

Final Evaluation Report

Enhancing the adaptation and strengthening the resilience of farming to Climate Change Risks in Fergana Valley

UNDP ID: #117191

Country:	Uzbekistan
Region:	Central Asia
Focal Area:	Climate Change
Implementing Agency:	United Nations Development Programme
Executive / Implementing Partner:	Chamber of Commerce and Industry (CCI)
Project Timeframe:	December 2018 – December 2021

Prepared by:
Richard Sobey, International Consultant / Team Leader
Adila Tadjibaeva, National Consultant

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Disclaimer

The Final Evaluation (FE) views were discussed with UNDP, the Implementing Partner – Chamber of Commerce & Industry (CCI), Project Board members, local government partners and other key stakeholders. There was a debriefing / stakeholder workshop held to present views and refine findings. UNDP, the Project Manager, and CCI provided comment on the draft report before finalization.

The views held within this report are those of the FE team.

Acknowledgement

The FE Team would like to acknowledge all project partners who supported the development of this report for the project.

Abbreviations and Acronyms

agromet	agrometeorology; used to describe the localized crop-based weather forecasting system
Amudar	a new software app for weather and crop disease & pest forecasting
app	software application (on a computer or smart phone)
APR	Annual Project Report
Atlas	UNDP project tracking system
AWPB	Annual workplan & budget
bulletin	advisories for farmers, based on weather, crop production and pest & disease control (i.e. agromet-based)
BWA	Business Women's Association
CCA	Climate Change Adaptation
CCI	Chamber of Commerce and Industry (as the Implementing Partner)
CHS	Centre for Hydrometeorological Services (State agency, a.k.a. Uzhydromet)
DoA	Department of Agriculture (Regional level)
Executive	~IP
FE	Final Evaluation (of the project)
horticulture	intensive fruit & vegetable production, often in hothouses with advanced drip irrigation
hydromet	hydrometeorology
IP	Project Implementing Partner (CCI)
IPM	Integrated Pest Management, which often includes organic farming methods
Khokimiyat	local government administration
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
MWR	Ministry of Water Resources
NIM	UNDP – National Implementation Modality
PB	Project Board
PM	Project Manager
PPQA	Plant Protection & Quarantine Agency; a key agency that the project worked regarding agriculture advice to farmers
PRF	Project Results Framework (~logframe / Strategic Results Framework)
PT	Project Team
RP	Responsible Party (ies) (implementing on behalf of the IP)
SMART	Specific, Measurable, Achievable, Relevant and Time-bound (for logframe indicators)
Smart	using SIM cards for weather data transmission; Smart phones with internet for receiving telegram messages
station	a micro-climate agromet station for crop-based weather data collection and transmission
telegram	a smart-phone group messenger service, similar to WhatsApp
TF	UNDP Russia Trust Fund (donor)
TRAC	Target for Resource Assignment from the Core (UNDP funds)
UNDP	United Nations Development Programme
UNDP CO	UNDP Country Office
WMO	UN World Meteorological Organisation

UNITS

ha	- hectare (100 m x 100 metres)
m	- million or meters
US\$	United States Dollar
soms	Uzbekistan currency (US\$1 = 10,700 soms on 8 th September 2021)

Executive Summary

The executive summary is a 9-page summary of the Final Evaluation (FE) report.

Project Title	Enhancing the adaptation and strengthening the resilience of farming to Climate Change Risks in Fergana Valley		
UNDP Project ID	117191	Fund approval (Russia UNDP TF)	Nov-18
Trust Fund ID	00206	Project document signature	Dec-18
Country	Uzbekistan	Project manager hired	May-19
Region	Central Asia	Inception Seminar	Jun-19
Focal Area	Climate Adaptation	Final Evaluation	Sep-21
Strategic Program	UNDP Strategic Plan	Closing Date	Dec-21
Trust Fund	UNDP Russia TF		
Modality	UNDP-supported National Implementation Modality (NIM)		
Executive / Implementing Partner	Chamber of Commerce & Industry (CCI)		
Other Partners / Responsible Parties	Plant Protection & Quarantine Agency (PPQA); Tashkent Inha University; Regional governments of Namangan, Andijan & Fergana		
Project Financing:	at Approval (US\$)	at Final Evaluation (US\$)*	
[1] TF financing	800,000	800,000	
[2] UNDP contribution	0	301,692	
[3] Government	0	124,382	
[4] Other partners	800,000	1,135,767	
[5] Total co-financing [2 + 3+ 4]	800,000	1,561,841	
PROJECT TOTAL COSTS [1 + 5]	1,600,000	2,361,841	

*Expenditures through to 15th August 2021

Project Description

Project Description

The project was aimed at ensuring that farmers benefit from sustainable management of natural resources and have improved resilience to climate change. The project objective was to reduce economic risk and improve livelihoods by increasing the export potential of the agro-sector. This was to be achieved through enhanced resilience of farmers and institutions to the impact of climate change. There were two components in the project:

1. Equipping policy-makers & institutions with the tools for sustainable use of natural resources and addressing climate change in agro-production in the horticulture and vegetable sectors
2. Enhancing the export potential of small-hold farmers through horticulture & post-harvest production, and improving ability to cope with climate change, to ensure food security & resilient livelihoods, while engaging women and youth

Project Barriers

- Limited policies on the administration & adaptation of agriculture practices to climate change impact
- Weak knowledge by policy-makers & farmers on the climate change reality and on adaptation measures
- Limited access of small-hold farmers to advanced technology & infrastructure to respond to climate change
- Inefficient post-harvest handling and storage

Project Approach

The aim of the project was to create institutionalized integrated services for farmers in the Fergana Valley, that would enhance their adaptation to the impact of climate change. This was to be achieved via:

- Enhancing regional government capacity to understand the impact of climate change on agriculture and mainstream climate change solutions into local development planning
- Supporting farmers to be more efficient in their use of natural resources (e.g. water), and in agriculture techniques, with a view to increasing resilience to weather variability
- Supporting farmer resilience by installing agriculture-based weather stations to provide localized weather forecasts and early-warning alerts

Project Location

The project location was in three regions in the Fergana Valley, namely Fergana, Namangan and Andijan, working with their local governments and farmers, the Chamber of Commerce & Industry (CCI) and the Plant Protection & Quarantine Agency (PPQA).

Project Management

The project was steered by a Project Board (PB), chaired by the CCI, who acted as the Implementing Partner (IP). The project established a Project Team (PT) which was led by a UNDP-appointed Project Manager (PM), who reported to CCI and UNDP. The project was under UNDP-supported National Implementation Modality.

Purpose and Methodology

The objective of this Final Evaluation (FE) was to gain an independent analysis of the achievement of the project, as well as to assess its sustainability and impact. The report focuses on assessing outcomes and project management. The FE additionally considered accountability and transparency, and provided lessons-learned for future projects. The overall approach and methodology followed UNDP Guidance for Conducting Evaluations. The FE was an evidence-based assessment and relied on feedback from persons who were involved in the design, implementation, and supervision of the project.

Evaluation Ratings Summary

UNDP-supported projects of this type require the FE to evaluate the implementation according to set parameters and ratings. The summary ratings of this evaluation are presented:¹

Exhibit 2: FE Ratings Summary Table

1. Monitoring & Evaluation	Rating	2. Implementing Agency (UNDP) & Implementing Partner (CCI) Execution	Rating
Overall quality of M&E	S	Overall quality of Implementation / Execution	HS
M&E Design at entry	MS	Quality of UNDP Implementation	HS
M&E Implementation	HS	Quality of Partner Execution (CCI)	HS
3. Assessment of Outcomes	Rating	4. Sustainability	Rating
Overall Project Outcome	HS	Overall Likelihood of Sustainability	MU
Overall Effectiveness of Results	HS	Financial resources	ML
- Objective	n/a	Socio-economic	ML
- Outcome 1	MS	Institutional framework & governance	ML
- Outcome 2	HS	Environmental	MU
Efficiency (cost)	HS		
Relevance	HS		

NB: Assessment of Overall Project Outcome includes Effectiveness of Results (Objective, Outcomes), Efficiency and Relevance

A detailed summary of the project is presented:

Exhibit 3: FE Achievement Summary Table

Project: UNDP Russia TF - Enhancing the adaptation and strengthening the resilience of farming to Climate Change Risks in Fergana Valley (UNDP ID: #117191)
Achievement Description & FE Rating
Outcomes/ Results
Overall Project Achievement - The overall rating is Highly Satisfactory
The achievement of the outcomes should lead to the project objective or goal which in this case can be taken as the project title. Outcome 1 and 2 were rated as moderately satisfactory and as highly satisfactory, with the Outcome 2 of higher significance and therefore weighting. The project had no real shortcomings.
Justification: There were a number of high points under Outcome 2, which worked well together and gave the project gravitas, not only on a technical level, but also on an institutional and policy level. These were augmented by the inclusion of climate change impacts being mainstreamed into a regional development plan. The high points in concerned: Plant Protection & Quarantine Agency (PPQA) improvement in the delivery of much better quality extension services; the use of agrometeorology (agromet) micro-climate weather stations to provide localized weather forecasts; the provision of software to predict the risk of plant disease & pests; and the demonstration of horticulture projects using these advanced technologies, as well as other climate change adaptation (CCA) measures, such as drip irrigation, and cold-storage units.

¹ The methodology for the ratings is presented in **Annex 9**

Effectiveness - Outcome 1 Achievement – Moderately Satisfactory**Outcome 1 - Equipping institutions with tools to deal with climate change in agro-production in the horticulture sector**

There were seven indicators attached to the Outcome 1 level which were rated as: satisfactory (3); moderately satisfactory (1); and moderately unsatisfactory (3). However, the indicators varied in terms of importance.

Justification: The high point was the development of the Namangan regional strategy with the inclusion of sub-chapters on climate change impacts and on preparing for the green economy which were good. This was graded as satisfactory along with indicators for training and for promoting Integrated Pest Management (IPM) techniques. Whilst the project design envisaged coding software for agro-planning and crop yield forecasting, this was perhaps a step too far for the project which was limited by time and funds. What Outcome 1 achieved was laying down the foundations for implementation of Outcome 2, in exposing local government and their agriculture administrators to the importance of applying modern CCA technologies to agriculture, which were then demonstrated under Outcome 2.

Assessment of climate change in horticulture, with a focus on economic / export potential, regional development, and gender

The study mentioned climate change impacts such as high summer and mild winter temperatures (lack of snow or cold snap / secondary frosts to kill and reduce plant diseases / pests), and heavy rainfall in the spring causing blossom drop / damage. Whilst climate changes in the Fergana Valley were clearly presented, the study was not so detailed on explaining to decision-makers what actual adaptation measures farmers could take.

Regional development strategy and counterparts trained in climate change

Namangan Development Strategy (2020-30) was prepared with the inclusion of sub-chapters on climate change impact and associated risk, and on the development of a decarbonized green economy. Project support for mainstreaming climate change risk and mitigation into regional development planning, was a first, and was a useful template for other regions. Seventy-seven government staff were trained in these topics.

Training on Integrated Pest Management (IPM), in tandem with introducing micro-climate weather stations

An IPM guideline was prepared, so that PPQA could promote its contents via their phyto-consulting centres and telegram groups. Project also prepared a disease and pest identification & control manual.

Agro-planning software for forecasting of crop yield and export volume

Due to covid, this output was postponed and was thereafter limited in scope. The expectation is for the software to be piloted with the Department of Agriculture (DoA) in the district Yangikurgan, of Namangan.

