Final evaluation of "Enhancing Agriculture Production through Irrigation System Improvement and Strengthening Institutional Capacity"
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Project code: OSRO/AFG/502/JCA
Figures and tables

Figures
Figure 1: Theory of change ......................................................................................................................................... 8

Tables
Table 1: Rice production in Afghanistan and yield comparison ...................................................................................... 4
Table 2: Potential project beneficiaries ......................................................................................................................... 6
Acknowledgements

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### Acronyms and abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ANSCU</td>
<td>Afghanistan National Seed Companies’ Union</td>
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<tr>
<td>ARIA</td>
<td>Agricultural Research Institution of Afghanistan</td>
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<tr>
<td>CADP</td>
<td>Comprehensive Agriculture Development Programme</td>
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<tr>
<td>CPF</td>
<td>Country Programme Framework</td>
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<tr>
<td>CTA</td>
<td>Chief Technical Adviser</td>
</tr>
<tr>
<td>ELISA</td>
<td>Enzyme-linked immuno-sorbent assay</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<tr>
<td>FAOAF</td>
<td>FAO Afghanistan</td>
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<tr>
<td>FAORAP</td>
<td>FAO Regional Office for Asia and Pacific</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information Systems</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MAIL</td>
<td>Ministry of Agriculture, Irrigation and Livestock</td>
</tr>
<tr>
<td>MEW</td>
<td>Ministry of Energy and Water</td>
</tr>
<tr>
<td>MRRD</td>
<td>Ministry of Rural Rehabilitation and Development</td>
</tr>
<tr>
<td>IA</td>
<td>Irrigation Association</td>
</tr>
<tr>
<td>ID</td>
<td>Irrigation Directorate (MAIL)</td>
</tr>
<tr>
<td>ISE</td>
<td>Improved Seed Enterprise</td>
</tr>
<tr>
<td>LTO</td>
<td>Lead Technical Advisor</td>
</tr>
<tr>
<td>OED</td>
<td>FAO Office of Evaluation</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
<tr>
<td>PAAIL</td>
<td>Provincial Agriculture, Irrigation and Livestock office</td>
</tr>
<tr>
<td>PMS</td>
<td>Peace Medical Services</td>
</tr>
<tr>
<td>RIPA</td>
<td>Rice-based Agriculture Development Project of Afghanistan</td>
</tr>
<tr>
<td>SCD</td>
<td>Seed Certification Directorate (MAIL)</td>
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<tr>
<td>SSP</td>
<td>Strategic Sector Priority</td>
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</table>
Executive summary

1. With most of Afghanistan’s irrigation infrastructure in disrepair, the project is relevant to farmers for improving agriculture production and productivity. The objectives of the Government’s national development strategies, FAO’s Country Programme and the Government of Japan’s development assistance recognize the primacy of improved irrigation infrastructure and water management to enhance food security. It is still important to develop government capacity to manage irrigation rehabilitation activities. The project was more relevant to the rice and potato crops, and growers have the potential to increase productivity.

2. The project achieved substantial results regarding rehabilitated irrigation structures, increased command areas, and enhanced productivity and production of rice in the three project provinces. Rehabilitation of dilapidated irrigation infrastructure and development of an improved seed potato industry helped improve food production and contributed to the Government’s agricultural development and food security objectives. Rehabilitation of irrigation and water control structures benefited downstream communities, allowing them to increase their land under rice production. Laying the foundations of a virus-free potato seed industry was a major achievement, considering the capacity shortfall in Afghanistan to develop such an industry. The evaluation recommends that future irrigation rehabilitation projects include training to demonstrate improved cropping practices to drive productivity improvements as well as livelihood support activities to help farmers diversify their livelihoods, grow alternative crops and build their resilience to external shocks.

3. The main factor contributing to the achievement of the intended outcomes was the competence of project teams to operate in difficult, often unstable and insecure working environments. Continuous support from all levels of government was also an important factor for effective results. Coordination and decision-making arrangements among partners were adequate. The evaluation recommends that the Geographical Information System (GIS) be considered a necessary tool to support evidence-based decision-making and more accurate monitoring and assessment of project progress and results. In addition, all stakeholders should critically evaluate and validate the Peace Medical Services (PMS) approach, screen best practices, and document lessons learned and experiences. Sustainability was based on empowering farmers to efficiently manage water and maintain their newly built irrigation infrastructure. The viability of a commercial potato seed industry will be tested during the next 12 months. Training of potato farmers and enterprises involved in the potato industry will help determine the sustainability of the industry beyond the end of the project. The project established the basics for a more productive and dynamic local potato industry by creating an innovative sector to support future development of the industry. The newly built water control infrastructure will be sustainable, provided that farmers regularly carry out maintenance. The availability of high-quality potato seeds has the potential to increase profitability for all industry players and drive a sustainable and vibrant potato industry.

4. An effective means to incorporate gender inclusiveness in irrigation rehabilitation projects is through implementation of a broader range of alternative livelihood support activities. In this project, in addition to the involvement of women in activities associated with the production of virus-free potato seeds, limited alternative livelihood support activities were offered. Parallel activities could enable women to actively participate and could empower
them as secondary earners. The evaluation recommends addressing gender inclusiveness in irrigation rehabilitation projects through kitchen gardens or meal preparation for workers.

5. Gender empowerment can be enhanced by encouraging communities to include women as members in the water users associations since more formal participation of women will strengthen their bargaining position as resource users within households and communities.
1. **Introduction**

1. This is the final evaluation of the project for Enhancing Agriculture Production through Irrigation System Improvement and Strengthening Institutional Capacity (OSRO/AFG/502/JCA: USD 3.09 million). This evaluation was a key milestone in the project design and was included in the relevant project documents, according to arrangements agreed between the donor (Japanese International Cooperation Agency - JICA), the Government of Afghanistan and the Food and Agriculture Organization of the United Nations (FAO). OSRO/AFG/502/JCA was implemented by FAO in Afghanistan (FAOAF) in collaboration with the Ministry of Agriculture, Irrigation and Livestock (MAIL). The Ministry of Energy and Water (MEW) and the Ministry of Rural Rehabilitation and Development (MRRD) also participated in project activities. The project was designed to increase productivity and production by: i) rehabilitating and upgrading irrigation and water control infrastructure in three provinces targeting rice production; ii) training farmers and government staff in the development and water management systems established; and iii) establishing mechanisms and developing capacities for production of virus-free potato seeds.

1.1 **Purpose of the evaluation**

2. The main purpose of the evaluation was to provide accountability to the donor and partners by assessing FAO’s contribution to the overall objective of the programme, i.e. increased agricultural production and productivity in project provinces. The evaluation also proposed lessons from the implementation processes that could inform future decisions by the Governments of Afghanistan and Japan, and FAO regarding the formulation of future projects or follow-up interventions.

3. The primary target audience of the evaluation includes the Governments of Japan and Afghanistan, and FAO. It informs these intended users on whether the project is still relevant, the effectiveness of the institutional mechanisms in delivering intended or unintended results, the impact of the project on the beneficiaries (farmers, MAIL and other government ministries) and whether the results were sustainable beyond the conclusion of the project. Lessons learned and recommendations proposed in this evaluation may be used by other project teams as a basis for strategic and programmatic planning and implementation for similar future projects in both Afghanistan and other countries.

1.2 **Scope and objective of the evaluation**

4. **Scope**: The final evaluation reviewed the project for Enhancing Agriculture Production through Irrigation System Improvement and Strengthening Institutional Capacity (OSRO/AFG/502/JCA). The final evaluation assessed achievements of the projects at the district and farm levels. FAO in Afghanistan has been involved in many irrigation and livelihood projects since early 2000s, and subsequently it is considered to have a comparative advantage in these projects as demonstrated by its current involvement in national-level irrigation projects. The 2014 Evaluation of the FAO Country Programme highlighted this experience and noted this as a strength of FAO in Afghanistan. Therefore, this final evaluation was able to assess results compared to other FAO irrigation and livelihood projects in Afghanistan.
5. **Objectives:** The main objectives of this independent evaluation were to: i) determine the results from the intervention and to ascertain overall project performance; ii) recommend some operational and policy options that could be taken within the remaining period of project implementation; and iii) identify key achievements and issues that could serve as lessons or guidance for future programming.

6. Another evaluation objective was to determine the successes and failures of the project in order to draw lessons learned and best practices for similar, future interventions. The evaluation reached conclusions and provided recommendations and lessons learned on performance and good practices based on evidence and the findings of the evaluation, which would be suitable for replication or upscaling in future projects.

7. In order to achieve these objectives, the evaluation addressed the following key questions:
   
i. Relevance: Is the project still relevant for meeting the needs of the beneficiaries and to what extent does it contribute to the implementation of the national development strategy, fulfilment of the donor and FAO Country Programme objectives?
   
ii. Effectiveness: What actual needs were addressed by the project? What factors contributed to achieving or not achieving the intended outcomes?
   
iii. Impact: What were the intended and unintended results achieved by the concluded project? To what extent did the project achieve its intended results?
   
iv. Efficiency: To what extent did the project make use of available technical, technological, financial and knowledge inputs to deliver outputs and achieve outcomes?
   
v. Sustainability: Are the project’s results sustainable beyond project conclusion?

8. A full list of evaluation sub-questions is included in the Terms of Reference (TOR) annexed to this report.

### 1.3 Methodology

9. The final evaluation was conducted from September to November 2018. The evaluation team was composed of an evaluation manager from the FAO Office of Evaluation (OED), a Team Leader with an evaluation background and experience in Afghanistan and a national irrigation engineer. The evaluation implemented a transparent and consultative approach with all stakeholders throughout the evaluation. The final evaluation process followed the principles of the United Nations Evaluation Group (UNEG) Norms and Standards for Evaluations in the UN System and aligned with OED’s Manual on evaluation guidelines and practices.

