009/3/	Steel Bars (8 mm and 3 long)			500	2	1,000	Auja DARF
102	2009/3/	Outdoor Toilet (Global GAP standards)			5	728	3,640	DRAFS (Jericho, Auja, Jiftlik, Nassarya, Ein Balda)
103	2009/3/	French Tunnels			3	4,380	13,140	DRAFS (Jericho, Auja, Jiftlik, Nassarya, Ein Balda)
104	2009/3/	Trailer	Bassamco	2009	1	9,000	9,000	ASAP Office

Total: 290,841 US\$  
Rate&Date: 30,881,526 JPY (Exchange rate of March 2009)



## Local Cost Allocated by Japanese Side

No.	Category	FY.2007	FY.2008	FY.2009	Unit: Japanese Yen	
					Amount	Amount
1	Trainings	3,515,000	3,312,000	4,528,000		11,355,000
2	Transportation, Lodging and Perdiem	1,643,000	2,131,524	2,609,000		6,383,524
3	Printing	928,000	1,400,000	1,900,000		4,228,000
4	Radio Broadcast				550,000	550,000
5	DARF expenses (consumable inputs)	2,380,000	5,500,000	4,500,000		12,380,000
	Total	8,466,000	12,343,524	14,087,000		34,896,524

## Assignment of Counterparts by Palestinian Side

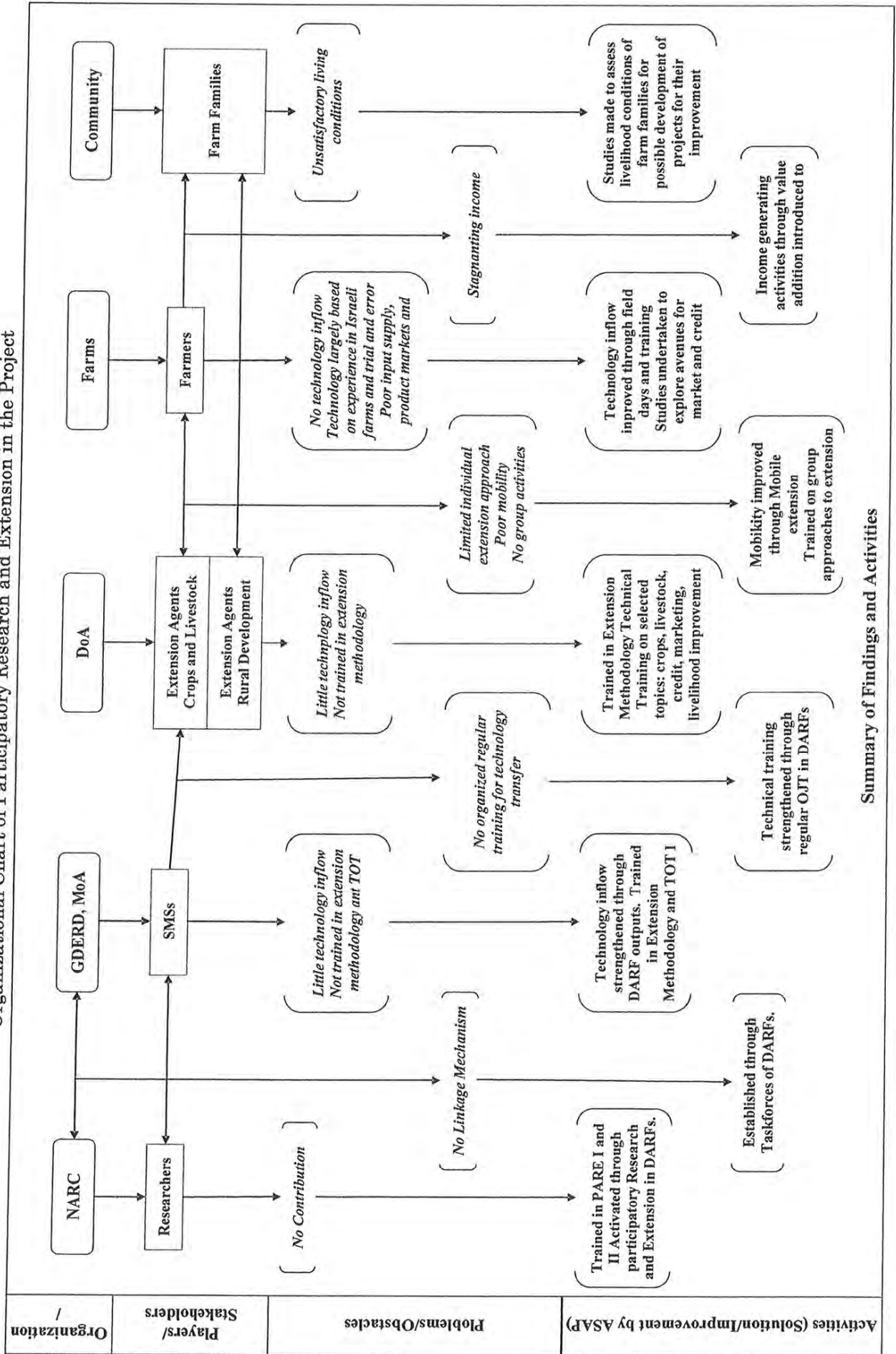
No.	Name of Counterpart	Field	Present Post	Date of Assignment	
			Post at assignment time		
1	Tawfeq Alqubag	PHD Plant production and Protection	Researcher NARC HQ	May	2007
2	Ahmad Rabaia	Economic	Dir. Rural Development NARC HQ	May	2007
3	Aziz Salameh	PHD plant Breeding	Biotechnology dept. researcher/NARC HQ	May	2007
4	Ammar Housain	Analyticalchemistry	Dir. Natural Resource Div/ NARC	May	2007
5	Ahmad Amarneh	Researcher	Researcher Plant production and protectionNARC HQ	May	2007
6	D.Zeyad Feddah	Field crops	NARC HQ Act.DG. NARC	Sep	2009
7	Iyad Badran	livestock/ Poultry	Livestock Researcher/NARC HQ	Jan	2009
8	Abdallah Lahlouh	Agriculture Economy	MoA DG of Planning and Policies DG. Extension and Rural Development	May	2007
9	Ashraf Barakat	Horticulture General	Senokrot Hdiv.Horticulture/ GDERD	May	2007
10	Osama Doleh	livestock	MoA Dir. Livestock/ Extension	May	2007