Effectiveness - Outcome 2 Achievement - The overall grading is Highly Satisfactory**Outcome 2 – Encouraging smallholders to export through improved CCA including post-harvest measures, to ensure food security / resilient livelihoods, while engaging women and youth**

There were seven indicators attached to the Outcome 2 level which were rated as: highly satisfactory (4); and moderately satisfactory (2); and satisfactory (1). There were three indicators which were of higher importance and were all graded a highly satisfactory. These concerned:

- Improvement in PPQA extension services, which were manifested through three phyto-consulting centres, and the creation of regular farmer bulletins, which were delivered to telegram user groups accessing smart phones
- Establishment of 24 agrometeorology (agromet) micro-climate weather stations, with two software platforms being hosted by Tashkent Inha University, for the provision of weather forecasts, allied to plant disease & pest risk forecasts
- The establishment of 14 horticulture projects, which were designed to utilize CCA best practices. These sub-projects demonstrated water-saving methods, became hosts of the weather stations, and members of the telegram subscriber groups to receive the early-warning farmer bulletins on weather change and plant disease & pest problems

Weather stations installed to provide localized weather forecasts for farmers

Twenty four micro-climate agromet stations with two designs were installed. There were: nine German-designed T-Warner stations using the software FieldClimate; and 15 project-designed stations and software called Amudar. They were called agromet stations because the weather and soil sensors are designed and placed closer to the agriculture crops, and so are more useful and accurate for crop growing data and predictions. They are GPS located, and connected to the internet via a SIM card. They measure air & soil temperature, air & soil humidity, rain, wind direction & speed, saturation dew point, evapotranspiration, and vapour pressure. Thus for example, the accuracy in predicting frost is much better for these micro-climate stations. Their range in the Fergana valley is taken to be up to ~80 km² (5 km radius), although it can be more in a flat area. A Tashkent Inha University consultancy called Amudario, was responsible for installing the agromet stations and creating predictive software, called Amudar.

The location of the stations was: Namangan district - Chartak x 3, Yangikurgan x 2, Turakurgan x 2, Chust; Andijan - Andijan x 3, Asaka x 3, Khodjaabad x 2; Fergana - Altiarik x 3, Kuvasay city x 3, Kuva x 2.

Software infrastructure for agromet early-warning

The project introduced an early-warning services platform and software application (app) called FieldClimate, which uses the weather data from global online weather forecast services, and the micro-climate data from the T-Warner stations, in order

to model plant disease and pest problems. The project also developed its own platform and app, called Amudar, which uses the same global weather services, but with the climate data coming from the project-designed stations. This meant that a much more affordable system was also delivered. For both apps, the 'cloud-based' system consisted of a server for data storage, a system platform, and a laptop or Smart phone with the software app.

The aim for the Amudar application is for interactive weather graphs, with a forecast on disease spread (for 6 fruits & 43 diseases). The algorithm is expected to take into account not only the local weather patterns, but also local horticulture crop varieties, and locally-adapted and / or endemic plant disease and pests. The Amudar app presentation is in Uzbek and Russian language. Tashkent Inha University (School of Computer Science) and their Amudario research consultancy are responsible for hosting the agromet services to provide early-warning plant protection advice to farmers. Amudario will continue to subscribe to the global weather forecasts until end-2022.

The project has been very effective in establishing this system, and then going on to design a domestic version, that is more tailored for the farmers in the Fergana Valley. The Amudar software is in operation, although it is now being updated to include data from the insect pheromone traps (which have also needed to have software coded for them).

Insect Pheromone Traps

The project has been piloting a pest monitoring system to identify problem pests / emerging infestation. Twelve pheromone traps (trap + camera + telemetric picture transmission using a SIM card) have been deployed, and a data management system designed. The system is using algorithms (software code) to interpret real-time and time series pictures of pest species, pest stage of development and densities on the traps to predict infestation. The plan is to integrate this Smart-trap information with the micro-climate station data analysis.

PPQA extension services to provide climate risk / impact information to farmers

A phyto-consulting centre was opened in each of the three regions. A key delivery method for disseminating the advice to farmers was via telegram groups which were created, and based on each of the 24 stations. The PPQA then designated officers to coordinate their regional-level early-warning farmer advisories (bulletins) to the telegram groups. i.e. from the information generated in the FieldClimate and Amudar apps. The bulletins were tailored for each station telegram group and usually sent around twice a week.

Prior to the project, the capacity of PPQA to provide such services (quality and delivery of such timely information) was limited. The project has been successful in working directly with the PPQA. The uptake of these bulletins in a simplified format for farmers to support disease / pest control, has been good. The accuracy and speed of localized pest control has increased – most important is a timely forecast, allowing time for actions to be effective.

A concern at present, is that the PPQA telegram channels are putting out too much advice, that there could be farmer fatigue with so many messages. In order to maintain an early-warning system, and filter out excess information, there could also be a facility for SMS 'push notification messages' agreed with telecom providers.

At present, the number of farmers using the telegram group services is limited, as only fruit farmers within a 5 km radius of a station were included. However, prediction models for vegetable crops are expected to be added to the software, so the number of farmers accessing the telegram messages will significantly increase. There are some challenges to overcome such as: lack of awareness of the channels; lack of access to smart-phones; and overload of PPQA 'blog-style' information.

Making an interactive farmer-friendly interface on the Amudar app itself (in addition to the summarized but frequent messages sent out on the telegram channels) could also provide an alternative. E.g. provide a link and 'select 10-day weather forecast and a certain crop, to read the agromet advice on a particular plant disease / pest risk and what to do. At present the farmer receives all messages on all crops and all diseases being sent.

Horticulture projects

Fourteen horticulture business development projects were supported. Originally seven projects were selected, but with the advent of extra funds (from UNDP and Japan) for covid response activities, it was possible for the project to support 14 projects. From 62 proposals, 14 were selected in 2020, and with project technical expertise and equipment supplied, they are now all in operation. The project investment was \$370,482, with investment of the cooperatives and enterprises at \$1,132,744. The employment generated was 538 persons. Eight projects are cooperative, five private and one is a state research institution.

Study on the development of the agro-insurance sector

A study on agro-insurance was conducted (2020). Based on the results, three seminars were held with 89 participants. Whilst insurance is an adaptation measure, it treats the symptom and not the cause. A last issue at present for the sector, is that in order to receive a pay out for crop damage, only official weather data from the Centre for Hydrometeorological Services (CHS. a.k.a. Uzhhydromet) can be used, and not from the project agromet stations.

Training & Awareness

Twenty-one training events were held. In total 1983 participants were trained (14% were women). The events were held across the three regions. Approximately 30 technical guidelines were prepared. For the limited size of the project, the inputs in terms of training was good, and for the awareness materials the output was very good, and marked a significant uplift in availability of high quality localized weather forecasts and disease / pest control advice to project farmers.

Efficiency
<p><u>Efficiency</u></p> <p>The localized weather forecasting for farmers and extension measures would not have been undertaken without the project, nor put together in such a cohesive way. The project efficiently utilised funds in procuring a limited number of agromet forecasting stations and then reproducing a domestic version that was far cheaper, and thus more sustainable / replicable for farming communities in the future. Furthermore, financial inputs were in excess of plan, by 50% extra funding being utilized. These inputs were from government, UNDP and the private / cooperative sector, which also indicated high project relevance. Thus, the (cost) efficiency was rated as highly satisfactory.</p>
Relevance
<p><u>Relevance</u></p> <p>The measures were relevant under a number of UN SDGs. The project was in-line with the national agriculture strategy. The project followed and implemented national policy in supporting regional development planning, in improving horticulture practices, and in upgrading extension services in their methods and skills. The project design remained highly relevant and was thus graded as highly satisfactory.</p> <p><u>Mainstreaming</u></p> <p>A government policy has been to encourage the establishment of cooperatives. Out of the 14 horticulture projects supported, eight were cooperative ventures. In terms of mainstreaming climate change impacts, the Namangan development strategy was prepared and included not only known climate changes in the Fergana Valley, but also included activities to de-carbonise the economy.</p> <p><u>Ownership</u></p> <p>The project worked in close cooperation with CCI as the main implementing partner, who played a key role in steering the project, and in actively leading the process for the transparent selection of horticulture projects.</p> <p>Whilst improving extension services was integral to the project design, it was not foreseen that the PPQA would also play such a leading and intrinsic role, in not only upgrading their own skills and expertise, but also in using the internet to deliver extension bulletins to farmers. This was popular with the horticulture farmers and brought them together with the government PPQA service.</p> <p>The project supported two regional agriculture research institutes, who used the project to develop their research topics, and curricula taught in horticulture best practices, and in the use of modern agromet technologies.</p> <p><u>Gender Equality & Empowerment of Women</u></p> <p>The assessment of climate change impact on agriculture failed to include gender issues, despite gender specifically being outlined in the scope of the study. For its baseline survey, only 17% of 92 respondents were women.</p> <p>Concerning the selection for horticulture projects, there were 13 criteria, of which the 10th was 'proportion of jobs created for women'. The Business Women's Association were represented on the selection committee. However, there didn't appear to be a high preference towards selecting proposals submitted by women's groups, with only two of the 14 horticulture projects selected, led by women. In terms of horticulture business support, employment was generated for 538 persons of which 282 were women. Thus women's engagement was good with 52% women employed. Twenty-one training events were held. In total 1983 participants were trained, however only 14% were women, which was not good.</p> <p>The Namangan development plan included a one page section on 'ensuring employment & improving gender equality'. Measures for women included 'employ a women in each village citizens council in the position of 'Assistant Labour Inspector' to support women's employment.</p>
Implementation
<p>Implementation – The overall rating is Highly Satisfactory</p> <p>Project Implementation: According to the given five categories - coordination & operational matters, partnership arrangements & stakeholder engagement, finance & co-finance, M&E systems (see next), and adaptive management (work planning, reporting & communications)</p> <p>Coordination & Operational Management</p> <p>The implementing agencies (UNDP and CCI) had no real shortcomings in terms of the quality of implementation. Implementation of the five management categories has led to efficient and effective project implementation. The overall quality of implementation was rated as Highly Satisfactory.</p> <p>The project prodoc was signed between UNDP and CCI in December 2018. CCI were described in the prodoc as the Executive / Implementing Partner (IP). A standard letter of agreement between UNDP and CCI described the working arrangement for the UNDP-supported National Implementation Modality (NIM), which in effect meant a joint UNDP / CCI project, with the government represented by CCI, maintaining overall responsibility for the project, and with UNDP providing a number of management services. In practice, the project was implemented by a Project Team (PT), with UNDP and CCI support. The PT was located in two offices inside CCI, in Tashkent and in Namangan. The Tashkent office staff included: Project Manager (PM), Admin / finance, and a project assistant / outreach person. The Namangan office staff included: two task managers,</p>

driver, and part-time independent M&E reviewer.

Covid

In real terms, the 1st lockdown was from April – September 2020, thereafter with restrictions on UNDP and government staff movement / ability to work from the office or in the field. Thus it became difficult to meet local stakeholders in the regions in particular. In 2021, the situation eased and the PT managed to meet directly with farmers and conduct other business via remote meetings. During the covid period, the project was also restricted in organizing public awareness events and some training events. Despite covid, the project has been able to undertake most planned activities and effectively utilize project funds. UNDP were considered as helpful in allowing the project to 'continue with caution'.

Partnership Arrangements & Stakeholder Engagement

Chamber of Commerce and Industry - CCI have a history of project partnerships with UNDP. They jointly drafted the prodoc with UNDP, and acted as the project IP. One of the roles of CCI was to oversee the selection horticulture projects, which was organised by public tender.

Plant Protection & Quarantine Agency (PPQA) - The project worked closely with the PPQA in the upgrade of their agriculture extension services, and in the provision of higher quality and timely disease / pest control advice for horticulture farmers.

Tashkent Inha University and State Agrarian University - The project collaborated with two universities to develop and install the agromet stations, and to develop the data management platform and its weather and plant disease forecasting software.

Fergana & Andijan Agriculture Research Institutes (ARIs) - The project worked with the Fergana Scientific & Practical Centre for Smallholders, and the Andijan Research Institute of Vegetables. They used the project to upgrade their teaching curriculum and research topics in the fields of agromet services, CCA and horticulture business generation.

Departments of Agriculture (DoA) - The DoAs were involved in the training events, and were able to upgrade their skills. The DoAs have close links with the PPQAs. The DoAs via their Ministry of Agriculture work with the Centre for Hydrometeorological Services (CHS) concerning weather forecasting and agriculture advice.