10. To assess any change in vegetative cover on the land surface (increased productivity), FAO headquarters conducted the Geographical Information System (GIS) monitoring of the Normalized Difference Vegetation Index (NDVI), which is a measure of the vegetative cover on the land surface. Vegetation differs from other land surfaces because it tends to strongly absorb the red wavelengths of sunlight and reflects it in the near-infrared wavelengths. NDVI is a measure of the difference in reflectance between these wavelength ranges. Three canals were selected by the evaluation team (Shakhak Banu, Nahr-e Chaman and Aliabad Ramazani) to assess the change in NDVI in 2018 compared to that in 2017.
11. A preliminary review was conducted of relevant background documentation that included but was not limited to the project design document, progress reports, photographs (before and after project interventions), GIS maps and baseline reports. The evaluation team also researched secondary data for Afghanistan, such as agricultural statistics, national development policies, FAO sectoral evaluations and industry reports and studies.

12. Findings on OSRO/AFG/502/JCA, including alignment with the FAO Country Programming Framework (CPF) and FAO Strategic Objectives were mostly based on review of background documentation as well as interviews with FAO staff from the Country Office and the Lead Technical Officer at the FAO Regional Office for Asia and the Pacific (RAP).

13. To assess the contribution of the project towards its expected outcomes and impact, primary data were collected through key informant interviews and focus group discussions with representatives from: partner government departments at the national and provincial levels, the donor, the FAO Representative Office, the FAO Regional Office and farmers during field visits to the project provinces. To help validate primary research, the team conducted open and semi-structured interviews with project stakeholders in project areas.

14. Due to security considerations, national staff visited 10 project sites in Kunduz, Baghlan and Takhar Provinces of the 43 irrigation rehabilitation schemes. During these visits, the team observed rehabilitated and newly built infrastructure and discussed project implementation, training and other capacity building interventions with beneficiary farmers (73) in group discussions in project areas. The team also discussed project interventions with eight Provincial Directorate of Agriculture, Irrigation and Livestock (PAIL) staff from these areas. The information collected during these interviews was used to validate and triangulate results detailed in progress reports, case studies and surveys provided by the project team.

1.4 Limitations

15. Security in Afghanistan remains an impediment to the delivery of development assistance and implementation of irrigation support projects. The evaluation team was unable to visit project areas and was therefore dependent on the fieldwork conducted by the national team members for the collection of primary data from project beneficiaries and provincial officials. Beneficiaries from Components 1 and 2 travelled to Kabul to meet and discuss the project results with the mission.

1.5 Structure of the report

16. Following this introduction, Chapter 2 presents the background and context of the project. Evaluation questions and key findings are presented in Chapter 3, followed by conclusions and recommendations in Chapter 4.

The report is accompanied by the following annexes:

Annex 1. Terms of Reference
Annex 2. GIS monitoring
2. **Background and context of the project**

17. The project for Enhancing Agriculture Production through Irrigation System Improvement and Strengthening Institutional Capacity aimed to improve irrigation management among rice growers in Kunduz, Baghlan and Takhar Provinces in north-eastern Afghanistan to help increase their production and productivity. The project also supported the development of a virus-free potato seed industry as a means to support increased local production and productivity in the main potato-growing provinces. The project was implemented by FAO with MAIL as the key government counterpart agency and funded by the Government of Japan.

Table 1: Rice production in Afghanistan and yield comparison

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (tonnes)</th>
<th>Area (ha)</th>
<th>Yield (tonnes/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Afghanistan</td>
<td>Pakistan</td>
<td>Japan</td>
</tr>
<tr>
<td>2000</td>
<td>260 000</td>
<td>130 000</td>
<td>2.0</td>
</tr>
<tr>
<td>2004</td>
<td>463 000</td>
<td>195 000</td>
<td>2.4</td>
</tr>
<tr>
<td>2007</td>
<td>552 000</td>
<td>170 000</td>
<td>3.2</td>
</tr>
<tr>
<td>2010</td>
<td>672 000</td>
<td>208 000</td>
<td>3.2</td>
</tr>
<tr>
<td>2013</td>
<td>512 094</td>
<td>205 000</td>
<td>2.5</td>
</tr>
<tr>
<td>2016</td>
<td>356 565</td>
<td>119 000</td>
<td>3.0</td>
</tr>
</tbody>
</table>

*Source: FAOSTAT*

18. The potential for improved productivity within the Afghan rice sector is evident compared to industry standards from other rice-producing countries (Table 1). Also, the Programme Manager of the Rice-based Agriculture Development in Afghanistan (RIPA) informed the mission that the RIPA demonstrations of improved rice cultivation practices in rice growing areas of Afghanistan had more than double typical rice yields up to 6.9 tonnes per ha.

19. The components and expected results were as follows:

**Component 1**

i. Irrigation systems such as irrigation canals, water management infrastructure and equipment were rehabilitated covering 9 000 ha in rice growing areas of Kunduz, Takhar and Baghlan Provinces were rehabilitated. These activities were expected to: expand the command areas of each rehabilitated system; increase cropping intensity due to more equitable water supply during critical months of the cropping calendar; mitigate the devastating effects of flooding on cropping lands; increase on-farm productivity due to more reliable supplies of irrigation water and improved management of irrigation systems; and increase productivity through double cropping.

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1 RIPA (2011–2020), funded by JICA and implemented in conjunction with MAIL in all rice-growing districts of Afghanistan, promotes improved rice cultivation practices and increased yields (120–310 percent in demonstration plots). RIPA also focuses on the introduction of appropriate varieties, improved crop and water management practices, the building of extension capacity of PAIL staff, and the promotion of better post-harvest technologies.
ii. Beneficiary farmers were expected to contact another Japanese-funded and implemented project, RIPA, in project areas in order to be trained and supported for growing rice more productively.

iii. Capacities of beneficiary households were built in efficient water management, operations and maintenance (O&M). MAIL, MEW, MRRD and project staff were trained in water accounting.

iv. Around 90 Irrigation Association (IA) executives, 120 IA members and 300 farmers were trained; associations were developed and formalized in accordance with national water law.

Component 2

i. Peace Medical Services (PMS) incorporated into national good practices and disseminated through government staff trained on PMS. FAO, MAIL, MEW and MRRD together with PMS would evaluate the approach, screen best practices and document lessons learned. The analysis included the context, institutional arrangement, environment, technical considerations and sustainability to understand what worked in Nangarhar. The analysis prepared the foundation for training, dissemination of materials and expansion of PMS activities.

ii. A training centre was constructed and handed over to PMS in Nangarhar.

iii. Potential areas were surveyed for PMS application in order to understand the geography, hydrological conditions, availability of materials, and social conditions of areas selected for pilot locations. The application and suitability of the PMS approach in other locations were tested.

iv. Farmer-to-farmer exposure visits and visits by relevant government officials were conducted.

Component 3

i. A potato tissue culture laboratory for multiplication of disease-free material was established through in vitro techniques and enzyme-linked immunosorbent assay (ELISA) testing for detection of viruses.

ii. Capacities were built of ten staff selected from MAIL agencies – the Agricultural Research Institute of Afghanistan (ARIA), the Improved Seed Enterprise (ISE), the Seed Certification Directorate (SCD) and the Afghanistan National Seed Companies Union (ANSCU). Training was provided in both Afghanistan and potato tissue culture production facilities in Pakistan and India.

2.1 Context description

20. Rice is the second staple crop in Afghanistan after wheat. Cereal production is dependent on seasonal rain and snowmelt volumes to supply rivers and irrigation canals; therefore, farmers are vulnerable to fluctuations in available surface water resources. Afghanistan has never been self-sufficient in cereals, and national production needs to be supplemented with imports by the private sector or foreign assistance. Irrigation systems were seriously affected during the war since maintenance was neglected, leaving them in varying states of disrepair. The irrigated area of Afghanistan has decreased by almost 70 percent and crop productivity fell more than 50 percent compared to pre-war levels. With improved irrigation systems and management, MAIL estimates that rice growing productivity could increase by 25 percent.
21. FAO in Afghanistan has been involved in multiple irrigation and livelihood projects since the early 2000s and is subsequently considered to have a comparative advantage in irrigation projects as demonstrated in its current involvement in two national-level irrigation projects, the Irrigation Restoration and Development Project (MEW) and the On-Farm Water Management Project (MAIL). A key component of these projects is building capacity of government staff in counterpart agencies, with the aim that these government counterparts will have the skills and ability to manage such irrigation rehabilitation activities and projects in the future. The 2014 Evaluation of the FAO Country Programme also highlighted this experience and noted this as a strength of FAO in Afghanistan.

22. Afghanistan has a tradition of community-based irrigation management called mirab, composed of elected farmers. The project provided technical training to mirabs and farmers on the O&M of rehabilitated irrigation systems, and efficient water management. There is a requirement to transform mirabs into irrigation associations to help address the various economic and environmental challenges of any irrigation system. Mirab members need enhanced capacity in order to transform into formal legal entities. Empowering local water user communities to manage the O&M of their canals will also help advance the decentralization agenda of the Government and enhance irrigation sector sustainability.

23. Mirabs participated in all decision-making stages of the canal rehabilitation cycle: identification, preparation, design, construction, and operation and maintenance of rehabilitated schemes. Together with representatives from local communities, project supervisory and quality control staff, they needed to sign-off at construction completion in order for contractors to receive their final payments. The O&M of built structures then became the responsibility of local communities.