11	Mohammad Saed A	Horticulture General	Dir. Vegetable and flowers dept.	May	2007
12	Basem Hamad	Horticulture General	Dir. Planning Extension	May	2007
13	Safa' Bses	Food Processing	Dir. Rural Development Dept	May	2007
14	Mustfa Brakat	plant protection	Dir. Of plant protection	May	2007
15	Reem Fathi	Livestock	Hdiv. Poultry estesion	May	2007
16	Imad Ghanmeh	Head of Div.	Hdiv. Soil dept.	May	2007
17	Tareq Abu Laban	BA	MoA Dir. Marketing dept.	May	2007
18	Ahmad Shwikeh	Agriculture Economy	Dir. Of international cooperation dpt.	Nov	2008
19	Kasem abdo	Soil science	GD of Soil and Irrigation	May	2007
20	D.Azzam Tubilih	Field crops	Deputy Minister of Agriculture	May	2007
21	Hanin Almasri	Plant productiona and Protection	Gender Unit/ MoA Hdiv. Rural Development dept.	May	2007
22	Ahmed Faris	Plant productiona and Protection	Dir. Jericho DOA	Sep	2009
23	Ayyad Saaydeh	Livestock	Head of Auja Ext.Unit	May	2007
24	Mahmoud Soud	Plant productiona and Protection	Hdiv. AES	Aug	2009
25	Mahmoud Bsharat	Plant productiona and Protection	Hdiv. Agriculture Laboratories	Jun	2009
26	Jafer Salahat	Plant productiona and Protection	Hdiv. Natural Resources/ jericho DOA	Feb	2008
27	Nazeeh Ishtayah	plant protection	Hdiv. Horticulture/ jericho DoA	May	2007
28	Omer Sawaftah	Hdiv. Rural Development	DoA Jericho Hdiv. Rural Development/ Jericho DoA	May	2007
29	Sami Draghmeh	Plant productiona and Protection	Head Albadan Extension Unit	May	2007
30	Hashem Sawaftah	Plant productiona and Protection	Head Ein Al Baida Extension Unit	May	2007
31	Majdi Bsharat	Livestock	Hdiv. Livestock/Tubas DoA	May	2007
32	Raed Abu Khalil		Dir. Tubas DoA	Sep	2009
33	Majdi el Aghbar	Livestock	Hdiv. Livestock/Nablus DoA	May	2007
34	Ahmad Abdel Wahab	plant protection	dir. Nablus DoA	Sep	2009
35	Mohammad Masre	Post-harvest	MoA Dir. Marketing dept.	May	2009
36	Alah Ismaeel	Rural Development	Dir. Rural Development Dept	Nov	Jul. 1