Financial management & finance

The funding was provided by UNDP Russia (Trust Fund) in two advance tranches of \$500,000 and \$300,000. Approval was via a UNDP Russia – Uzbekistan interoffice memorandum (January 2019), which indicated the 1st tranche to be transferred by January 2019, and the 2nd by August 2020. The cost of UNDP General Management Services (GMS) to the project was stated as \$59,259 (8%), which excluded direct UNDP support services. Under the UNDP-supported financial arrangement, UNDP managed the book-keeping under their standard systems, with no separate bank account required.

Co-financing - The project's matching co-financing was originally to come from horticulture business projects (\$800,000), when in fact, these project contributed \$1,260,149, which was 58% more than promised. Other contributors included UNDP Country Office who added \$301,692 from covid and green recovery funds. The added government contribution from CCI and the PPQA was valued at \$124,382. In total, this meant that project funds of \$1.60 million, became \$2.36 m, which was 48% more than planned. Thus co-financing was considered good.

Adaptive management (work planning, reporting & communications)

Work planning

The prodoc included a 3-year workplan with breakdown by year and by component. The annual plans were approved by the UNDP Resident Representative and and counter-signed by the Chairperson of CCI. They were additionally endorsed by the Project Board (PB). There were three such annual plans covering the years 2019-21. The overall budget breakdown:

Inputs – Revision D	Total Budget (\$)	2019	2020	2021
UNDP TRAC	3,900		3,900	0
Donor	740,742	170,574	339,438	230,730
Total	744,642	170,574	343,338	230,730
GMS (8%)	59,258	13,644	27,169	18,445
Total	803,900	184,218	370,507	249,175

The table indicates that the GMS fixed fee was effectively removed at source, making the donor contribution reduced to \$740,742, as opposed to \$800,000.

Spending against the two outcomes and for project management:

to 15/8/21	Outcome 1	Outcome 2	Project Management	Total
Expenditure \$	148,683	452,171	101,048	701,901
Expenditure %	21	64	14	n/a

The overall plan and budget (until project end December 2021), included \$184,421, for Outcome 1, \$447,907 for Outcome 2, and \$108,414 for project management. Thus there was no significant deviation from this. Through to 15/8/21, the disbursement rate was 87%, with \$101,999 remaining to end-December 2021. (i.e. with funds of \$803,900, and \$701,901 spent from this)

Reporting

Annual reports for 2019 and 2020 were prepared, with the final 2021 report due in December 2021. The PM reported annually to the UNDP with the written report (which was indicator-based and public) entered into the UNDP project management system, Atlas. Semi-annual reports were prepared primarily as an internal document for the donor (Russia - UNDP Trust Fund for Development) to monitor progress and planning. The PT is in the process of preparing an 'exit strategy' which will become part of the final (annual) report. Concerning, the asset list, the handover of equipment to the IP (CCI) will be undertaken at the end of the project.

Communications

The project PM held weekly meetings with CCI in their office. There were also *ad hoc* meetings as necessary, and formal (quarterly) progress meetings. The project also adapted to covid in going 'on-line', when 'face to face' meetings could not be held. For example, the PM / Task Managers weekly meeting went online as did the monthly UNDP Inclusive Growth Cluster meetings with PM attendance.

Monitoring & Evaluation

M&E Systems – Design & Implementation – The rating for the overall quality of M&E is Satisfactory

The project's M&E plan was presented in the prodoc, and listed seven types of action, with description and frequency. These included results tracking, risk management, lessons & knowledge reporting, quality assurance, project design review & revision, reporting, and project board. The project engaged a regional M&E / outreach specialist. The person worked at the local level in monitoring and providing problem-solving ideas to the stakeholders and back to the PM. Such monitoring was written into the project design. The engagement of this specialist worked well, possibly because the role included 'outreach' and therefore working with the farming groups in the delivery of project activities.

Sustainability

Overall Rating: Moderately Unlikely

Financial Risks to Sustainability - The rating is 'Financial Sustainability is Moderately Likely'

The PPQA was established in August 2021 from the two separate agencies for plant protection and for plant quarantine. The phyto-sanitary certification requirements for horticulture exports to neighbouring countries, including Russia have increased in recent years. This means that stopping disease and pests at source has become a much higher priority, and therefore the government is investing in such PPQA services. In 2021, the China government provided \$3 m for Tashkent, Andijan and Namangan for the upgrade of plant quarantine laboratories. UNDP also has a new €5 m agriculture project in the Fergana Valley and Karakalpakstan.

There is however a long-term funding concern for Inha University's consultant company Amudario being able to continue to host the agromet platforms. After 2022, they will need funds, or probably need to charge a subscription fee, which after all the effort to provide free services for the pilot farmers in Fergana Valley, would undermine the trust of farmers and the true economic value of these extension services.

Socio-economic Risks to Sustainability - The rating is 'Socio-economic Sustainability is Moderately Likely'

The proportion of women trained under the project was only 14% and bearing in mind women are responsible for probably 50% of agriculture work. In this respect, the project didn't really achieve gender equality or sufficient women's empowerment. However the number of women-led farms in the three regions is only around 5%.

Institutional & Governance Risks to Sustainability - The rating is Moderately Likely'

What the project has shown is that it is possible to be flexible with an interested government agency, namely PPQA, in their development of extension services, but also in using new technologies, such as in the uptake of new internet-based agromet station data. Traditionally, the role of all weather forecasting was with CHS, but these micro-climate stations, are not under their remit. The challenge for the future is for farmers to meaningfully access both and for the government agencies to ensure that the forecasts don't contradict each other, which could erode farmer trust in these new systems. CHS also have agrometeorologists and technicians who maintain automatic weather stations, thus there could be a supportive role of CHS towards PPQA, as it develops its services. Also vice-versa, CHS could learn how the packaging of hydromet, agromet and early-warning advice for farmers could be improved.

Environmental Risks to Sustainability - The rating is 'Environmental Sustainability is Moderately Unlikely'

Due to water demand in excess of supply, and due to the recent transition to a farm cluster system, the clusters themselves have begun to sink boreholes to supply water. Such boreholes are subject to drilling permission, and maintaining a sustainable flow rate. It was noted that ~50% of the project's horticulture enterprises use aquifer water from boreholes, but it was not clear if this water is metered, nor ultimately if groundwater / aquifer re-charge levels are being monitored in the Fergana Valley.

Impact

Impact

The project impact for pilot farmers was to improve their trust in national and local weather forecasts, especially as they became directly linked to agriculture advice bulletins on farming activities, and specifically on plant disease and pest control advice. This meant that the horticulture crop yields and their quality has increased for the demonstration farmers.

If we take an agromet station coverage to be ~100 km², and that the project installed 24 stations, that's a coverage of ~2,400 km², which in comparison to the area of the three regions ~18,000 km², then that equates with the project covering 13% of the territory. For a demonstration project of limited size, this is a significant impact.

Catalytic Effect

Scaling-up & Replication

- The plan was for 12 stations to be installed, whereas the project installed 24 stations. There is a good opportunity to further scale-up this farmer forecasting system once it has been refined

Demonstration

- An international off-the-shelf micro-climate forecasting system was deployed and demonstrated together with a software application that predicts plant disease and pest problems
- The project demonstrated the value of using drip irrigation, to improve horticulture output; and the value of post-harvest cold-storage to improve quality for export
- The inclusion of climate change impacts, and decarbonizing directions described in a regional development plan

New techniques /approaches

- A project-designed micro-climate forecasting system was deployed with a software application that predicts Fergana Valley specific plant disease and pest problems is being designed and tested
- An insect pest trap and and internet linked identification system was developed by the project and is being tested.
- The PPQA used telegram channels with farmer subscriber groups to deliver extension advice, with improved local weather forecasts

Conclusions

One of the impacts of climate change has been that winter cold weather snaps are less common now (compared with even five years ago), so this means that there is less natural control of particular plant diseases and pests. Also insect disease and pests are also becoming climate adapted (e.g. earlier breeding season due to earlier higher spring temperatures), thus the software algorithms based on particular 'breeding' dates need to be monitored and updated periodically (based on pest breeding cycle knowledge and the weather data).

The project work with the two universities and two agriculture research institutes proved valuable, because they are all now using the knowledge of the new agrometeorology technologies and predictive software to train the next generation of researchers and students, in the methods and benefits of such systems. This was an important aspect of the project.

The project installed 24 micro-climate weather stations. This was made possible by through collaboration with Tashkent Inha University who designed a much cheaper 'datalogger', which allowed for more stations to be procured than the ten that were originally planned for. The coverage of these stations reached an impressive ~13% of the area of the three regions, but more are needed to replicate this finer granularity of weather forecast with tailored agriculture advice for farmers in other districts, not covered.

The project has proved to be successful in just three years, and this in spite of covid restrictions. There is a need to improve the horticulture export value-chain, but this was mostly outside the direct scope of this project, except in demonstrating post-harvest cold-storage facilities. Whilst, the improvement in PPQA services and in their disease / pest control has taken a clear step-up for the three regions, the step to create 'phytosanitary-clean' corridors for transboundary export is for another project.

Whilst CHS holds ~100 years of historical weather data for the Fergana Valley, it is unclear if it has, as yet digitized the data, which would be useful for climate change predictive modelling. There are however, plans to archive the weather data from the Amudar project stations, within their platform system.

Lessons Learned

In July 2021, there was a presidential resolution for the amalgamation of plant protection and quarantine services, to become PPQA. Therefore, a new mandate has been set for PPQA services. The project has demonstrated the need not only for traditional specialists (e.g. agronomists, entomologists) to be recruited to keep up with climate change impacts, but also that new types of specialists, such as agrometeorologists and IPM / biological pest control specialists are needed. It is useful that PPQA maintains its in-house training institute to train its inspectors. CHS also have professional agrometeorologists, but the link with equivalent PPQA specialists in continued professional development was not apparent.

Embedding project innovations into two universities and two agriculture research institutes showed foresight and

is having a very positive impact on agriculture research topics, student curricula, and ultimately in producing the next generation of agrometeorologists, agronomists, plant pathologists, and software designers.

PPQA is expected to maintain the agromet stations, but the Amudar forecasting & plant disease prediction system which is 'cloud-based' (data storage server, host platform and the software application), is still under development. Thus there is a need to ensure that it will be completed and its sustainability built in. The main concern here is for continuing to fine-tune the forecasting and prediction software, and for hosting both the FieldClimate and Amudar platforms and services after 2022.

For joining up the agriculture information network, from a farmers point of view, there is no plan at present. CHS provide more general agromet services, (but on the basis of regional weather forecasts) directly to MoA who pass on to their DoAs, especially seasonal, monthly, and 10-day windows, on a regional level. However the farmers at present have to hunt down this information separately. It would be a benefit to farmers, if they could concurrently receive official CHS user-friendly weather forecasts to compare with their more localized agromet services.

The value of providing a free access weather and extension service for farmers should be understood in the context of improved economic value of horticulture exports. If these new services became fee-paying, then it would be a regressive step.

Recommendations

Exhibit 4: Key Recommendations Table [with responsible entity]

1. The agro-planning and crop yield prediction software needs to be further developed and piloted [CCI with UNDP]
2. There is an agrometeorology-based GCF concept proposal that could be re-visited, in order to further develop agrometeorology systems [UNDP with CCI, PPQA]
3. The project supported 14 horticulture projects, but there is a need to provide more detailed lessons-learned [UNDP with CCI]

Full report

1. INTRODUCTION

1.1. The project

This UNDP-supported UNDP Russia Trust Fund-financed project ‘Enhancing the adaptation and strengthening the resilience of farming to climate change risks in Fergana Valley’ (#117191) was implemented in Tashkent, and three regions in the Fergana Valley, namely Fergana, Namangan and Andijan. The project started in December 2018 and ended in December 2021. The 3-year project was under UNDP-supported National Implementation Modality with the Chamber of Commerce & Industry (CCI) as both the Executive and Implementing Partner (IP). The project was managed by UNDP and a Project Team (PT), under the direction of a Project Board (PB), led by CCI as the Executive.