### Table 2: Potential project beneficiaries

<table>
<thead>
<tr>
<th>Output</th>
<th>Beneficiaries</th>
<th>Beneficiaries</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Farming households in Kunduz Takhar and Baghlan Provinces</td>
<td>9 000 households</td>
<td>Increased agriculture production</td>
</tr>
<tr>
<td></td>
<td>Labourers and landless households</td>
<td>120 000 days annually</td>
<td>Increased farm work (1 200 households – 100 workdays per year)</td>
</tr>
<tr>
<td></td>
<td>Local traders</td>
<td>Business annually increased</td>
<td>Increased input requirement in farming and post-harvests</td>
</tr>
<tr>
<td></td>
<td>Labourers</td>
<td>300 000 days</td>
<td>Employed during rehabilitation of canals (3 000 families based on 100 workdays per year)</td>
</tr>
<tr>
<td>2</td>
<td>Officials from the MEW, the MAIL and the MRRD</td>
<td>45 staff</td>
<td>Capacity building and raising awareness in PMS methods</td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>300 households</td>
<td>Enhanced knowledge on PMS</td>
</tr>
<tr>
<td>3</td>
<td>ARIA, ISE, SDC and ANSCU</td>
<td>10 staff, more than 100 seed companies</td>
<td>Capacity in virus-free potato seed production</td>
</tr>
</tbody>
</table>

Secondary beneficiaries

| 1 | Farming households | 200,000 households | Increased rice production |
| 2 | Farming households | 9,000 households | Improved irrigation management |
| 3 | Potato farmers | 2,000 households | Increased potato production |

Total 224,200 households (1,569,400 persons) and 55 government staff

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2 The Water Law of Afghanistan requires existing farmer groups to follow guidelines with rules and regulations for establishing irrigation associations and to be registered at MAIL.
24. The PMS Approach has been developed in Nangarhar Province over the past 12 years and has successfully built a new irrigation scheme off the Kunar River that has transformed previous desertified agricultural lands back into irrigated farming lands. Local farming communities have benefited from the regular supply of irrigation water and canals built with readily available local resources. The main objective of PMS is to improve traditional irrigation systems for resolving local water shortages following community-based approaches with users involved at all stage of irrigation development: design, construction, O&M, and monitoring and evaluation (M&E). PMS has focused on the irrigation systems that are exposed to annual flooding and sedimentation and thus maintained stable water supplies from intake to the end of the canal. Seasonal variability needs to be properly addressed while designing improvements. PMS also empowers mirabs with additional resources (funds for emergency repairs).

25. Potato is the third staple crop in Afghanistan, grown in highland areas of Bamyan, Maydan, Wardak, Ghazni, Badakhshan and Kabul. It is the major crop in Bamyan grown on around 70 percent of the irrigated land, i.e. 12 000 ha. Farmers either retain a portion of their harvest or buy potatoes from local markets to use as seed. This reduces genetic vigour and the potential for optimal production while crops become more vulnerable to environmental stresses. Since the highland areas of Afghanistan have few insect or disease problems, the availability of improved seed and modern cultivation practices would increase productivity by an estimated 20-40 percent. Average yields are around 12 tonnes/ha in Afghanistan, compared to 22 tonnes/ha in Pakistan and 32 tonnes/ha in Iran. Afghanistan is self-sufficient in potato production and in 2016 it exported almost 2 000 tonnes (FAOSTAT); with higher productivity, it could become an important regional exporter.

26. The project commenced in April 2016, three months after the contracted date, with a budget of USD 13.09 million. A Chief Technical Adviser, based in Kabul, was responsible for project execution supported by a MAIL-appointed National Project Coordinator who facilitated coordination between the project and relevant provincial staff (PAIL) and MAIL departments. A Project Steering Committee (PSC) consisting of the Deputy Ministers of the MAIL, MEW and MRRD, as well as FAOAF, RAP Lead Technical Officer, National Project Coordinator, Chief Technical Adviser and JICA met quarterly to provide oversight of project progress and approval for future workplans and budgets.

1.2 The theory of change

27. The theory of change (TOC) describes and illustrates how and why a desired change was expected to occur in a particular context. Project activities included participatory approaches to prioritize irrigation schemes for rehabilitation, together with farmer training on better water management and maintenance. Government officials and farmers in the eastern regions of Afghanistan were trained in managing irrigation restoration activities and PMS approaches to rehabilitation and system management. The establishment of a virus-free potato seed industry was also a key activity. These interventions led to the desired results regarding the expansion of the command areas of rehabilitated canals, enhanced capacities of farming communities and government staff. With these enhanced skills, project outputs were assumed to lead to the higher-level result, i.e. increased agricultural production and productivity, and an increase of 25 percent in the impact indicator on rice yields.
**Figure 1: Theory of change**

**Impact**
- Increased agricultural production and productivity
  - Sustainable and improved farming systems
  - RIPPA instructs and supports improved rice production practices
  - Companies producing certified potato seed profitable
  - Sufficient extension support and access to credit
  - Community willingness to adopt virus-free potato seed
  - Sustained commitment of government partners

**Outcomes**
- Improved irrigation services and virus-free potato seed production
  - IAs effectively manage water distribution & maintenance
  - Increased demand for improved inputs
  - Increased farm work: 1,200 HH with 100 days/yr
  - Equitable distribution and reliable water supply along entire canal
  - Breeder and multiplication of virus-free potato
  - Potato seed production established in Bamyan

**Outputs**
- Rehabilitated irrigation systems covering 9,000 ha of rice growing areas
- PMS method disseminated
- Mechanisms and capacities for producing virus-free potato seed

**Activities**
- Water Accounting
- Community consultation
- Prioritisation feasibility
- Identification of farmer groups
- Allot land manuals, equipment
- Training & Exposure visit
- Rehabilitate laboratory
- Training locally & abroad
- Construct greenhouses cold storage
- FFS, establish seed producer group

**Source:** Evaluation team
3. Evaluation questions: key findings

EQ1: Is the project still relevant for meeting the needs of the beneficiaries and to what extent do they contribute to implementation of the national development strategy, and fulfilment of the donor and FAO Country Programme objectives?

Finding 1: Rehabilitating and modernizing Afghanistan’s irrigation infrastructure remains relevant for rice farmers to increase their production and household incomes. The objectives of the government’s national development strategies, FAO Country Programme and JICA’s development assistance, support improved irrigation infrastructure and water management to enhance food security in Afghanistan.

The project is still relevant for meeting the needs of beneficiaries. With over 70 percent of Afghanistan’s irrigation infrastructure still in disrepair, it is critical to rehabilitate and modernize irrigation systems in order to improve water delivery and ensure a more efficient use of the resource. One of the key results of the project demonstrated that improved irrigation infrastructure improves water availability, equity and reliability at key periods during the cropping season, particularly for farmers further downstream who traditionally received little, if any, irrigation water. This enabled more farmers to properly plan their cropping cycles and maximize their use of other improved inputs, which led to increased production of rice (and second crops) in all project provinces and helped enhance food security for both local communities and Afghanistan.

The project is still relevant for combating flooding in different project areas. Before the project, farmers needed to continually rebuild their canals and water control structures with local materials that were inadequate against the force of annual floods. Since they could not properly plan their cropping patterns, they adapted by reducing the areas available for irrigated cropping. The project built more substantial water control structures that diminished the threat of flooding and soil erosion, which was a key benefit of the project mentioned by all farmers met by the mission team.

National development strategies. The project was relevant to the Government of Afghanistan’s national development strategy, the Afghanistan National Peace and Development Framework (ANPDF 2017–2021). The framework includes the Comprehensive Agriculture Development Programme (CADP), which aims to raise productivity and household incomes in rural areas, improve agricultural import substitution and afro-industry, and increase exports. Within CADP, the project was relevant for the following Strategic Sector Priorities (SSPs):
i. SSP 1: Improving Irrigation Systems – This priority aims to increase irrigated land from 2.45 million ha to 2.74 million ha during the five-year period of the programme, while also targeting increased production and productivity through irrigation and improved water management practices. Institutional strengthening involves reform of legislation, polices, institutions and improved management to promote investment in irrigation development by the private sector. SSP1 also emphasizes institutional strengthening of government irrigation agencies at all levels, and establishment of irrigation associations at the community level.

ii. SSP 2: Cereal production – MAIL is developing a comprehensive rice strategy that includes a focus on improved cultivation techniques and varieties to increase rice production to 1 million tonnes in 2021, which would attract the private sector to further develop the rice value chain.

iii. SSP 6: Food and nutrition security, and resilience building – Efforts are being made to reduce the high levels of food insecurity and severe malnutrition with 33 percent of the country facing high levels of food insecurity by addressing availability and access to food.

31. The project supported the four pillars of the FAO Country Programming Framework (CPF) for Afghanistan (2017—2021):

   i. better governance through improved capacity for policy planning, land reform, decentralization, management of common natural resources;
   ii. fostered expansion of irrigation and field water management;
   iii. intensive agriculture for commercialization, value chains development and job creation;
   iv. support to vulnerable farmers for improved food and nutrition security, resilience and emergency response to natural and man-made disasters and climate change.

32. The CPF defines the development objectives for collaboration between FAO and the Government of Afghanistan towards achieving the government priorities. Climate change, gender and capacity development are cross-cutting issues across the CPF. FAO will take the lead in ensuring that the activities within the CPF are implemented as agreed. A steering group led by MAIL and FAO meets periodically to review the progress of the CPF.

Finding 2: Providing virus-free potato seed would expand the industry, improve productivity and could develop Afghanistan into a major regional potato exporter.

33. Developing a sustainable virus-free potato seed industry is a key element to increasing local productivity and production of potatoes, and increasing food supplies. FAO indicated that the single major variable affecting potato yields was the quality of seed farmers used, and estimated that the average yield increase from the use of good quality seed would be 30 percent to 50 percent over the traditional use of farmers’ seeds (FAO, 2008). The project was relevant in helping develop the potato seed industry to certified seed level and support private seed companies to develop the industry further with a supply of good quality seed to potato farmers in the main growing areas of Afghanistan.

Have project interventions responded to the needs and priorities identified by the Government?