**Budget allocated by Palestinian Side**

ANNEX 8

No.	Name	Field	Present Post at assignment time	Period months till 31/3/2010	Allocated Time for ASAP %	Monthly Salaris (\$)	Allocated Salaris By MoA/PNA (\$)	Total Allocated Salaris By MoA/PNA (\$)
1	Tawfiq Qubbaj	PHD Plant production and Protection	Researcher NARC HQ	36	40%	842	337	11958
2	Hazem Marabeh	Plant production and Protection	Researcher NARC HQ	36	40%	789	316	11211
3	Aziz Salameh	PHD plant Breeding	Biotechnology dept. researcher/NARC HQ	36	40%	868	347	12332
4	Ammar Housain	Analyticalchemistry	Dir. Natural Resource Div/ NARC	36	70%	658	461	16349
5	Ahmad Amameh	Researcher	Researcher Plant production and protection/NARC HQ	36	40%	789	316	11211
6	Ali Fatafa	PHD	NARC HQ DG. NARC	28	20%	1579	316	8979
7	Zeyad Feddah	PHD Field crops	NARC HQ Act.DG. NARC	7	20%	1184	237	1666
8	Iyad Badran	livestock/ Poultry	Livestock Researcher/NARC HQ	15	40%	842	337	5098
9	Sameer Bsharat	PHD analytical chem. Researcher	Dir. Natural Resource Div/ NARC	24	40%	842	337	8196
10	Abdelhadi Daghlas	Researcher	Dir. Natural Resource Div/ NARC	11	40%	789	316	3516
11	Abdallah Lahlouh	Agriculture Economy	MoA DG of Planning and Policies DG.	36	40%	1579	632	22421
12	Ashraf Barakat	Horticulture General	Senokrot Hdiv.Horticulture/ GDERD	36	40%	921	368	13079
13	Osama Doleh	livestock	MoA Dir. Livestock/ Extension	36	40%	789	316	11211
14	Mohammad Saed Allah	Horticulture General	Dir. Vegetable and flowers dept.	36	40%	1053	421	14947
15	Basem Hamad	Horticulture General	Dir. Planning Extension	36	10%	1053	105	3737
16	Safa' Bses	Food Processing	Dir. Rural Development Dept	36	20%	1053	211	7474
17	Musafa Brakat	plant protection	Dir. Of plant protection	36	40%	1053	421	14947
18	Imad Ghanmeh	Head of Div.	Hdiv. Soil dept.	36	40%	921	368	13079
19	Kasem abdo	Soil science	GD of Soil and Irrigation	36	20%	1579	316	11211
20	D.Azzam Tubilih	Field crops	Deputy Minister of Agriculture	36	10%	2632	263	9342
21	Ayyad Saaydeh	Livestock	Head of Auja Ext. Unit	36	40%	658	263	9342
22	Mahmoud Soud	Plant production and Protection	Hdiv. AES	15	40%	658	263	3982
23	Mahmoud Bsharat	Plant production and Protection	Hdiv. Agriculture Laboratories	36	40%	658	263	9342
24	Jafer Salahat	Plant production and Protection	Hdiv. Natural Resources/ jericho DOA	36	40%	658	263	9342
25	Nazeeh Ishtayah	plant protection	Hdiv. Horticulture/ jericho DoA	36	40%	658	263	9342
26	Sami Dragmeh	Plant production and Protection	Head Albadan Extension Unit	36	40%	658	263	9342
27	Hashem Sawafiah	Plant production and Protection	Head Ein Al Baida Extension Unit	36	40%	658	263	9342
28	Awad daraghmeh	Plant production and Protection	Hdiv. Natural Resources/ jericho DOA	36	40%	658	263	9342
	<b>Sub-Total Salaris</b>							<b>281338</b>
	<b>Office Space</b>							<b>18000</b>
	<b>G-Total</b>							<b>299338</b>

Organizational Chart of Participatory Research and Extension in the Project



Summary of Findings and Activities