1.2. Purpose of the evaluation and report structure

Purpose & Structure

The objective of the Final Evaluation (FE) was to gain an independent analysis of the achievement of the project, as well as to assess its sustainability and impact. The report focuses on assessing outcomes and project management. The FE additionally considered accountability and transparency, and provided lessons-learned for future projects. This report is in six sections - introduction, description, findings, sustainability, impact and conclusions / lessons / recommendations. The findings (Section 3) are additionally divided into strategy and design, implementation & management, and results.

1.3. Scope and Methodology

Approach

The overall approach and methodology of the evaluation followed the guidance outlined in UNDP Evaluation Guidelines (2021). The FE was an evidence-based assessment and relied on feedback from persons who were involved in the design, implementation, and supervision of the project. The FE team reviewed available documents (**Annex 7**), conducted field visits and held interviews. The international consultant was the team leader and responsible for quality assurance and consolidation of the findings of the evaluation, and provided the FE report.

The field mission took place from 18th August - 7th September 2021, according to the agenda compiled in **Annex 11**. The agreed upon agenda included a UNDP briefing on 18th August and a stakeholder seminar on 7th September. Due to covid, the FE was limited with the Team Leader prevented from travel due to in-country and UNDP travel restrictions, however the National Expert was present at all times, and travelled to the regions, to verify first-hand project results.

Methods

The FE determined if the project’s building blocks (technical, financial, management, legal) were put in place and then, if together these were catalysed sufficiently to make the project successful. The FE method was to utilise a ‘multi-level mixed evaluation’, which is useful when evaluating delivery of a new service or approach, being piloted through state institutions. The method allows for cross-referencing and is suitable for finding insights which are sensitive and informative. The rating scales are provided in **Annex 9**. Pro-forma questions on key themes such as those provided by the UNDP guideline were updated by the FE (**Annex 14**).

Main partners and Stakeholder feedback

The FE interacted with the Project Team (PT), the UNDP Country Office as well as with the executive (CCI) and project-associated stakeholders in Plant Protection & Quarantine Agency (PPQA), local government in the three Fergana Valley regions, and demonstration farming groups. The FE visited the project areas to interact with local administrators, technical staff and beneficiaries. Gaining a representative view from local stakeholders was partly limited by the covid situation, whereby the FE Team needed to conduct a number of meetings totally or partially by remote (Zoom). Additional telephone / email correspondence with stakeholders was arranged as necessary. **Annex 6** provides a list of people that the FE met and **Annex 10** is the mission agenda.

Ethics

The review was conducted in accordance with the UN Ethical Guidelines for Evaluators, and the reviewer signed the Evaluation Consultant Code of Conduct Agreement (**Annex 15**). In particular, the FE team ensures the anonymity and confidentiality of individuals who were interviewed and surveyed. In respect to the UN Declaration of Human Rights, results are presented in a manner that clearly respects stakeholders' dignity and self-worth.

2. PROJECT DESCRIPTION

2.1. Development Context

Sector-wide linkage with the International Community

- UNFCCC & the Paris Agreement – Uzbekistan signed 2016
- Sustainable Development Goals (SDGs, 2016) - the project contributes to goals 1, 2, 5, 15, and 17.
- UNDAF Outcome 6 – 'By 2020, rural population benefit from sustainable management of natural resources and resilience to disasters and climate change'
- UNDP Strategic Plan - Output 1: Policy-makers are equipped with instruments for sustainable use of natural resources and dealing with climate risks; Output 2: Agriculture production & post-harvest capacity is enhanced to cope with climate variability and threats

Project linkage to National Planning (Policy & Regulatory)

- Agriculture development strategy 2020-30 (2019) President decree PF-5853 – part of national development strategy
- Strategy for transition of Uzbekistan to a green economy 2019-30 (2019) President resolution PK-4477
- Automatic Weather Stations - Presidential decree #4819
- Provision of hydromet data (2020) President decree #4896 – indicates that weather services can be provided on a contractual basis, with no extra requirement to provide added data, other than that already.
- Plant Protection & Quarantine Agency establishment (2021)
- Decision to create extension service centers (2018) – for training on agriculture, and help farmers / cooperatives integrate value chains (production, harvesting, storage, processing, & export). To establish plant clinics in each region
- Measures to increase the efficiency of state plant quarantine services (2018) President Resolution PK-3626
- Development of agriculture cooperation in the horticulture industry (2019) President resolution PK-4239 – encourages the establishment of cooperatives
- Horticulture & greenhouse development (2019) President resolution PK-4246
- Development of the fruit, vegetable & viticulture sector, creation of value chains (2019) President resolution PK-4549
- Water saving technologies (2020) Presidential decree PK-4919
- Drip irrigation- Presidential decree #4919; & Cabinet Minister decree #575 (2020) - state budget for drip (99 billion sums)
- Lemon production – Presidential decree (2020); and decree #3586 (2018)
- (Agro-) insurance agency as an authorized state body to protect rights / benefits of customers. Cabinet decree (2019)
- Regional Development Plans - for the 3 project regions, Namangan in particular - Implementation of 'Development of Uzbekistan Action Strategy in 5 priority areas' (2019) President decree PK-3437 - Namangan decree 441

Linkage to donor-projects

- UNDP Covid Rapid Response Facility with Japan Government covid-support funds (2020)
- UNDP Green development project, included the awareness & provision of solar panels

2.2. Problems that the Project Sought to Address

Development challenge (prodoc, p3)

- Climate change vulnerability from high sensitivity of arid arable land, high population density and high demand for water
- The average annual temperature has been increasing by 0.3°C every decade since 1960. The increase in temperature, is leading to increased rain, but intense downpours occurring more often. There is also evidence of more drought, out of season frosts, heat waves and storms². E.g. late frost in April 2014, and a heatwave in March of 2015, resulted in a 30% loss of fruits / nuts. E.g. In Fergana Valley, more than 75% of respondents to a climate survey, noted an increased incidence of plant disease and pests, together with issues of water availability.
- Agriculture is highly dependent on irrigation. The agriculture sector accounted for 18% of GDP in 2016, and employs 30% of the labour force. Smallholders accounted for 65% of agriculture production in 2016, but they lack climate adaptive

² The weather system includes hot air from Iran / Afghanistan, and colder weather from northern neighbours

capacity. Agriculture accounts for a significant share of export revenue (11% in 2016). The export value of fruits / vegetables was \$709 m in 2017. It is estimated that yields in horticulture will decline by 7% by 2030 and by 14% by 2050, due to human impact and climate change.

- Factors for farmer climate vulnerability include: lack of climate change adaptation (CCA) policy; lack of knowledge in the risks & solutions (policy-makers and farmers); access to new technologies for smallholders; poor post-harvest methods

Climate change in Fergana Valley (Namangan Development Plan, 2021)

- The last decade was characterized by the longest period with a significant increase in temperature and an unusually high temperature. The hottest July weather observations in the Andijan and Namangan regions were observed in 2018 and 2019 throughout historical records. July 2018 and 2019 in the Fergana Valley were also hot for all weather observations.
- Climate change, variability, & drought indicators of extreme events have a negative impact on the quantity / quality of agriculture produce, especially when best adaptation technologies are not applied
- Also, there has been an increase in precipitation instability over the past decades. During 1970-90 the average rainfall was 134 mm, while during 1991-2017, this figure was 166 mm, which is a 25% increase.
- Deviations from the historic standard for the average annual temperature were observed every five years from 1970 to 2018. In the Fergana Valley, this equates with ~0.5 degrees rise over the past 30 years.

2.3. Description and Strategy

The project aimed at supporting the Chamber of Commerce and Industry (CCI) in ensuring that the rural farmers benefited from sustainable management of natural resources and improved resilience to climate change. The project objective was to 'increase the export potential of the agro-sector and ensure preparedness and responsiveness (institutions / people), and enhance resilience of farmers to climate change threats, thus reducing economic risk and improve livelihoods.' The overall outcome was 'resilience of the agro-sector and farmers to climate change enhanced through improved access to markets and sustainable agriculture production.'

Within the Project Results Framework (PRF / logframe), there were two components (with nine outputs):

1. Equipping policy-makers and institutions with the tools for sustainable use of natural resources and dealing with climate risks in agro-production in the horticulture and vegetable sectors
2. Enhancing the export of small-hold farmers through agriculture and post-harvest methods, and improved ability to cope with climate vulnerabilities and climate-related risks, to ensure food security and resilient livelihoods, while engaging women and youth

Project Location

The project location was in Tashkent and three regions in the Fergana Valley, namely Fergana, Namangan and Andijan, with their relevant local governments, and line offices, and with CCI and the Plant Protection & Quarantine Agency (PPQA) in particular.

Fergana Valley Regions (Uzbekistan)	Area (km ²)	Population ³
Fergana	7,005	3,564,800
Namangan	7,181	2,652,400
Andijan	4,303	2,965,500

Project Timing & Milestones

The project timing was from December 2018 until end December 2021. The project document mentions that UNDP through project assurance will support the project board (PB) in achieving milestones.

Comparative Advantage

UNDP had a comparative advantage in capacity building, and in the provision of technical support in the design and implementation of the project. UNDP also had an advantage working with government especially in strengthening institutional, policy and legislative mechanisms, in undertaking risk assessments, in mainstreaming climate change adaptation (CCA) into development planning and in harnessing best practices across the thematic area.

2.4. Implementation Arrangements

³ In 2015, source - Wikipedia

Project Management Structure

The project was steered by a Project Board (PB), chaired by CCI. The project established a Project Team (PT) which was led by a UNDP-appointed Project Manager (PM), who reported to CCI and UNDP. The project was under UNDP-supported NIM, which specifically included financial control of project funds⁴

2.5 Key Partners & Stakeholders

The project outlined its expected partners and stakeholder engagement strategy:

- The project targeted rural farmers, agro-producers, produce buyers / sellers, agro-policy makers, and local khokimiyats (government administrations)
- Close partnership will be established with the CCI both in Tashkent and in the regions; representatives of the Ministry of Economy at national and local levels will also be engaged; representatives of the Council of farmers, dekhans households and owners of homestead lands will be key stakeholders
- In the area of agro-processing and increasing export potential, the project will closely cooperate with 'Uzagroexport', acting as an export promoter of fresh / processed fruits and vegetables. Partnership with the Ministry of Agriculture (MoA) will be established through the State Centre on certification and control of the quality of agro-production crops.
- For small-scale business initiatives, the project will launch a competitive process of selection, whereby 49% funding is to be provided by the project on grant basis. The other 51% of selected pilot projects are to be proposed to be funded by potential beneficiaries (agro-producers).
- Local Selection Committee will be formed for fair selection of business proposals. This committee will include the representatives of CCI, regional and local khokimiyats, Farmer's Council, agro-associations, and Business Women Association (BWA). During the selection, special preference will be given to women candidates and youth-led initiatives.
- Project target districts for pilot projects will be identified jointly with the local authorities in three regions of the Fergana Valley based on the criteria of vulnerability to climate change

A description of the set of Final Evaluation stakeholders – those who were responsible for implementation of the project and those associated with the project – is provided as **Annex 8**.