Finding 3: Participatory approaches involving beneficiaries from the outset and training them to operate and maintain their newly built water management infrastructure continues to be an appropriate approach to irrigation rehabilitation.
34. The project was relevant to the needs and priorities of the Government as reflected in the Afghanistan National Peace and Development Framework (ANPDF), which called on ministries and agencies to refocus their efforts on strategic sector priorities. These priorities recognized the project’s participatory approaches such as guiding project interventions according to farmers’ priorities. The SSPs recognize that MAIL, MRRD and MEW needed continued investment support to achieve the ambitious goals specified in the National Priority Programmes of CADP.

35. The project was also relevant to the priorities described in the government’s water sector management strategy, which aims to manage Afghanistan’s water resources to increase sustainable economic and social development, and to ensure an adequate supply of water for future generations. OSRO/AFG/502/JCA supported the strategy’s priorities for the irrigation sector, which are to: enhance household food security; protect communities from the negative impacts of droughts and floods; and promote sustainable development and management of water resources through effective services for efficient water use in order to facilitate economic growth and social development.

Have project interventions responded to the intended objectives established by the donor?

36. JICA aims to contribute to socioeconomic stability in Afghanistan through sustainable economic growth and subsequent job creation by development. The Japanese Government set four pillars of assistance for Afghanistan: i) security improvement; ii) infrastructure development; iii) agriculture and rural development; and iv) response to basic human needs such as education and healthcare. Together with projects on Kabul metropolitan development, JICA focuses on agriculture and rural development. The project supported JICA’s development framework’s four key pillars: i) change management (capacity development for administrative management, human resource development); ii) water resources development and management; iii) increased agricultural productivity; and iv) promotion of farming system diversification and value-added agriculture. The project contributed to JICA’s objectives of supporting sustainable development in agriculture, infrastructure and human resources development.

How have the interventions contributed to strengthening national and local capacity development to design and implement relevant activities, steps and processes?

Finding 4: Training and support to PMS is relevant to the Government’s plan to adapt this approach into national irrigation schemes.

37. The project design specified that the officers of the Provincial Directorate of Agriculture, Irrigation and Livestock in Kunduz, Baghlan and Takhar Provinces would be involved in each step of the irrigation canal rehabilitation process. They will analyse and design the planned rehabilitation works for each selected canal. At project commencement, assessments by project members of PAIL officers’ capacity to undertake such work determined that these counterpart staff did not have sufficient capacity to complete the necessary tasks, hence, project engineers needed to design the construction works.

38. The project contributed to strengthening local capacity to implement a participatory approach to rehabilitating irrigation schemes including: disseminating initial information; screening and prioritizing projects; designing projects; cost estimation; tendering; contracting; overseeing the work of construction companies; and handing over rehabilitated canals to local communities. PAIL officers were also involved in the institutional development of irrigation associations, and training irrigation association
members on better water management and maintenance of the canals. The project helped build MAIL capacity to design and implement rehabilitation activities through this on-the-job training and formal training of government staff at the provincial and national levels both in Afghanistan and abroad. Beneficiary farmers and mirabs received on-the-job training in better water management practices, and the O&M of their built irrigation structures allowing them to independently manage more efficient water distribution and contribute to sustainability of the improved irrigation systems.

39. The Government will adopt and implement elements of the PMS approach into national irrigation rehabilitation and management projects. The project trained 95 government officials at the Nangarhar PMS training centre, and nine government officials observed the PMS approach in action in Japan, which could be considered in various irrigation schemes in Afghanistan. This training and support to government officials will assist government deliberations on adopting the PMS system or elements of the process into future national irrigation schemes.

40. The project developed national capacity in the relevant activities and processes to operate a virus-free potato seed industry in Afghanistan. This involved establishing a functional laboratory, hiring competent technicians, conducting ELISA testing of potato samples, and supporting in-field infrastructure (including cold-storage) and the multiplication of breeder seed and certified seed for sale to potato growers. The project laid the foundation for the expansion of this industry into the primary potato growing areas of Afghanistan, i.e. Bamyan Province.

3.2 EQ2: What were the intended and unintended results achieved by the project? To what extent did the project achieve its intended results?

Finding 5: Rice farmers reported productivity improvements and increased incomes due to their rehabilitated canals and improved water management practices.

41. The project team provided an updated summary of results during the mission visit to Kabul, which included the following:

Output 1. Irrigation systems rehabilitated for 9 000 ha in Kunduz, Takhar and Baghlan Provinces.

42. Component 1 achieved 50 percent of the irrigation schemes, its target of 9 000 ha of additional irrigated rice-growing area at the time of evaluation (September 2018). The project completed 42 irrigation schemes (original target was 30) and ended up rehabilitating about 23 700 ha (May 2019), which will return these irrigation canal schemes to their full capacity totalling 23 700 ha. The project did not undertake major structural canal changes, but rehabilitated canals with the intended result aimed at improving equitable water distribution. These interventions provided additional benefits to farmers, minimized water wastage and seepage, improved conveyance which increased water access to all farmers along the canals, prevented flood damage to communities and cultivated areas, and reduced the canal maintenance burden on farmers.

i. The project team identified 146 potential irrigation schemes for rehabilitation and conducted a diagnostic analysis on 54 schemes in target areas; 42 schemes met the
selection criteria for rice cultivation (being close to RIPA demonstration plots, a maximum water savings for production gains and prime rice growing areas) and full development proposals for these schemes were accepted.

ii. A participatory approach was implemented from the outset: local communities were involved in identifying their needs, agreeing on rehabilitation plans and schedules, providing labour to contractors and monitoring contractor performance up until the completion of the works.

iii. 30 contracts were awarded covering the 42 schemes – 14 schemes were completed and handed over to communities in 2018 and the remainder will be completed and handed over by the end of 2019.

iv. O&M training and equipment for nine completed schemes were supplied; the remaining training will be completed by the end of 2019 for all rehabilitated irrigation schemes.

v. Water accounting training: six of seven training modules were completed in Kabul, Bangkok and Dubai for MAIL, MEW, MRRD and FAO staff. The final training module will be completed by the end of the project.

vi. Irrigation associations are at various stages of development for the 42 irrigation schemes: 25 irrigation associations were formed and 9 registered with MAIL; 17 are still to be established.

43. The objective of the water accounting training was to create a working group among the three counterpart ministries that could utilize water accounting in key watersheds of Afghanistan for their ministries. This intended result could not be verified nor could its utility for participants at the time of the evaluation because the training course had not yet been completed. However, MRRD beneficiaries met during the mission indicated they were utilizing key elements of the water accounting training in their fieldwork and were developing a Water Accounting Manual based on their training that would be utilized by their ministry.

44. The project team had not commenced the household impact survey and therefore the evaluation cannot comment on the impact indicators (i.e. 25 percent increased rice yield and 25 percent improved water productivity). The mission interviewed several groups of farmers who benefited from rehabilitated schemes completed in the project areas in 2017 and estimated that they had increased rice yields by 5–30 percent due to a more equitable and reliable distribution of irrigation water during the growing season.

45. The team could not judge at the time of the evaluation the extent of achievement towards the intended impact of 25 percent productivity improvements in rice production and 25 percent water efficiency gains because the project team had not yet undertaken an impact analysis of farming communities in project areas. Geographic Information System monitoring (Annex 2) of three sample canal rehabilitations completed in mid-2018 demonstrated a steady increase in vegetation in 2018. However, any sustainable productivity improvements need a multi-year monitoring after the work is completed (four or five crops) in order to make substantive conclusions regarding the project impact on these sample areas.
46. The following emerged from the GIS analysis of the NDVI in three locations:

i. **Shakhak Banu** – a 3.50 km irrigation canal in Banu district, Baghlan Province, with a command area of 300 ha and 1,500 households. The project rehabilitated and constructed weirs, spillways, two wash culverts and four structures. Building works were completed in May 2018. The monthly deviation data for 2018 indicate an increase of NDVI values compared to 2017 NDVI values, but relatively similar to 2016 values.

ii. **Nahr-e-Chaman** – a 12.70 km canal in Taluqan district, Takhar Province, with a command area of 1,270 ha and 2,500 households. The project rehabilitated and constructed dykes, canal lining, canal off-takes, and six structures within the canal. The rehabilitation contract was completed in July 2018. The monthly deviation data for 2018 show a consistent increase of the NDVI values for almost all months of 2018. This is an indication that in 2018 there was an increase in crop productivity with two exceptional harvests.

iii. **Aliabad Ramazani** – a 30 km irrigation canal in Ali Abad district, Kunduz Province, with a 3,560 ha command area and 2,500 households within the area. The project rehabilitated and constructed intakes, spillways, canal linings and three structures. All construction was completed in June 2018. The monthly deviation data for 2018 show a consistent increase of NDVI values only for the last months of 2018, which indicates that in the last harvest, there was an increase in crop productivity.

**Output 2.** The Peace Medical Services irrigation method disseminated, and staff trained on the PMS approach.

i. A training centre with accommodation was completed on PMS premises and handed over.

ii. 20 PMS staff were trained; 149 mirabs/canal operators from eastern region were trained; 95 PAIL, River Basin Agency and DRRD staff will be trained by the end of the project.

iii. Observation tours: Three observation tours to Marwarid canal intake (Nangarhar) and three tours to Yamada weir (Japan) were organized for 14 participants from MAIL, MEW and MRRD.

47. The project supported the Government’s pledge to adopt PMS into national projects building or rehabilitating irrigation schemes; training was provided to 95 government staff with the objective of improving knowledge of PMS in the provinces and developing a cadre of government staff familiar with this approach. The expected results from Output 2 were unclear and stakeholders expressed mixed reactions:

i. There were no indications following the project PMS capacity building activities that any features of PMS would be adapted or whether government officials would be able to utilize the system or certain elements into their programmes in other areas of Afghanistan.