3. FINDINGS

3.1. Project Strategy

3.1.1 Project Barriers

Project Barriers [Before-project scenario]

- Limited policy measures on administration and adaptation of agriculture practices to climate change impact
- Weak knowledge of farmers and policy makers of the climate change reality and adaptation measures
- Limited access of smallholders to advanced technology & infrastructure to respond to climate change
- Inefficient post-harvest handling and storage methods

3.1.2 Project Design, Objective & Approach

The aim of the project design was to create institutionalized integrated services for farmers in the Fergana Valley – services that would enhance their adaptation to the impacts of climate change. This was to be achieved via:

- Enhancing regional government capacity to understand the impact of climate change on agriculture and mainstream climate change solutions into local development planning
- Supporting farmers to be more efficient in their use of natural resources (i.e. water), and in agriculture techniques, with a view to increasing resilience to weather variability (i.e. CCA measures)
- Supporting farmer resilience by installing micro-climate weather stations to provide localized weather forecasts and early-warning alerts for farmers

The two component outcomes were expected to deliver:

Policy-makers equipped with instruments for sustainable use of natural resources and addressing climate change in the agro-production sector, especially in horticulture

⁴ The letter of agreement between UNDP and CCI outlined the arrangement, the services provided by UNDP, and the chargeable unit rates for particular services. (prodoc Annex 5)

- Analysis of the impact of climate change on regional development, with a focus on agro-business, exports, and gender
- Climate change impacts submitted to regional khokimiyats for inclusion in regional development planning (in Ferghana, Namangan and Andijan)
- Piloting agriculture-based weather stations, with the promotion IPM to regional government
- Recommendations / feedback to regional government on localized climate-adaptive agriculture solutions, i.e. farmer-based forecasting services
- Horticulture crop volume prediction software for agro-planners

Increasing agriculture production for export for smallholders through CCA measures (while engaging women / youth)

- Assist extension services to support to farmers to be climate change aware and adopt CCA measures
- Seven pilot horticulture projects launched with cost-sharing contributions
- Twelve micro-climate weather stations to serve at least 300 farmers
- Analysis of the agro-insurance sector with respect to climate change risks
- Building capacity of farmers on marketing, export potential, and crop insurance
- Building capacity on plant protection, post-harvest and cold storage methods
- Make CCA more accessible across the agro-sector (from farmers to plant protection product suppliers to crop exporters)

3.1.3 Design Assumptions & Risks

A risk analysis was undertaken (prodoc, Annex 2) with four risks outlined. Those that proved to be correct / incorrect:

Assumption / Risk with Mitigation	FE comment
Government staff turnover rate is high - Use signed minutes of meetings as evidence	- The project did not appear to be significantly hampered
Severe weather / climatic events - Project design concerns CCA	- There were no severe events, however the climate change survey indicated climate change impacts on the weather and therefore on farmer ability to grow horticulture crops
Farmers unwilling to adopt new approaches - Low probability	- Risk unfounded – adoption of new technologies largely successful
Farmers lack finance - Project has funds and can leverage added funds	- Whilst the project utilized both its core and leveraged funds for activities, its beneficiary groups were mainly the 14 selected horticulture farms and the 24 telegrams groups

The prodoc risk log was uploaded in Atlas, and remained the same in 2021, except for an added covid risk which was recorded as: 'movement restricted due to covid from April 2020 to December 2021' and as being 'substantial'. The 'treatment' was listed as 'the project will revise its activities and switch to on-line or reschedule those, which can be implemented after the pandemic'. As of September 2021, the covid risk remained significant.

Results Framework Indicators & Targets

The prodoc project results framework (PRF) contained nine outputs indicators (with baselines and targets). However the UNDP webpage for the project described the project in terms of two outcomes, each with seven indicators (with baselines and targets). These are both described in **Annex 1** – Indicators with assessment against indicator and FE rating provided; and **Annex 2** – Outputs – with achievement reported by the PT, with FE comment. Thus there was some overlap. The text in section 3.3 Project Results reconciles these differences (by focussing on the content). For brevity here, the nine output activities [with target]:

- 1.1 Regional development strategies & action plan that integrate adaptive measures against climate change risks in agriculture sector [strategy & plan]
- 1.2 Number of recommendations on consideration of climate-induced risks in regional development planning with a focus on agro-business, export potential and gender [5]
- 1.3 Integrated pest management / control through the introduction of local agromet stations [IPM system in use]
- 1.4 Number of recommendations on localized adaptive agriculture systems to counter climate change risks, for agro-development planning and forecasting [13]
- 1.5 Software for land planning, forecasting of crop yield and export volumes for agro-planners [software]
- 1.6 Number of women / youth engaged in pilot projects using efficient agriculture practices / innovative solutions with consideration of climate change [15]

- | | |
|-----|---|
| 1.7 | Number of weather stations established to provide localized crop-based weather data for farmers [12 stations] |
| 1.8 | A study on the development of the agro-insurance sector [1 study] |
| 1.9 | Number of agro-producers trained on marketing, export opportunities, insurance [100] |

The PRF did not include and risks or assumptions, which was a short-coming. The PRF was not formally amended, although there were 'two' versions, as mentioned above. The PRF indicators, baseline and targets were considered acceptable and SMART (Specific, measurable, attainable, relevant and time-bound) in most cases, but some of the targets were too low, or reduced to a low number. E.g. the Target number of women engaged in pilot agriculture projects, (with a ratio of 3 women to 7 men), was 10. The sequence of outputs under component 2, could also have been better.

3.1.4 Gender Design

The project had a gender marker as GEN-2 (i.e. for projects that have gender equality as a significant objective). In terms managing social & environmental risk, one of the overarching principles concerned 'gender equality & women's empowerment'. Farming labour is heavily dependent on women, but they are less likely to run farm businesses or their smallholder farms (dekhans)⁵. The project approach was to work with the Business Women's Association (BWA) on a regional level to support gender-inclusive planning, and secondly to identify the horticulture projects that equally benefited women⁶. Thirdly, the the prodoc mentioned '15% of the programmatic budget' will be dedicated to supporting women smallholders and / or farms within which employ a majority of women. Additionally, there were expectations to consider gender: when preparing the baseline climate change risk and adaptation assessment; and when preparing the Namangan development strategy.

3.2. Project Implementation

3.2.1 IA and EA Coordination & Operational Management

The overall quality of implementation was rated as **Highly Satisfactory**. The quality of UNDP Implementation was rated as **Satisfactory**. The quality of the IP (CCI) implementation was rated as **Highly Satisfactory**.

The project prodoc was signed between UNDP and CCI in December 2018. CCI was described in the prodoc as the Executive and Implementing Partner (IP). Thereafter in Annex 5 of the prodoc, a standard letter of agreement between UNDP and CCI described the working arrangement for the UNDP-supported NIM, which in effect meant a joint UNDP / CCI project, with the government represented by CCI, maintaining overall responsibility, with a number of UNDP implementation and management services listed, and stated that any change to them would require the UNDP Resident Representative and CCI mutual agreement⁷.

In practice, the project implementation was managed by a Project Team (PT), who also organised the PB meetings on behalf of CCI and UNDP. The PT was jointly appointed by UNDP and CCI. Thus, whilst decision-making lay with CCI and the PT (i.e. the Project Manager), who resided in CCI offices and worked closely with them, the management control (of authorisation of fund use and release to the project) lay with UNDP in deciding on approval of staffing, purchase of equipment and services, training events, and allowing staff to visit the field. Thus, the PM needed to work closely with UNDP, and follow all UNDP project procurement and implementation procedures.

Coordination & Operational Management by Implementing Agency (UNDP)

Project Board

The PB was led by CCI (chair) and co-chaired by UNDP Uzbekistan. Two Project Board (PB) meetings were held in December 2019 and 2020 respectively, with the latter undertaken by remote communication (Zoom platform). For these two meetings, the PB attendance with key points of interest is presented in **Annex 5**. The last PB meeting is planned for December 2021.

The membership of the PB was not sanctioned by official letter, but rather taken as agreed from the prodoc (which was officially signed). According to the prodoc, the PB consisted of the senior supplier (UNDP Russia Trust Fund),

⁵ Household plots were re-classified as 'dehkan farms' in 1998, at which time the Law of Dehkan Farms was passed

⁶ Prodoc p14 – 'the project will ensure more active women's participation in selection of pilot project sites'

⁷ The UNDP support services for the project were listed as: recruitment of project staff / consultants; facilitation of training activities (workshops etc); procurement of goods & services; financial transactions including the processing of payments & disbursements; and administrative services, including travel authorisation. All services were also unit-costed.

executive (CCI)⁸, and senior beneficiaries (local governments of the three regions, MoA, Ministry of Economy, and the Farmers' Council). There was a PB ToR (prodoc Annex 4). Thereafter the structure of the project included project assurance (UNDP – Sustainable Development Cluster), and the PT (PM, staff and specialists)⁹.

Social & environmental safeguards

Regarding social & environmental safeguards, a risk screening was undertaken (prodoc Annex 1). The only risk that was flagged 'yes' was strangely under the human rights section concerning the ability of 'duty-bearers' (CCI) not having the capacity to undertake the project. It is assumed, that this refers to not being an approved supplier of UNDP services in terms of financial management, (and hence the UNDP-supported NIM)

Coordination & Operational Management by the Implementing Partner (CCI)

The project was implemented by a PT, who coordinated closely with both UNDP and CCI. CCI provided PB oversight and weekly meetings with the PM.

Project Team (PT)

The PT was located in two offices inside CCI, in Tashkent and in Namangan¹⁰. The Tashkent office staff included: PM, Administration / finance, and a Project assistant / outreach person. The Namangan office staff included: two task managers, driver, and part-time independent M&E reviewer.

Covid

In real terms, the 1st lockdown was from April – September 2020, thereafter with restrictions on UNDP and government staff movement / ability to work from the office or in the field. Thus it became difficult to meet local stakeholders in the regions in particular. In 2021, the situation eased and the PT managed to meet directly with farmers¹¹ and conduct other business via remote meetings. During the covid period, the project was also restricted in organizing public awareness events and some training events. Despite covid, the project has been able to undertake most planned activities and effectively utilize project funds. UNDP were considered as helpful in allowing the project to 'continue with caution'¹².

3.2.2 Institutional Mechanisms - Local Partnerships / Stakeholder Engagement

Chamber of Commerce and Industry

CCI have a staff / membership of ~24,000, with 10 projects in the agri-sector valued at ~\$20m. CCI have a history of project partnerships with UNDP. They are nationally-based with regional branches. They jointly drafted the prodoc with UNDP, and act as the project (joint) IP with UNDP. One of the roles of CCI was to oversee the selection horticulture projects, which was organised by public tender.

Plant Protection & Quarantine Agency (PPQA)

The project worked closely with the PPQA in the upgrade of their agriculture extension services, and in the provision of higher quality and timely disease / pest control advice for horticulture farmers¹³.

As a result of the project, the PPQA has created / upgraded three farmer-facing phyto-consulting centres, and taken on a modern delivery mechanism to provide farmer bulletins linking micro-climate weather forecasts to risk of incidence of plant disease and pests. PPQA in the regions also run three added channels such as for greenhouse production¹⁴. Outreach / dissemination is also via a local markets with a radio channel which provides farm-related news. On occasion, if there is a pest outbreak, TV will cover the problem.

Tashkent Inha University and Agrarian University

⁸ The Executing Agency was the Implementing Partner – see prodoc legal context (p32), which refers back to the 1993 agreement between UNDP and the Uzbekistan Government

⁹ UNDP SDC became the Inclusive Growth Cluster, after internal changes

¹⁰ Project office was planned to be in Namangan, however, the project was considered important on a national level, so its main office was situated within CCI in Tashkent, with a project branch office within CCI in Namangan Region

¹¹ Whilst UNDP were able to give 'permission' and authorize expenses for PT travel and activities, UNDP staff themselves were under directives from UN Headquarters in USA, and were unable to travel.

¹² In terms of this Final Evaluation, there were UNDP restrictions on travel for the international expert, as per the directive from UNDP headquarters.

¹³ In September 2019, UNDP assessed the capacity of PPQA as a project partner which indicated a network of staff in all districts with ~3 inspectors (agronomy, entomology & phytopathology) per district. PPQA also run plant clinics in all districts. A 21-page MoU was signed between UNDP and PPQA in May 2020.

¹⁴ Fergana PPQA reported in total, they have 2,000 subscribers to their telegram groups

The project collaborated with two universities to develop and install the domestically-made agromet stations, to develop the data management platform and app for the agromet weather stations, and develop a further data management platform and app for the pheromone traps.

Fergana & Andijan Agriculture Research Institutes (ARIs)

There were two agriculture research institutes engaged with the project, namely the Fergana Scientific & Practical Centre for Smallholders, and the Andijan Research Institute of Vegetables, Melon & Potatoes – Seed Testing Station. They were directly engaged in terms of an agromet station placement, and the other as one of the supported horticulture enterprises, in the project provision of tomato seed processing & packaging equipment.

However, they used their project link to upgrade their teaching curriculum and research topics in line with the project objectives on agromet services provision and in horticulture business generation.

Departments of Agriculture (DoA)

District extension services are being delivered via a new farmer cluster system. DoAs are also working directly with cooperatives¹⁵. The DoA supported some of the horticulture projects with their initial registration papers. The DoAs have been involved in the project training events, and were able to upgrade their skills. The DoAs have close links with the PPQAs. The DoAs can support applications for government subsidy in the horticulture sector. (E.g. 7 million soms / ha for greenhouse establishment; and 50% of expenses for lemon seedling production).

The DoAs via their Ministry of Agriculture work with the Centre for Hydrometeorological Services (CHS, Uzhydromet) concerning weather forecasting and agriculture advice.

The list of key stakeholders is described in **Annex 8**.

3.2.3 Gender Equality & Empowerment of Women - Analysis

The (baseline) climate change impact on agriculture assessment failed to include gender issues, (despite specifically outlined in the scope of the study), apart from generally describing job type (women tend to work seasonally, as labour in planting, weeding, harvesting, and packaging). For the survey undertaken, only 17% of 92 respondents were women¹⁶.

Concerning the selection for horticulture projects, there were 13 criteria, of which the 10th was 'proportion of jobs created for women'. (see **Annex 5** for full list of criteria). The BWA were represented on the selection council. However, there didn't appear to be a high preference towards selecting proposals submitted by women or women's groups, with only two of the 14 horticulture projects selected led by women.

In terms of horticulture business support, employment was generated for 538 persons of which 282 were women (and of which 131 youth). Thus women's engagement was good with 52% women employed. The target of 30% was therefore exceeded. Twenty-one training events were held. In total 1983 participants were trained, however only 14% were women, when the project had a target of 30%, so the targeted result was less than half way to this. Both these targets, were part of the PRF.

The Namangan development plan included one page sections on 'ensuring employment & improving gender equality' and 'youth issues in the region'. Measures for women include 'employ a women in each Makhalla in the position of 'Assistant Labour Inspector' to support women's employment. For 'youth', initiatives included 'digital tech training centres' in all districts.¹⁷

3.2.4 Finance & Co-finance

UNDP Financial management and Finance

The funding was provided by UNDP Russia Trust Fund in two advance tranches of \$500,000 and \$300,000¹⁸. Approval was via a UNDP Russia – Uzbekistan interoffice memorandum (January 2019), which indicated the 1st tranche to be transferred by January 2019, and the 2nd by August 2020. The cost of UNDP General Management Services (GMS) to the project was stated as \$59,259 (8%), which excluded all direct UNDP support services (as outlined in the UNDP – CCI letter of agreement).

Financial management and implementation modality was according to Standard Operating Procedures for Admin

¹⁵ Smallholders are being encouraged to switch to become cooperatives.

¹⁶ 30% youth who in this case would probably have less experience of climate change over the years

¹⁷ The section also goes on to state 21 knitting / sewing enterprises will be established to employ 8,000 women. This is not necessarily forward thinking.

¹⁸ Via UNDP Regional Bureau for Europe and CIS (RBEC, a.k.a 'Istanbul Regional Hub')

/ finance services, and for Project management (UNDP Uzbekistan CO, 2021), which conforms to UNDP Program & operations policies & procedures (POPP). Under the UNDP-supported financial arrangement, UNDP managed the book-keeping under their standard systems, with no separate bank account required. All spending could be and was presented in Combine Delivery Reports, which could separate out the project expenditure. The breakdown of planned and actual expenditures by year is provided in **Annex 4**. UNDP became VAT registered for the project in 2020, with the VAT paid reimbursed to the project. From 2020 onwards, the project has been VAT exempt at source.

Audits

The project was not audited, as its funding value was below the annual threshold of \$500,000. In addition, the last UNDP Country Office audit (every 3 years) was prior to project start, and so did not feature.

Co-financing

The project's matching co-financing was originally to come from horticulture business projects (\$800,000), when in fact, these project contributed \$1,260,149, which was 58% more than promised. Other contributors included UNDP Country Office who added \$301,692 from covid and green recovery funds. Then the added government contribution from CCI and the PPQA was evaluated at \$124,382. In total, this meant that project funds of \$1.60 m (\$0.80 m UNDP Russia TF + \$0.80 m horticulture businesses), became \$2.36 m, which was 48% more than planned. Thus co-financing was considered good. A breakdown of co-financing was provided as **Annex 3**.

3.2.5 M&E Systems – Design & Implementation

The M&E system design and the implementation of the M&E system was rated as **Satisfactory**.

The project's M&E plan was presented in the prodoc, and listed seven types of action, with description and frequency. These included: Results tracking – quarterly; Risk management – quarterly; Lessons & knowledge reporting – annually; Quality assurance – annually; Project design review & revision – annually; Reporting – annually and end of project; PB – annually.

The project engaged a regional M&E / outreach specialist. The person primarily worked at the local level in monitoring and providing problem-solving ideas to stakeholders and back to the PT. The reports were both of standard M&E type, but also *ad hoc* regarding particular interventions / horticulture activities. Such monitoring was written into the project design. When particular issues were reported, the PM would undertake a follow-up visit. The engagement of this specialist worked well, possibly because the role included 'outreach' and therefore working with the farming groups, making them aware and supported the delivery of project activities. i.e. the M&E and outreach specialist had a vested interest in making the project successful and then in being able to report the project successes.

Scorecards

There weren't any scorecards utilized for the project.

Exit Strategy & Asset List

The PT is in the process of preparing an 'exit strategy' which will become part of the final (annual) report. Concerning, the asset list, the handover of equipment to the IP (CCI) will be undertaken at the end of the project. The equipment includes computers, office equipment and a Chevrolet vehicle¹⁹.

3.2.6 Adaptive Management (Work planning, Reporting & Communications)

Work planning

Local Project Appraisal Committee (LPAC)

An LPAC meeting was held in November 2018. Due to time and money constraints, the LPAC recommended to limit the IPM activities to 'introductory concepts', and agri-insurance activity to assessing climate risk within the agri-insurance policy market. A note was made against the number of partners compared with the committed co-financing.

Inception Workshop

There was no inception workshop held, however, there were introductory meetings held in Tashkent and the three target regions²⁰.

Annual Workplans & Budget (AWPBs)

¹⁹ \$10,303 NBV would seem inexpensive for a UNDP project vehicle

²⁰ Inception workshops are more commonly held for projects vertically funded

The prodoc included a 3-year workplan with breakdown by year and by component (the two outcomes and project management). The project was allowed flexibility on spending, based on each of the three agreed AWPBs. The AWPBs were approved by the UNDP Resident Representative and counter-signed by the Chairperson of CCI. They were additionally endorsed by the PB (as per the minutes of the meeting) for the 2020 and 2021 plans. There were three such annual plans covering the years 2019-21. The 2021 plan was approved in February 2021²¹.

The overall budget breakdown

Inputs – Revision D	Total Budget (\$)	2019	2020	2021
UNDP TRAC	3,900		3,900	0
Donor	740,742	170,574	339,438	230,730
Total	744,642	170,574	343,338	230,730
GMS (8%)	59,258	13,644	27,169	18,445
Total	803,900	184,218	370,507	249,175

To note, the UNDP 8% service fee of \$59,258 was a project cost determined by the UNDP regional Istanbul office, although the share to differing UNDP offices was not mentioned in the letter of January 2019. The table indicates that this fixed fee was effectively removed at source, making the donor contribution effectively reduced to \$740,742, as opposed to \$800,000.

The AWPBs followed the UNDP standard accounting codes, thus it was not possible to determine spending against Output level, but rather only against the two Outcome levels and for project management (listed as Outcome 3)²². See **Annex 4** for detail for component / outcome by year expenditure.

Expenditure to date under Component 1, 2 and project management:

to 15/8/21	Outcome 1	Outcome 2	Project Management	Total
Expenditure \$	148,683	452,171	101,048	701,901
Expenditure %	21	64	14	n/a

The overall plan and budget (until project end December 2021), included \$184,421, for Outcome 1, \$447,907 for Outcome 2, and \$108,414 for project management. Thus there was no significant deviation from this. Through to 15/8/21, the disbursement rate was 87%, with \$101,999 remaining to end-December 2021. (i.e. with funds of \$803,900 and \$701,901 spent)

Reporting

Annual Reporting

Annual reports for 2019 and 2020 were prepared, with the final 2021 report due in December 2021. The PM reported annually to the UNDP Cluster lead with the written report (which was indicator-based and public) entered into the UNDP project management system (called Atlas).

The 2020 report stressed for example some of the selection criteria for the horticulture projects – high export potential, new employment and use of best practice technologies. Due to covid, it was noted that the supply of some equipment was delayed, and that from April – September 2020, most activities moved on-line. It was signed off in February 2021 by UNDP Deputy Resident Representative.

Semi-annual Reports

Semi-annual reports were prepared primarily as an internal document for the donor (Russia UNDP TF)²³ to monitor progress and check planning²⁴. For example, the July 2021 report indicated the project agreement with Namangan administration to include 'green economy' elements into the plan.

Communications

The project PM held weekly meetings with CCI in their office. There were also *ad hoc* meetings as necessary, and

²¹ The 2019 AWPB was signed but undated. The AWPB 2020 was signed by UNDP in July 2020 and counter-signed by CCI in August 2020, eight months into the 12 month plan.

²² Contractual services Companies (72100); Miscellaneous Expenses (74500); Audio Visual & Print Prod Costs (74200); Travel (71600); Local consultants (71300); Contractual Services Individuals (71400); Training workshops & conferences (75700); Equipment & furniture (72200); Professional services (74100); International consultants (71200)

²³ The Russia Embassy was also invited to PB meetings, and ad hoc field visits

²⁴ The UNDP Russia Trust Fund for Development provided a template for Annual Project Narrative and Financial Progress Report.

formal (quarterly) progress meetings.

As a result of covid, the PT adapted in that pre-covid, the PM went to Namangan every Friday, whereas during covid, the PM has maintained more presence (and freedom to work) in Namangan, returning to Tashkent for weekly report and planning to the executive partner (CCI). The project also adapted in going 'on-line', when 'face to face' meetings could not be held. For example, the PM / Task Managers weekly meeting went online as did the monthly UNDP Inclusive Growth Cluster meetings with PM attendance.

3.3. Project Results

The FE assessed two levels of the project results framework - outcome and output²⁵, which was guided by the indicators and targets set at each level. Project success is also built upon achievement of the outputs, according to 'framework logic.' The overall and outcome levels include a rating according to UNDP guidance as described in **Annex 9**. UNDP were provided with two tables:

- Progress towards objective and outcomes (Indicator-based) which is described in **Annex 1**, and
- Progress towards outputs which is described in **Annex 2**

According to FE guidance, these tables were rated and commented on. A detailed result-level analysis follows of the outcomes and the corresponding Outputs.

3.3.1 Effectiveness - Achievement of the Results Overall

Overall Effectiveness of Results

There were no objective-level indicators, however the achievement of the outcomes should lead to the project objective or goal which in this case is taken as the project title – 'Enhancing the adaptation and strengthening the resilience of farming to Climate Change Risks in Fergana Valley'

There were three 'high points' under Outcome 2, which brought the project to life, all worked well together and gave the project gravitas, not only on a technical level, but also on an institutional and policy level. These were augmented by the inclusion of climate change risks being mainstreamed into a regional development plan.

The three high points in brief concerned: the PPQA agencies improved delivery of higher quality extension services; the use of micro-climate weather stations to provide localised weather forecasting; the provision of software to predict plant disease & pests, based on the weather and pest life-cycle stages; and the demonstration of horticulture projects using these advanced technologies, as well as other CCA measures, such as drip irrigation. Thus the higher level rating for the project was **Highly Satisfactory**.