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3 The full analysis with the GIS analysis is provided in Annex 2.
ii. PMS is considered an entire land management system that is successful in Nangarhar, mainly due to the long-term dedication and commitment of the founder of PMS.

iii. PMS utilizes many of the natural attributes of the Kunar River in Nangarhar which is a strong flowing river with many of the natural resources necessary for the PMS method (e.g. large boulders). There are no other rivers similar to the Kunar River in Afghanistan, so it is doubtful that elements of PMS would be readily transferrable to irrigation schemes in other regions.

iv. The training provided by the project is insufficient to build the necessary capacities for government staff to integrate these measures into rehabilitation projects or adapt PMS completely into rehabilitation schemes. Much of the PMS approach was developed through trial and error over 10–15 years, which is impractical to attempt in other irrigation schemes of Afghanistan.

v. Communities benefiting from previous PMS interventions supported the approach because it utilized locally available materials and created work in the weaving of the gabions for canals.

Output 3. Basic mechanisms and capacities for production of virus-free potato seeds established.

48. The project created the basic mechanisms and capacities for the production of virus-free potato seeds, which was an ambitious objective in the project design considering the capacity limitations in Afghanistan for establishing such an innovative enterprise within the three-year duration of the project. Once the project employed a more practical, hands-on international adviser to guide the establishment process, more substantial results materialized and quickened development. However, more time is needed to support the production of breeder, foundation and certified seed on a sustainable, commercial scale. The results from activities to date include:

i. a functional tissue culture laboratory was established in Badambagh;

ii. ten government staff from ARIA, ISE and the Seed Certification Department (SCD) were trained in micro-propagation (Pakistan) and three staff were trained in ELISA testing (India);

iii. the ELISA test was carried out and three virus-free commercial varieties included for micro-propagation to produce pre-basic seed;

iv. around 85 kg of mini-tubers were produced for the production of two tonnes of basic seed for the 2019 cropping season;

v. five training courses were held on tissue culture and seed potato production at the national and local level for 300 farmers, extension officers and NGOs;

vi. two new greenhouses were constructed at Badambagh and four rehabilitated in Bamyan;

vii. a 20 tonne cold storage was built at Badambagh;

viii. booklets, manuals, brochures on tissue culture technology and potato production were published and distributed.
49. The international adviser on the project team for this component identified the following activities that had to be undertaken during the next 12 months in order to create a commercial potato seed industry:

i. increasing work in order to mass produce tissue culture plantlets and micro-tubers;
ii. developing seed potato certification guidelines and systems;
iii. supporting production of breeder and foundation seed in Bamyan;
iv. constructing a greenhouse in Bamyan for elite material multiplication;
v. producing foundation seed/basic-2 (target 30 tonnes);
vi. producing certified seed through private companies and ANSCU (target 300 tonnes);
vii. building capacities of virus-free potato seed growers in Bamyan through Farmer Field Schools training to produce improved seed potato;
viii. building capacities in establishing a seed potato certification scheme;
ix. supporting the establishment of a Seed Potato Farmers Group.

How has the projects’ implementation supported institutional and individual capacity development at the local and national levels?

Finding 6: The project strengthened capacities among counterpart ministries both in the field and in Kabul.

Water Accounting Training (Activity 1.1)

50. The project implemented a capacity development programme in water accounting aimed at 15–20 national level water resource managers in the three counterpart ministries (MAIL, MRRD and MEW) and FAO staff. The training involved learning new terminology and theoretical mechanisms of several interrelated hydrological and meteorological processes in order to establish a multi-disciplinary water accounting working group capable of designing, implementing, interpreting and communicating water accounting analyses. The justification for this training and the development of an inter-ministerial working group was due to the many water management challenges in the country including the lack of water-related data and effective water management planning, which adversely impacts the country’s ability to grow food. The group established an online communication forum, coordinates joint activities and resolves water supply issues.

Irrigation scheme rehabilitation (Activity 1.2)

51. PAIL officers enhanced their individual capacity through their active involvement in all fieldwork by project staff – information dissemination, needs analysis, feasibility studies, screening and prioritization of rehabilitation works, diagnostic analysis, designing and costing of construction works, contracting, monitoring and supervision of contractors, and certification of work completion. PAIL officers were involved in the institutional strengthening and registration of irrigation associations in project areas. They were also involved in the O&M training for irrigation association members to improve water management and the sustainability of the rebuilt canals and accompanying water management equipment and infrastructure.

Strengthening the Irrigation Associations (Activity 1.3)
52. At the community level, the project was active in strengthening local institutions by establishing new irrigation associations or converting existing farmer groups into formal irrigation associations – a total of 42 irrigation associations were established. To ensure better O&M of rehabilitated irrigation systems, irrigation associations were established in each irrigation scheme, and farmers using the irrigation canal became members. The executive board of the association comprises seven to ten villagers who are elected every four years and work on a voluntary basis. Each association is registered with the Irrigation Directorate (ID) of MAIL and has its own bank account. The association resolves agricultural problems in the village, including water-related conflicts. Irrigation associations are responsible for ensuring that the water is fairly distributed to all farmlands. The association keeps a logbook of every member’s land details and the amount of water required each season. The association plays a mediator role when members have arguments over the water timetable. The cost of maintenance was another previous issue that was resolved by having every member pay a fixed amount per area of farmland annually, which goes toward the maintenance of the rehabilitated irrigation canal.

Training on the PMS approach (Activity 2.3)

53. *Mirab* members, canal operators, PMS and government staff were trained in the PMS approach to irrigation rehabilitation and maintenance. These people and future trainees from the project-built training facility at the PMS compound could prove a valuable resource for helping the Government adopt the PMS approach into national irrigation scheme rehabilitation projects. However, most stakeholders felt that the training provided through the project would be insufficient to establish a solid core of government staff able to consider, advise on and implement the PMS approach in possible irrigation schemes located in other areas of Afghanistan.

Virus-free potato seed

54. Under Output 3, the project focused on building the institutional capacity of 10–12 MAIL staff (ARIA, ISE, SCD) to form the core team in order to produce virus-free potato seed. They were trained and mentored in all aspects all the way up to production of breeder seeds in Afghanistan, Pakistan and India. Training materials for potato tissue culture were prepared in local languages. The tissue culture laboratory and accompanying potato seed production systems were operational and expected to deliver the first crop of foundation seeds during the 2019 growing season. The establishment of this institutional capacity in Afghanistan is a major success for the project, but more time is required to complete the process of developing a sustainable certified potato seed industry capable of meeting grower demand for virus-free potato seed.

55. Capacity building of government departments in Afghanistan is still challenging. Often, following training, many trainees leave their poorly rewarded government jobs to join the staff of various international agencies, including the United Nations, international non-governmental organizations and local contractors. Another issue raised during the mission was the lack of necessary equipment and machinery in government offices that staff could utilize with their newly acquired skills. Unless donor-funded projects provide the necessary equipment, government staff cannot improve their skills through fieldwork and eventually lose their knowledge and skills acquired through training.
56. The project team has not undertaken the impact survey, and therefore there is no evidence to measure the extent of productivity and water efficiency improvements due to project interventions. Anecdotal evidence from farmers met during the mission suggests that Output 1 activities had contributed to the achievement of the project’s objective, but the sample size was small. Output 2 made no contribution to the project’s impact objective. Moreover, since no virus-free potato seeds had yet been sold to growers, Output 3 also made no contribution to the overall impact of the project.

What positive or negative impacts have project activities had on individuals within households and communities?

57. Beneficiary farmers in the three north-eastern provinces estimated that their rice yields had increased by 5–30 percent due to irrigation canal rehabilitation and improved water management practices administered by their irrigation associations. They estimated that their incomes increased by 15–30 percent due to improved yields and double cropping (rice-wheat; potatoes-rice; maize-wheat annual rotations). Also, some farmers were growing small plots of vegetables and improved productivity due to adequate water supply.

58. These farmers were also spending less time on maintenance of their canals (e.g. cleaning canals once per year rather than 3–4 times per year) and necessary repairs that often led to flooding of their cropping areas. With improved and stronger canal lining and structures, farmers no longer needed to spend time collecting natural resources to repair their canals and water management structures in the canals. This was one of the major tangible benefits of the project for beneficiaries in the targeted provinces. Farmers now pay a small fee based on their irrigated areas to their irrigation associations to cover the annual maintenance costs of their canal (AfA50 per jerib, or USD 3.30 per ha).

59. For individual and farming household beneficiaries interviewed during the mission, the resulting increased productivity of their expanded areas under irrigation led to improved food security, larger marketable surpluses of produce and increased household incomes. Farmers downstream of headworks in each canal system were the major beneficiaries relative to other farmers. A more equitable distribution of water was a major benefit for these farmers, who traditionally often received little, if any, water during critical periods of the crop growing season. They were also able to bring more fallow lands under irrigation and production. Downstream farmers could now grow irrigated rice and a second crop each year instead of growing dryland wheat, maize or peas that generated lower incomes.

60. With more consistent supplies of irrigation water, most farmers were able to expand their double cropping systems and further increase their on-farm productivity with larger marketable surpluses that increased their incomes. With improved irrigation and water control infrastructure, farmers now spent less time and effort in maintenance and repairs of their canals (only once per year, rather than three—four times per year previously). They no longer needed to cut down trees for strengthening canal inlets, banks and their diversion structures following construction of sturdy, well-designed irrigation infrastructure. With more equitable distribution of water and sufficient supplies to grow their crops, most individuals no longer conflicted with other farmers over access to water during critical periods in their cropping seasons.
Finding 7: The link with RIPA varied across each province, and the farmers in Baghlan supported by RIPA were not convinced that the improved production practices demonstrated by RIPA were worth the required increased costs.

61. Improved rice production techniques varied across provinces between RIPA plot project farmers. Beneficiaries in Kunduz and Takhar Provinces reported that they had received no support from RIPA to date, while farmers in Baghlan said that they had participated in RIPA demonstrations but were unsure whether they would adopt the improved growing techniques because the extra labour requirements and continuous surveillance of their rice crops would add to their production costs.