3.3.2 Effectiveness – Achievement of the Outcome Indicators and Outputs

Effectiveness – Outcome 1 at the Indicator and Output Level

Outcome 1 - Component 1: Equipping institutions with the tools for sustainable use of natural resources and dealing with climate risks in agro-production in the horticulture / vegetable sectors

The overall grading is **Moderately Satisfactory**. There were seven indicators attached to the Outcome 1 level which were rated as: satisfactory (3); moderately satisfactory (1); and moderately unsatisfactory (3). (see **Annex 1**). However, the indicators varied in terms of importance. The high point was the development of the Namangan regional strategy with the inclusion of sub-chapters on climate change impact and on preparing for the decarbonised economy which were good. This was graded as satisfactory along with indicators for training and for promoting integrated pest management (IPM). Whilst the project design envisaged coding software for agro-planning and crop yield forecasting, this was limited by time and funds.

What Outcome 1 achieved was laying down the foundations for implementation of Outcome 2, in exposing local government and their agriculture administrators to the importance of applying modern CCA technologies to agriculture, which were then demonstrated under Outcome 2.

Assessment of climate change in the agriculture sector, with a focus on economic impact, export potential, regional development, and gender

Result & Analysis

An assessment of climate change on the agriculture sector and its export potential was undertaken and presented

²⁵ There were no objective-level indicators

to counterparts (2019). The study included a survey with 120 respondents. It mentioned:

- Climate change factors: high summer and milder winter temperature (lack of snow or cold snap / secondary frosts to kill and reduce plant diseases / pests), and heavy rainfall in the spring causing blossom drop
- CCA measures: crop / variety selection, establishing forest-strips as wind-breaks, water conservation measures, and IPM including using biological control

The assessment focused on the behaviour of farmers towards plant disease and pest control, fertilizers, post-harvest storage, climate change impact & adaptive measures, and usage of extension information. Whilst climate changes in the Fergana Valley were clearly presented, the assessment was not very specific or detailed on actual adaptation measures that farmers could take on a farm or crop level.

Recommendations on climate change risk for regional development planning, with a focus on agro-business, their exports, and gender

Result & Analysis

The project developed 20 climate change risk and adaption recommendations for inclusion into the agriculture chapters of three regional development plans. The recommendations were shared with Namangan, Andijan and Fergana regional governments.

The recommendations consisted of known climate change events in the regions, and adaptation measures for the farmers. There was also a section on biological pest control as per the Agriculture Development Strategy (to 2030). They were used as a forerunner for the Namangan Development Strategy, section on climate risk

Regional development strategy / action plan, that includes agri-sector climate-change risk & adaptation measures

Result

A Namangan Development Strategy (2020-30) (pp177) with the inclusion of CC risks and CCA measures was prepared and shared with the Namangan Administration and the Ministry of Foreign Affairs (MFA). It was updated a second time to include 'de-carbonizing elements'. The plan includes sub-chapters on: 'risks associated with the impact of climate change' (p78-80); and 'directions for industrial development' which has a section on 'green economy development' (p83-88). The plan's priority actions with indicators are also listed in the plan annexes²⁶ (see **Annex 5**).

Analysis

These two sub-chapters in particular were prepared with project support. There was some discussion during the project design phase that CC risk and CCA measures would be incorporated into a pilot development plan, as opposed to a complete plan being drafted. In the end the Namangan administration (under a new government directive to produce a strategy) with various support, including from the project, developed a complete plan.

Project support for mainstreaming climate change risk into regional development planning, appeared to be a first, and was a useful example for other regions to follow. However, whilst climate change risk in particular was mainstreamed, an actual focus on adaptation approaches and local actions appeared to be lacking. Instead the plan moved straight towards the more 'centrally' planned priority actions on land rehabilitation under using best practices, without really spelling them out. The project horticulture activities should provide good demonstrations in this respect.

Counterparts trained in integrating climate change into local development plans

Result & Analysis

Seventy-seven representatives (17 women) of government organizations were trained in the development of regional planning, with the integration of climate change issues. A 2-day training course was held in each of the three regions. See section 3.3.3 Training for detail on the courses.

Promotion of Integrated Pest Management (IPM), in tandem with local agromet stations

Result & Analysis

A concept booklet on the basics of IPM was developed (Uzbek, pp15) and shared with the PPQA, so that they could promote the approach via their phyto-consulting centres and farmer telegram groups. Project also prepared a

²⁶ The targets in most cases only reference for 2021 and not for the remaining 9 years of the plan

pest identification & control manual. For example, Namangan PPQA mentioned ‘many trainings / seminars to upgrade skills of staff in using weather data for pest control and IPM’. See section 3.3.3 Training for a full list of output publications, with comment on the contents.

Incorporating into agri-development planning, the CCA of local agriculture systems

Result & Analysis

The target group for this output was local government agriculture development planners, and is similar to two other outputs on mainstreaming CCA into regional development and training the local government and line agency counterparts in this subject. See section 3.3.3 Training.

Agro-planning software for forecasting of crop yield and export volume for local government

Result

Due to covid, this output was postponed and was thereafter limited in scope. In September 2021, the project contracted a software development company to undertake the activity. The expectation is to develop a software tool by November 2021. It is going to be piloted in the district Yangiurgan, of Namangan, working with their DoA.

Analysis

The design and functioning of such agro-planning software requires the timely collection of data on seasonal production levels by crop, which may not be easy. What is feasible is coding for a model, within which expected crop production volumes (using known standard outputs per hectare x number of hectares), are compared against a forecast yield parameter (e.g. 90% of full output based on a fair / good weather prediction proxy). Thus the agro-planner has just to enter the crop hectareage and a figure for % of maximum crop, for the model algorithm to predict crop yield. The accuracy of the prediction will depend on the quality of the data input. There is a risk that the yield estimation software will only reach prototype stage by end of project.

Effectiveness - Outcome 2 Indicators and Outputs

Outcome 2 - Enhancing smallholders to export through improved CCA and use of improved post-harvest techniques, to ensure food security / resilient livelihoods, while engaging women and youth

The overall grading is **Highly Satisfactory**. There were seven main indicators attached to the Outcome 2 level which were rated as: highly satisfactory (4); and moderately satisfactory (2); and satisfactory (1). (see **Annex 1**). However, the indicators varied in terms of importance. There were three indicators which were of higher importance and were all graded a highly satisfactory. These were:

- Improvement in the PPQA extension services, which were manifested through three phyto-consulting centres, and the creation of regular farmer bulletins which were delivered via telegram channel subscriber groups
- Establishment of 24 micro-climate weather stations, with two software platforms being hosted by Tashkent Inha University, for the provision of agromet-based weather forecasts, allied to plant disease & pest risk predictions
- The establishment of 14 horticulture projects, which utilized CCA best practices, hosted the micro weather stations, and became members of the telegram groups to receive farmer bulletins

Micro-climate weather stations installed to provide agromet-based information for farmers

Result

Hardware infrastructure – Agromet stations

Twenty-four agromet stations with two designs were installed: There were nine German-designed T-Warner stations²⁷ which use software called FieldClimate; and fifteen project-designed stations which use software called Amudar²⁸.

They were called agromet stations because the weather and soil sensors are designed and placed closer to the agriculture crops, and so are more useful and accurate for crop growing data and predictions. They are GPS located, and connected to the internet via a SIM card. They measure air & soil temperature, air & soil humidity,

²⁷www.stepsystems.de/en/products/climate-control/weather-stations/t-warner-internet-weather-monitor/t-warner-internet-weather-stations/

²⁸ The German station is \$4,000 compared with the local version at \$1,000, due to the project-designed datalogger

rain, wind direction & speed, saturation dew point, evapotranspiration, and vapour pressure. Thus for example, the accuracy in predicting frost is much better for these micro-climate stations. Their range in the Fergana valley is taken to be up to ~80 km² (5 km radius), although it can be more in a flat area. A Tashkent Inha University consultancy called Amudario, was responsible for installing the agromet stations and creating predictive software, called Amudar.

The locations were:

- Namangan - Chartak x 3, Yangikurgan x 2, Turakurgan x 2, Chust
- Andijan - Andijan x 3, Asaka x 3, Khodjaabad x 2
- Fergana - Altariq x 3, Kuvasay city x 3, Kuva x 2

See **Annex 5a** for station details / location.

Software infrastructure – Agromet early-warning applications

The agromet services platform and app called FieldClimate, uses the micro-climate data from the T-Warner stations, with added online weather data from Meteoblue²⁹. It then uses an algorithm, to set the weather data against plant disease & pest predictions, based on their life-cycle stages. The result is this modelling is the app called FieldClimate.

For the other 15 project-designed stations, they have their own platform and app called Amudar, which the consultancy Amudario designed. The reason for the project designing its own datalogger and app, is that the T-Warner - FieldClimate system is more expensive and requires a subscription. For both apps, the 'cloud-based' system consists of a server for data storage, a system platform, and a laptop or Smart phone with the software.

The aim for the Amudar app is for interactive weather graphs, with forecast on disease spread (for 6 fruits & 43 diseases)³⁰. The algorithm is expected to take into account not only the local weather patterns, but also local horticulture crop varieties, and locally-adapted and / or endemic plant disease and pests. The Amudar app presentation is in Uzbek language³¹. Tashkent Inha University (School of Computer Science & Information Engineering) and Amudario research consultancy³² are responsible for hosting the agromet services to provide early-warning plant protection advice to farmers³³.

At present, the system interface for these apps (for the weather forecast & plant disease / pest early-warning predictions) is considered as too complicated for farmers. As a result, the information (e.g. weather screenshots plus plant pest advice is being disseminated via the telegram subscriber groups that are linked to each agromet station

Analysis

The project has been very successful in establishing this system, and then going on to design a domestic version, that is tailored specifically for the farmers in the Fergana Valley. A remaining issue is for the future funding to Amudario to finish the testing and demonstration of the system (with a sufficient number of crops and diseases included), and possibly to provide direct access to more people to the Amudar app.

Insect Pheromone Traps

The project piloted a insect pest monitoring system to identify problem pests / emerging infestation. Twelve pheromone traps (trap + solar-powered SIM-card camera for picture transmission) were deployed, and a data management system designed. The system uses software with identification recognition code to interpret the pictures of the insect pests (moths etc), their stage of development and their densities in order to predict infestation³⁴.

The project has been developing the software from scratch and piloting the forecasting of problems for 12 insect

²⁹ Meteoblue weather services cost the university €1,704 per year (i.e. €426/quarter)

³⁰ The software is being modelled for 43 pests / diseases (for apple 11; for pear 7; apricot 7; plum 6; cherry 5; grape 7), to estimate particular disease / pest risk. For details of how the agromet disease / pest model works – see **Annex 5**.

³¹ The project produced an agromet software instruction manual (pp24)

³² Amudario was created by Inha University, as a private consultancy, to produce agromet stations (25% of the foreign equivalent price and without expensive data subscription) and smart pheromone traps at affordable prices.

³³ Amudario will continue to subscribe to Meteoblue weather forecasts until end-2022.

³⁴ The pheromone capsules contain the female pheromones for a number of insect species, which the male insects are attracted to. The identification of each species and its maturity includes advanced machine 'object detection' learning methods

pests to begin with. At present, the alerts are ~15 days late, so with this sort of feedback the model can be adjusted. i.e. matching the weather modelling with insect life cycle events – e.g. egg hatch stage. The plan is to integrate these insect pest predictions with the Amudar app.

Analysis

Such camera traps have been used in Europe / Russia, for some time, the difference here is that they are being deployed with automatic (picture) data transmission which is linked to software that can identify the pest species.

The system is new in Uzbekistan and is specifically being refined by the project, to suit horticulture pest species that are adapted to the Fergana Valley climate (i.e. temperature and fruit-flowering regimes). The traps were deployed in August 2021, as a project 'add-on' to improve the quality of the farmer bulletins. Thus, the trap data can be linked to the Amudar system to refine predictions. The intervention with Smart pheromone traps is innovative and useful³⁵.

PPQA extension services to provide climate risk / impact information to farmers

Result

In cooperation with the PPQA, a two-part system of extension services was developed, based on establishing client-facing information centres and on using Smart phone telegram channels to deliver agriculture technical advice. Firstly, a phyto-consulting centre was opened in each of the three regions to disseminate advice to farmers, especially on plant disease and pests. Secondly, farmer telegram user groups were created, based on the location of agromet stations. For the 24 stations, there are now 24 groups with an estimated ~750 subscribers.