Have gender considerations been integrated in the design and implementation of the projects?

Finding 8: The project team did not adequately consult with women during the design stage nor include sufficient alternative livelihood support interventions to target women-headed household within the irrigation rehabilitation activities. However, most of the farmers working on developing a virus-free potato seed industry were women.

62. It is a good practice to begin with community consultations in order to understand the special needs of women given their limited mobility and social roles. For example, an irrigation support project implemented by FAO in the past included several alternative livelihood support activities, including orchard development, honeybee keeping, backyard poultry, seed development, flood protection works and catchment rehabilitation activities. These activities specifically focused on women, the landless or other marginalized people who would not directly benefit from irrigation development activities (FAO, 2005).

63. The design and implementation of the project did not adequately consider the roles of women both as members of the project team or as beneficiaries, nor incorporated the lessons learned from previous projects.

64. The evaluation team found that women were more adept than their male colleagues at the intricate work involved in meristem culture in the potato tissue production laboratory. An excellent initiative of the project was hiring three female interns (and two male interns) who had recently graduated from local agricultural faculties on six-month contracts to assist with work in establishing the foundations of a virus-free potato seed industry. They were willing workers who appreciated the opportunity to receive some work experience that could assist them in obtaining more permanent work in the agricultural field.

65. Gender concerns were integrated into the design of some irrigation structures such as in the construction of pathways to irrigation canals that could be hazardous, particularly for pregnant women, the elderly and young children. Some schemes included the construction of structures accommodating women’s needs, such as washing platforms. A benefit for some households following the rehabilitation of the canals and the construction of the water control structures was the establishment of more convenient household water supply points that removed the need for women and children to walk longer distances to springs or other water locations to fetch water for household consumption.
3.3 EQ 3: What needs were addressed by the project? What factors contributed to achieving or not achieving the intended outcomes?

Finding 9: The project contributed to addressing the need of rehabilitating and modernizing irrigation schemes in Afghanistan and the development of a commercial potato seed industry to boost productivity to international standards.

66. With the majority of Afghanistan’s irrigation infrastructure in disrepair, farmers need rehabilitated and modernized canals and water management infrastructure to improve water delivery and ensure a more efficient use of this resource. As demonstrated by farmers benefiting from the rehabilitated structures completed in 2017, quality irrigation infrastructure improves water availability, equity and reliability at key periods during the cropping season, particularly for farmers further downstream who traditionally received little, if any, irrigation water. This led to increased production of rice for these farmers and increased household incomes.

67. Similarly, there is a need in Afghanistan for improved potato seed to help boost productivity to international standards and provide higher production in potato growing areas, with the potential to develop a significant export industry. The entire quality potato seed supply chain needs to be developed. The project addressed the need to establish the foundations of the seed potato industry, particularly in Bamyan province, the main potato growing province, it needs to be addressed during the next 12 months.

Finding 10: The competence of the team to operate in often-insecure and difficult operational environments in the three north-eastern project provinces was the main factor that allowed the project to achieve its intended outcomes of improved productivity in rice growing areas. The team also needed to work with minimal capacities and infrastructure when establishing the basis for a local virus-free potato seed industry.

68. The main factor that contributed to the achievement of the intended results was the competence of the team in implementing project activities, and overall project management in difficult and often unstable operational environments. Each project province had different problems that led to setbacks, which the project teams needed to resolve in a timely manner to avoid extended delays in implementation schedules. PAIL staff needed to resolve local conflicts that usually arose at inopportune times during construction, which often threatened to derail tight schedules; hence, PAIL staff’s inputs at these critical times were conducive to achieving the intended results. The project team managed to achieve these results regarding rehabilitation of irrigation schemes in the three project provinces and establish the local institutional framework to deliver equitable water supplies to all farmers along the canals and maintain the canals for the benefit of farming households in these regions.

69. The approach to improving productivity was to establish regular and reliable water supplies to rice-growing farmers before RIPA would commence interventions in project areas. Since most canal rehabilitation sub-projects were completed in 2018, the next growing season will be the first season where most farmers will have equitable water supplies. Therefore, it is expected that the linkage of farmers with RIPA in these provinces would become more widespread as farmers now have adequate water supplies to benefit from the improved production practices demonstrated by RIPA. The linking of project beneficiaries with RIPA for improved rice production training will be a key activity for the team during the next 12 months.
The project needs more time because the team has not entirely achieved the intended outcome of establishing the basic mechanisms and capacities for the production of virus-free potato seed from Output 3 activities. However, the project team established a sound basis to achieve this outcome, which is considered a major result, i.e. establishing such an innovative enterprise in Afghanistan that previously lacked any capacities in the production of virus-free potato seed, the third major staple cereal crop. With extra time, it would be possible to expand the basic mechanisms and capacities for seed production into Bamyan Province where commercial seed growing could be established, which would form the basis of a profitable and sustainable high-quality potato seed growing industry. This should be the target for Output 3 if the project is extended by 12 months.

To what extent has the institutional and implementation set-up been conducive to achieve the intended results?

Finding 11: The strength of affiliations and partnerships between the three MAIL agencies responsible for improved seed production will be important for the ownership and sustainability of results within the potato seed industry.

Senior officials and deputy ministers from counterpart ministries stated that their continued support for projects such as OSRO/AFG/502/JCA was essential to improving food production in Afghanistan. Provincial and district government staff facilitated the participatory planning processes by mobilizing communities in project areas and discussing their requirements regarding rehabilitation of irrigation canals and water control measures.

The MEW is responsible for rehabilitation and construction of dams, headworks and main irrigation canals, and oversees the safety and stability of these structures. The MAIL is responsible for tertiary channels and on-farm activities, including irrigation and livelihood support. Institutional capacity was lacking, and project team members needed to assume responsibility for most of the activities associated with designing the canal infrastructure and overseeing the construction works. The project rehabilitated primary, secondary and tertiary canals in order to achieve the intended results of increasing productivity and production in the rice growing areas of the three project provinces. The project provided PAIL staff with on-the-job training to help build capacity in MAIL. Staff from all three counterpart ministries were also involved in formal training courses both in Afghanistan and abroad. Developing MAIL’s skills in participatory needs analysis, designing, surveying and supervising civil works aimed to provide the basis for them to continue irrigation development programmes in other river basins.

The other institutional set-up that will be conducive to achieving the intended results is the affiliation between the three MAIL agencies (ARIA, ISE, SCD) and their agreed responsibilities in establishing a virus-free potato seeds industry in Afghanistan. While the project team can assist and propose responsibilities among these agencies, they will need to collaborate and understand each other’s areas of responsibility along the supply chain and willingly cooperate in other areas of the supply chain to be able to sustainably deliver commercial quantities of certified seed to potato growers throughout the country.

The project built several important assets necessary to support this intended result (e.g. a tissue culture laboratory, a greenhouse and cold storage) and these MAIL agencies need to agree on and cooperate with regards to ownership of these assets following handover to MAIL at the end of the project. Stakeholders within MAIL had not yet discussed these
ownership and responsibility issues. During the mission, several MAIL staff requested guidance from FAO to assist decision-making regarding asset ownership and responsibilities. The continued and efficient operations of these assets will be dependent on a collaborative partnership between all MAIL agencies involved in the production of certified seed.

Was there good coordination and decision-making arrangements established among key partners?

75. A high-level coordination committee was established with three deputy ministers from the counterpart ministries that met every six months to oversee project progress, discuss problems and issues, recommend actions and agree on future work plans. Such an institution provides a forum for discussion among stakeholders and decision-making, and would be able to quickly resolve any disagreements. It was difficult for the committee to meet on a regular basis because each deputy minister had busy schedules and the project team spent inordinate amounts of time arranging briefings in addition to these meetings.

76. Project team members collaborated with PAIL staff during fieldwork, which facilitated efficient coordination between the two main partners implementing the project that assisted the achievement of effective results. PAIL staff were responsible for liaising with communities through mirabs and individual water users. Farmers met during the mission in Kabul, and project provinces were satisfied with their level of involvement in the project from initial discussions and prioritization of structures to the final sign-off of construction and handover to their responsibility of rehabilitated canals and equipment. Beneficiary farmers believed that they were adequately involved in all decision-making processes concerning construction, management, training and ownership of irrigation infrastructure. Farmers received no extension support or follow-up meetings from their local PAIL officers; they only visited local areas when they needed to accompany project team members to project locations.

Were there any implementation gaps and delays? If any, what are their causes and consequences on planned and implemented outputs?

77. Project designs generally overestimate what could be achieved in the time available and underestimate the security and capacity constraints relevant to Afghanistan. Initial delays in signing contracts, mobilizing key team members and other contractual delays meant the project actually started three months later than indicated on the signed contract. The causes for unintended delays to project implementation included the following:

i. Influential people in certain communities tried to reverse previously agreed procedures and responsibilities between the project teams and community members.

ii. Some farmers were reluctant to abide by the agreed water stoppage schedules in order for rehabilitation construction to proceed, which hampered contractor work plans.

iii. Deterioration in security hampered fieldwork in the three project provinces (the team scoped possible irrigation canals for rehabilitation in rice-growing areas of Nangarhar and Badakshan as contingency options).

iv. Due to security considerations, team members needed to travel from Kabul to the project provinces, and many field tasks needed to be managed and completed in restricted time periods.
v. Due to inadequate numbers of qualified and competent construction companies, most contractors could not build at two locations at once; hence it required more time for construction.

vi. Construction limitation of the canals because it coincided with the irrigation season and therefore construction was slow; in addition, diversion canals could not be built due to lack of space.

vii. The capacity of PAIL staff necessitated design work by the project team and the poor initial survey work also led to necessary alterations in contracts.

viii. Flooding during construction works led to delays and damages.

ix. There were procurement delays of up to three months.

x. There was a high turnover of senior staff within counterpart ministries, for example during the period of the project MAIL had three different deputy ministers and allocated four different project directors.

xi. Disruption in electricity and water supplies to the potato tissue culture lab at Badambagh required adding costly extra voltage and groundwater supplies during tissue culture processing procedures.

78. Project teams and PAIL staff worked to overcome these issues and minimize disruption through various local remedial actions. The project team abided by FAO Country Office security regimes and required security protocols, which were particularly important during field work. The project’s risk mitigation strategy monitored security concerns at the local level through communications with local communities, PAIL officers and private contractors prior to field visits. The involvement of government staff and communities throughout the design and implementation of all project field activities also helped overcome any delays caused by community leaders, individuals of government staff.

To what extent did the project make use of available technical, technological, financial and knowledge inputs to deliver outputs and achieve outcomes?

79. FAOAF has proven skills and experience in implementing irrigation and livelihood projects and was a key partner in several completed and ongoing irrigation rehabilitation projects. FAOAF was able to utilize this knowledge and skills to design and implement this project, which efficiently built on these previous experiences of implementing similar projects. These local competencies were also advantageous in establishing and strengthening local governance structures (i.e. irrigation association) in accordance with the government’s water laws and regulations administered by MAIL. Additionally, FAOAF procurement systems were efficiently used to purchase necessary equipment, supplies and services, and most importantly to contract local construction companies to rehabilitate canals and build infrastructure in often inhospitable conditions.

80. Although FAOAF had a limited technological background in developing a commercial improved seed industry in Afghanistan, the project team was able to utilize the knowledge and technical expertise available within the three MAIL counterpart agencies (ARIA, ISE and ANSOR) developed through their experiences in establishing an improved wheat seed industry previously funded by various donors and successfully commercialized. This local expertise was complemented by the international expert recruited by FAOAF to advise on and develop the foundations for a similar commercial potato seed industry in Afghanistan. However, there was no technical expertise or knowledge available among government
counterparts for establishing the foundations of an improved quality potato seed industry, and the project needed to establish the basis of this industry from scratch within the duration of the project.

3.4 EQ4: Are the projects’ results sustainable beyond their completion?

Finding 12: To date, results indicate that outcomes will be sustainable beyond the project since farmers who benefitted from the first rehabilitation works completed during 2017 have already increased their productivity and incomes due to more regular water supplies provided through rehabilitated irrigation infrastructure, strengthened irrigation associations and improved water management, including regular maintenance of their irrigation infrastructure.

The project aimed to develop more effective water management at the field level by training *mirabs* and irrigation association members in the O&M of upgraded irrigation canal structures to ensure sustainability of these project interventions. Communities were involved from the outset in making key decisions on sections of canals to be rehabilitated and other necessary water control infrastructure. This participatory approach helped generate community ownership of the new structures, which contributed to sustainability of project results. As the farmers and local communities experience the benefits of their rehabilitated canals they will continue to support their irrigation association in managing water supplies efficiently and maintaining canals for the benefit of all farmers living along the length of the canal (and not just the few farmers at the head waters). Such benefits and improved livelihoods will contribute to the sustainability of project interventions.

As the demand for quality potato seed increases, laboratory staff will need to work full-time producing micro-tubers and basic seed to supply the expanding industry. The directors of ARIA, ISE and SCD (responsible for ANSCU) all confirmed with the mission they had sufficient budgets to employ all the required staff and operate the laboratory full-time for producing tissue culture and basic seed for supplying private companies to grow certified potato seed. They also intended to employ potato inspectors to monitor good growing practices are continued throughout the potato seed supply chain.

To what extent were sustainability considerations taken into account in the design and implementation of interventions?

Finding 13: The training centre at the PMS compound in Nangarhar is a valuable asset for the organization, which will assist with their training programme for government staff and farmers from across Afghanistan. The project established a basis to create a vibrant seed potato industry, but more time is required to involve private sector players and move the bulk of the activities to the potato growing regions during the one-year extension – profitability should drive sustainability of this industry.

The project involved local communities from the outset to build a sense of community ownership and sustainability. Following canal rehabilitation, it was expected that beneficiary farmers would now spend less time maintaining their irrigation infrastructure and rebuilding damaged areas often by cutting trees to line canals. This resulted in a more reliable and equitable supply of irrigation water distributed to farmers along the length of the canals in accordance with their identified needs, which helped reduce disputes over access to water at critical periods during the cropping season.
84. With traditional water control structures made of local materials, farmers did not have the proper means to regulate and withstand massive water flows during spring thaw; canal inlets were usually wiped out; and farmers needed to spend time and energy to rebuild them, including cutting trees from surrounding areas. Project-built structures therefore contributed to environmental sustainability through improved water control and reduction in damage caused by floods to farmlands and other areas. Farmers no longer needed to cut trees to strengthen canal inlets (500—1,000 trees used each year in Takhar Province), banks and locally made diversion structures. This was a major benefit mentioned by mirab members met during the mission in Takhar Province.

85. Three MAIL agencies – ARIA, ISE and SCD – will be responsible for operating and expanding the virus-free potato seed enterprise established by the project and supporting the production of certified seed by seed growers for sale to potato farmers. Much of this work would be expected to expand to Bamyan, the prime potato growing province in Afghanistan. All three agencies have experience developing improved certified wheat seed in Afghanistan during the past 10–15 years, which should provide a sound basis for developing a similar potato seed enterprise. Laboratory staff trained by the project also need to work in their original MAIL positions and divide their work timetable with their tissue culture work at Badambagh.

Were exit strategies appropriately defined and implemented, and what steps have been taken to ensure sustainability of results?

86. On-the-job training of farmers and the establishment of trained members of registered irrigation associations was an important component of the exit strategy so that local communities could properly manage and allocate their irrigation water supplies and provide ongoing maintenance to their improved irrigation infrastructure. The farmers and mirab members interviewed during the mission reported that these systems are fully functional and that farmers are enjoying the benefits of improved water management and equitable and reliable water distribution during the growing season, and therefore are amenable to pay the maintenance fees to their irrigation associations. These functioning systems and farmer satisfaction suggest these structures will be sustainable after project closure.

87. The project needs another year to ensure sustainability by continuing to develop the basic mechanisms and capacities to supply certified potato seed to growers. This was not adequately defined within the project design. In addition, the establishment of the basics of a virus-free potato seed industry within three years of the project duration was overly ambitious. The project aims to hand over the enterprise to competent staff in place who are capable of operating the tissue culture laboratory and the necessary field activities to provide basic potato seed for multiplication by commercial growers. The project also needs to build the capacity of commercial entrepreneurs seeking to grow elite and certified seed to sell to growers, and the capacity of potato growers to reap the full productivity benefits from utilizing improved potato seed. However, support to these downstream players in the potato supply chain will last only a few months (if the project is extended by 12 months) and it will be difficult to gauge at that stage in 2019 how sustainable the achievements of Output 3 will be.
How did the development of partnerships at the national level contribute to the sustainability of results?

88. The FAO project team maintained a working relationship with MAIL and JICA at the national level, which contributed to sustainability of results. The FAO Country Office was in an advantageous position to learn and adopt many sustainable practices into the project design and implementation from previous FAO-implemented irrigation rehabilitation projects in Afghanistan, such as the World Bank-funded Irrigation Restoration and Development Project. The usual modus operandi in these projects was to utilize government staff as much as possible in participatory processes with local communities, identify priorities, and design and implement the construction of rehabilitation works in irrigation canals. However, the ID within MAIL lacked sufficient capacity and such competent staff were not available for the project. Therefore, project engineers needed to complete most of the design and construction tasks during regular field visits from Kabul.

89. While FAO has experience in implementing irrigation scheme rehabilitation and training projects, establishing the mechanisms and capacities for a virus-free potato seed industry was a new venture for FAO in Afghanistan. The relationship developed between FAO and MAIL agencies (ARIA, ISE and SCD) was critical to the effective implementation of project activities and results to date.
4. Conclusions and recommendations

4.1 Conclusions

Conclusion 1. (EQ.1) The project outputs on rehabilitation of dilapidated irrigation infrastructure and development of an improved seed potato industry contributed to improve food production. The availability of high-quality potato seeds has the potential to increase profitability for all industry players and drive a sustainable and vibrant potato industry.

The project was relevant to the rice sector - the second major staple crop in Afghanistan and a higher value crop than wheat – as rice growers have the potential to increase their productivity when compared to global industry best practices. This will become increasingly important as climate change possibly reduces snowfall and volumes of water available each year. The project has established the basics for a more productive and dynamic local potato industry by establishing an innovative sector to support future development of the industry.

Conclusion 2. (EQ.2) Rehabilitation of irrigation and water control structures benefited downstream communities allowing them to increase their land under rice production. Establishment of the foundations of a virus-free potato seed industry was a major achievement considering the capacity shortfall in Afghanistan to develop such an industry.

The project trained irrigation association members in more efficient water management operations and maintenance in order to increase water availability, equity and reliability throughout the cropping season. Equitable distribution reduced the number of disputes and allowed all farmers to increase their rice production. The project supported government intentions to adopt PMS into national irrigation projects, despite political interest; it is difficult to assess the value added by PMS to project outcomes. Raised awareness about PMS could not justify further project expenditures compared to the reliable methodologies demonstrated in Output 1 that delivered cost-effective results. OSRO/AFG/502/JCA also established the basis for a sustainable virus-free potato seed industry as a public-private partnership. Women were adept technicians in laboratory tissue culture work and associated activities to produce virus-free potato seed, but the project offered limited alternative livelihood support activities besides seeds to guarantee a broader range of women participation.

Conclusion 3. (EQ.3) Competent project teams able to work effectively in difficult operational environments was the main factor contributing to effective outcomes.

Project team members needed to travel from Kabul to the north-eastern provinces for project implementation, which often meant insufficient time to adequately cover all activities in Output 1 including accurate surveying and the quality of work of contractors. Team members were also instrumental in guiding the development of the virus-free potato industry in Afghanistan, training competent staff and industry stakeholders, and building the necessary infrastructure.
Conclusion 4. (EQ.4) Newly built water control infrastructure will be sustainable provided farmers practice regular maintenance. Farmers interviewed by the mission who had benefited from structure rehabilitated in 2017 experienced the benefits of modern irrigation infrastructure and therefore they were determined to maintain these improved enhancements to their livelihoods. Improved incomes and profits will drive sustainability in any industry – rice, potatoes, etc.

4.2 Recommendations

To FAO, donors and project designers

Recommendation 1. Projects need to have integrated outputs and outcomes to produce a consolidated impact on project beneficiaries in a realistic time frame considering the contextual constraints in Afghanistan. OSRO/AFG/502/JCA extended with a one-year no-cost extension.

93. The project design encapsulates three distinct outputs that could not be interlinked or integrated together to produce a consolidated project aimed at increasing rice productivity and water efficiency. In the project, the output activities should have been interdependencies to produce outcomes and a consolidated impact. The project would have been more effective if it were divided into three individual projects related to three specific sectoral development targets. FAO has extensive experience implementing irrigation rehabilitation and capacity building projects in Afghanistan. The tried-and-tested model works effectively and in fact, roughly 75 percent of the project budget was devoted to Output 1. Yet, the project team needed to divide their focus and efforts between three disparate fields of work in three geographically different areas of Afghanistan.

94. While Output 3 activities did not contribute to the project’s impact on beneficiary growers, the output interventions did establish a foundation and clear path to the provision of certified high-quality potato seed to farmers. The problem with Output 3 results was that the project duration was insufficient for introducing a new technology into Afghanistan such as building a virus-free potato industry – at least five years are needed to establish the venture and support entrepreneurs producing certified seed and growers utilizing virus-free potato seed for at least one season.

95. Irrigation projects implemented in complex operational environments, such as northeastern Afghanistan, need to be of four-five years duration. Funds were not disbursed evenly over the duration of the project due to the amount of time needed to complete the initial irrigation scheme surveys, diagnostic analyses, water management infrastructure designs, prepare tenders and contract companies for rehabilitation works, and establish and build the capacity of the irrigation associations. Most of this work needed to be completed by project team members during their visits to project areas from Kabul. The project design generally overestimated what could be achieved in the time available. The security situation also deteriorated in the three project provinces, which added difficulties to fieldwork and achievement of results.
To FAO, donors and MAIL

Recommendation 2. Irrigation rehabilitation projects should include training to demonstrate improved cropping practices to drive productivity improvements as well as livelihood support activities to help farmers diversify their livelihoods, grow alternative crops and build their resilience to external shocks.

96. Output 1 interventions and the linkages with RIPA demonstration plots focused on increasing productivity and production of rice among farmers in the north-eastern project provinces. OSRO/AFG/502/JCA was fortunate to link with RIPA to provide this training and demonstration support to farmers, although the effectiveness of these linkages between projects cannot be gauged at the time of the evaluation because the RIPA interventions were just starting in project areas. Nevertheless, all irrigation rehabilitation projects need to provide training and support to farmers to assist them in adopting improved production techniques and in driving on-farm productivity improvements as soon as possible after the commencement of these projects. For irrigation rehabilitation projects, this training is better placed within the project framework rather than linking with other external training facilities or projects. This would provide more control over this key activity, and project teams would be more influential in driving benefits to achieve the project impact (i.e. productivity improvements and water efficiency gains).

97. Farmers growing cereals practice continuous cropping of their land, which leads to soil deterioration and a higher probability of problems caused by pest and disease (and an increased dependence on agro-chemicals). Changing weather patterns, unpredictable rainfall and prolonged dry periods are also increasingly impacting farmers, and some interlocutors, including the Deputy Minister of MEW, are beginning to question the long-term viability of growing rice in Afghanistan.

98. Project training for improved cropping practices, such as crop diversification, should therefore include a comprehensive package of activities that would help improve soils and longer term cropping outcomes. Crop diversification depends on many issues, including: land size, farming experience, asset wealth, location, access to agricultural extension services, information on output prices, low transportation costs and general information access. Diversified cropping systems, in general, tend to be more agronomically stable and resilient mainly because they are usually associated with reduced weed and insect pressures, reduced need for nitrogen fertilizers (especially if the crop mix include leguminous crops), reduced erosion (due to the inclusion of cover crops), increased soil fertility and increased yield per unit area.

99. Crop diversification is a viable climate-smart agriculture practice that significantly enhances crop productivity and consequently resilience in rural smallholder farming systems. Project beneficiaries will remain predominately rice growers; however, development assistance projects should demonstrate the benefits of crop diversification through rotations and inter-cropping in climate-smart agriculture and through increased productivity (alternative crops, such as legume and cereal crop productivity) as well as of enhanced resilience (household income, food security and nutrition).
To FAO as the implementing partner of irrigation rehabilitation projects

Recommendation 3. Capacity building activities of government staff should be based on an assessment of needs, available resources (before and after the project) and aim to build applicable skills to ensure sustainability of results.

100. Capacity building of government institutions needs to be targeted at practical and sustainable outcomes. The project provided in-field training and mentoring for PAIL staff and irrigation association members to competently manage, operate and maintain rehabilitated water control structures. Formal training courses in Afghanistan and abroad concerning water accounting and the PMS approach to irrigation management did not always transfer into useful skills for government staff that would assist them in their daily work. Government staff met during the mission appreciated the training but were not utilizing the full array of their newly acquired skills and could not explain how these skills were directly relevant in their work responsibilities. Without an opportunity to use these practical skills in their work, these government staff will likely quickly lose these skills.

101. It is uncertain whether any counterpart ministry has the resources or capacity to organize sufficient in-house training to maintain the technical skills of their staff developed through the project training courses. Therefore, project teams should critically assess the capacities and resources of government agencies, before and after the project, and align training courses and equipment purchases accordingly, so that learned skills can be readily applicable to specific work areas under the responsibility of government staff.

To FAO as the implementing partner and designers of irrigation rehabilitation projects

Recommendation 4. GIS should be considered a necessary tool to support evidence-based decision-making, and more accurate monitoring and assessment of project progress and results.

102. GIS monitoring and evaluation of project progress needs to be included from commencement of irrigation support projects. Irrigation rehabilitation projects suffer from a lack of regular monitoring and evaluation. Since the primary purpose of monitoring was to achieve efficient and effective project performance, GIS should be an integral part of the Management Information System and a regular internal activity in any irrigation project. GIS monitoring of irrigation canal rehabilitation and command areas would provide real time results on progress and early warning of problems, such as canal damage and leakage. GIS can also be utilized for multiple tasks and monitoring indicators to provide an array of performance evaluation information – realization of the irrigation potential; production and productivity improvements (maximization of crop yields); changes in land use; extent of double (or triple) cropping; efficient management of irrigation water; and improvements or deterioration in irrigated lands, for example salinity and water-logging.

103. There are methodological problems in developing cost-effective and reliable approaches that can be used with the resources and expertise available. GIS would assist in overcoming these problems and help establish baselines, monitor project progress, identify limitations, assist with work planning, and increase the irrigation potential of rehabilitated systems. There are several open source GIS software programmes and geospatial data is freely available. These solutions may now guarantee a more cost-effective and sustainable approach to allow for more investment in capacity development.
104. FAO supported the establishment of a GIS monitoring unit in MAIL, but more support would likely be required to enable MAIL to monitor such activities around an irrigation rehabilitation project. Skilled GIS technicians are in high demand and often difficult to retain in government departments. Therefore, designers of agricultural irrigation projects may need to allocate sufficient funds to employ external GIS monitoring services that can complement any information provided by in-house GIS technicians and provide a wide selection of monitoring and evaluation information that is relevant to irrigation rehabilitation projects in order to inform accurate decision-making.

To the FAO implementation team, MAIL, MEW and MRRD

Recommendation 5. All stakeholders should critically evaluate and validate the PMS approach, screen best practices and document lessons learned and experiences.

105. The project team should evaluate and document lessons learned from the PMS system operational in Nangarhar. The FAO team, and MAIL, PMS and staff from MEW and MRRD (if available) should evaluate and validate the PMS approach, screen best practices and document lessons learned and experiences. This could form the basis of an operations-type manual that would describe the context that allowed PMS to work, institutional structures and responsibilities, transferability of certain PMS practices, technical considerations and sustainability of the PMS approach to determine the most effective interventions. The result of this analysis would prepare the foundation for training as well as other dissemination materials. Such a document could be invaluable for government staff and the intention to expand PMS into national irrigation rehabilitation projects.

To FAO as the implementing partner and to designers of irrigation rehabilitation projects

Recommendation 6. Gender inclusiveness in irrigation rehabilitation projects could be addressed by targeting women’s participation in the project through a range of agriculture-based livelihood activities and/or promoting their inclusion as members in the existing water user associations.

106. An effective way to incorporate gender inclusiveness in irrigation rehabilitation projects is through implementation of a broader range of alternative livelihood support activities. In this project, in addition to involving women in activities associated with the production of virus-free potato seeds, limited alternative livelihood support activities were offered. Parallel activities could enable women to actively participate and could empower them as secondary earners.

107. Another key element is to encourage communities to include women in the local water users associations to strengthen their bargaining position as resource users within households and communities. An advocacy strategy for the inclusion of women in community decision-making bodies should formally be consulted in the design of future FAO rehabilitation and infrastructure projects as well as community natural resource management projects.
Bibliography


Appendix 1. Map of project areas

Source: Project team - OSRO/AFG/502/JCA
Adapted from UNITED NATIONS, World Map, February 2019.
Corrigendum
Updated on 17/09/2021

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