Each district has PPQA officers responsible for co-ordinating the early-warning farmer bulletins to the telegram groups. These advisories consist of: the weather data from FieldClimate or Amudar, the plant disease and pest risk prediction from the same apps, and the PPQA advice on what the farmer should do. The DoA supports preparation of these bulletins, which are usually sent prepared twice a week. The farmer bulletins are tailored for each of the agromet station-based telegram group. So for example, providing information on the micro-climate / temperature etc, and if a cold-snap is coming, for the telegram group to prepare for frost in their orchards and vineyards. Ten-day weather data is also taken from Yandex, so support the advisories³⁶.

Project figures indicate: 1,582 recommendations on disease / pest control and farming techniques have been provided via the phyto-consulting centres; and 749 bulletins on risks of disease / pest outbreak have been provided via the telegram channels.

Analysis

Prior to project, the capacity of PPQA to provide such services (quality and delivery of such timely information) was limited. The project has been successful in working directly with the PPQA³⁷. The uptake of farmer bulletins in a simplified format for farmers to support disease / pest control, has been good. The accuracy and speed of localised pest control has increased under the project³⁸.

A concern at present, is that the PPQA telegram channels are putting out too much advice (like daily blogs), so there could be farmer fatigue with so many messages and so much to read. (see also **Annex 5**). Also, in order to maintain an early-warning system, and filter out excess information, there could also be a facility for SMS 'push notification messages' agreed with telecom providers.

At present, the number of farmers using the free telegram group services appears limited, so solutions to address this need to be identified (e.g. lack of awareness of the channels, lack of access to smart-phones, or overload of PPQA 'blog'-style information).

At present the access to the Amudar app is limited, but options to expand this should be found, as some farmers are probably more engaged with the technical side of its contents, and they don't grow all crops. E.g. 'select 10-day weather forecast and a certain crop, to read the agromet advice on particular plant disease / pest risk and what to do.

Pilot small-scale horticulture projects with cost-sharing contribution

³⁵ In comparison, in terms of agromet-specific stations with an entomological (insect) observation capacity, Uzhydromet only has four

³⁶ <https://yandex.com/weather/region/105809?via=brd>

³⁷ They were only mentioned once by name in the prodoc, and not even as a project partner.

³⁸ E.g. if forecast is three days late, with the result being the farmer sprays after another three days, then this can be too late to stop an infestation.

Result

Fourteen horticulture business development projects were supported. Originally seven projects were selected, but with the advent of extra funds for covid response actions, it was possible to support 14 projects in total. CCI led the public tender and proposal selection process. The proposers were provided training in proposal preparation. Once selected the owners signed an MoU with UNDP in December 2020 (pp9). From 69 proposals, 14 were selected and with project technical expertise and equipment supplied, they are now in operation:

Summary – Equipment supplied

	Horticulture Activity	Project Supply & Project Investment
Namangan	Cold storage of fruits & vegetables	Refrigeration units x 3 (\$23,023)
	Honey production	Honey processing equipment (\$20,846)
	Cold storage of fruits & vegetables	Refrigeration units x 4 (\$26,016)
	Orchard establishment & vegetable cultivation	3-wheel 80 hp tractor; mini-tractor 40 hp; mounted sprayer & boom- 400 litres (\$40,017)
	Lemon seedling cultivation	two heat furnaces; filter & control panel for greenhouse drip irrigation system; 66 air fans (\$33,920)
Andijan	Orchard establishment with drip irrigation	Drip irrigation equipment for 10 ha (\$18,777)
	Tomato seed production	Tomato seed production (cleaning, treating, packing etc) equipment (\$19,600)
	Almonds & walnut production	Drip system 15 ha; Mini tractor 40 hp (\$35,643)
	Vegetable cultivation	Tractor 80 hp; disc harrow; fertilizer spreader; cultivator; mounted sprayer; 3-share plough (\$28,820)
Fergana	Orchard establishment & drip irrigation	Mini tractor 50 hp; mounted sprayer; mounted fertilizer spreader; 3-share plough (\$14,650)
	Cherry orchard establish, greenhouse, with drip irrigation	drip irrigation 5.2 ha for orchard & greenhouse (\$8,708)
	Vineyard establishment	Drip irrigation for 11 ha (\$21,670)
	Vineyard establishment	Drip irrigation for 8.1 ha; tractor 70 hp; trailer sprayer (\$38,952)
	Agriculture services development	Mini tractor 50 hp x 3 set; 2-wheeled mini tractor with attachments x 3 (\$39,840)

The project investment was \$370,482, with investment of the cooperatives and enterprises at \$1,132,744. The employment generated was 538 persons. See **Annex 5** for (contact and other) details of the 14 horticulture projects

Analysis

Horticulture projects submitted and selected by workers model and by women's empowerment

#	Submitted	Women led proposal	Selected	Women-led selected
Proposals	69	8	14	2
By Co-operative	25	2	8	2
By Private company	44	6	6	0

The success rate for cooperatives was very good (~1 in 3 proposals were successful, compared with ~1 in 7 for private enterprises). However, only ~1 in 9 proposals were led by women, and overall only two of the 14 projects selected were led by women.

Horticulture projects - status

The FE team visits, as well as the June and September 2021 monitoring reports indicate that one or two of the interventions require 'hands-on' guidance by the project, and a UNDP – CCI agreement to ensure monitoring and finalisation post-project. A brief snapshot only is provided here:

Andijan Horticulture Projects

Andijan, Bulokboshi District – Almond & Walnut orchard – Cooperative Bogbon Tram Agro

Almond and walnut orchards (15 ha) using drip irrigation [cooperative 'Bogbon Tram Agro']. The new orchard is set high on the hills, far from the water source. For water supply of the planned 15 ha, three pools are to be dug (2,700 m³). The arable land for the garden has been prepared, new seedlings were purchased and planted on 14 ha. The project supplied 3 sets drip irrigation equipment with installation completed.

Issues – Only 1 pool has been dug and only 1 geo-membrane purchased, as the coop is unable to obtain a loan. The M&E

June 2021 report indicated further: the manager is overloaded, isn't able to settle all issues. The recommendation was to review the coop organizational structure, hire an extra person to solve the issues.

Orchard and drip irrigation - Production cooperative Single Woman

Installation of drip irrigation for a new almond orchard. Most of the work has been completed - central pipeline line of 3,400 meters was laid, 2 pools for collecting water were organized, 10 hectares of land were developed and ploughed on the hill, about 8,000 almond seedlings were purchased and planted. However, the land is to be taken for new Andijan construction, so the farm has to move

Processing tomato seed - Andijan Scientific Testing Station - Research Institute of Vegetable, Melon & Potato

All contributions of the parties have been completed, the opening of the facility was held on August 13, 2021, material for the media was prepared for the event. All equipment provided by the project was installed and connected to a 3-phase power transmission system, and during the tomato ripening season was used to extract seed

For the Andijan ARI, part of the research effort is towards fruit and vegetable disease and pest control, so their project involvement was apt with the provision particular pest control forecast information for the PPQA's farmer bulletins.³⁹ They also focus on the varietal selection for CCA. From the project side, employment was generated, and they participated in project training events, e.g. for post-harvest cold storage techniques and disease / pest control – under which skills were improved (see **Annex 5**)⁴⁰.

Vegetable cultivation - Production cooperative Solih Ziyo Zoda

The garage for equipment has been prepared. A barn has been prepared for storing and distributing the products. The laying of the crop is planned after the harvest in the Autumn.

Namangan Horticulture Projects

Namangan - Honey production Unitary enterprise (Yangikurgan valley fruit export company)

The region (and district) has several localised weather zones, however the Namangan weather forecast is not very accurate for the enterprise which is situated in the hills, and there is 12 hour (delay) difference with the Tashkent forecast. So for rain, crop spraying may need to be repeated, when the forecast is 'late'.

Honey production enterprise (300 ha of apple orchards) indicated only 1 in 30 full time workers are women, although all 50 seasonal workers are women who are paid 40,000 soms / day. To date, the result of the project, only two new positions have been created, although both for men.

Project agromet station was installed, with a PPQA inspector, via a telegram group, twice a week, providing information on weather forecast and pest / disease control. It was confirmed that the arrangement is working well, and saving the company time and money⁴¹. The surrounding telegram group famers have an interest in improving fruit quality as a result. There are 24 famers in the group. Some of the neighbouring famers are contract-growing for the enterprise, so disseminating farmer information is important

The present status is that the processing building has been constructed and honey supply contracts established, but the processing / packaging (pouring moulds) equipment needed to be changed, so that production has yet to start. The pheromone trap pilot is working with insects being supplied to the PPQA inspector, who has been giving pest control recommendations as a result.

Cold storage of fruits and vegetables - Farm entity Ne'matjon Ikromjon Dilnoza

The profit gained from the first harvest (early-ripening apple varieties) enabled the farm to purchase and install a transformer on the territory of the cold storage unit. A stock of french plums has been prepared for export to neighbouring countries. They plan to store late-ripening varieties of apple trees. The farm has made a preliminary agreement with the neighbouring 5 farms for storing crops from their orchards. M&E requested that employment data be provided to the project, as well as when the 4th refrigeration unit will be installed.

Cold storage of fruits and vegetables - Farm entity Boburjon Javohir Sohibjon

Harvesting of apples and plums is on-going. Plums are being dried and exported to Russia. M&E requested that employment data be provided to the project

Orchards & vegetable cultivation - Production cooperative Pop Yong'oqzorlari Agrofirma

Now, the shed for storing equipment has been built. After picking grain, the grain, corn, mung bean and peanuts have been

³⁹ Particularly for melon, legumes, and beans

⁴⁰ The equipment to process tomato seed for market sale, allowed the ARI to improve seed extraction from 3 to 4 kg / ton, and to not only sell raw seed, but to package / brand the seed with a 3-fold increase in profit (from 1,000 to 3,000 soms / kg). As the seed, is certified at the centre, it can be exported, which was a project objective. In terms of scaling-up, the ARI plans to improve the processing, packaging & branding of ~30 varieties of vegetable seed including melon – to create further employment, & export revenue.

⁴¹ Before receiving timely PPQA farmer bulletins, the company used to employ agronomists from Turkey or Greece to provide growing and seasonal pest / disease advice

planted on 17 hectares. Unfortunately, the remaining land has not been cultivated this year due to the lack of access to water. The cooperative plans to obtain a loan from the World Bank to reclamation of these lands, a business plan has been prepared with an approximate amount of work for 4 billion sums.

Cultivation of lemon and lemon seedlings – Company Radivon Citrus Mevasi Tomorqa Xizmati

Growing lemons in a 1 ha greenhouse. The iron frames have been constructed. Adjusting the power supply, drip irrigation and heating equipment are in process. After installation of the control system, it is planned to plant lemon seedlings in the Autumn. Also, within the framework of the agro-cluster, other work is being carried out: 5 ha of land, transferred by the local khokimiyat, were distributed over 20 acres between 25 representatives of youth. This created additional jobs. Services were provided for the construction of greenhouses for growing lemons in Yangikurgan and other districts of the Namangan region.

Fergana Horticulture Projects

Fergana, Altıarık District – Vineyard ‘Cooperative Damir Oltıariq Agro-invest’

On the territory of the drip equipment and the pumping station, a canopy was built, the floor was concreted, a mesh fence was installed. Sandbags were removed around the water tank and a concrete curb was cast, the territory of the garden and the entrance to the greenhouses was landscaped, the paths were cleaned and levelled.

On August 12 an opening ceremony to grant agriculture equipment was held. Regional CCI, Regional agriculture department representatives, district Khokim, representatives of Farmer’s council and PPQA, as well as cooperative members, Community members participated at the event. The materials for mass media were developed; photos and tablets about the project have been prepared. The M&E September report recommended to organize an irrigation course on the effective distribution of water between the members of the cooperative, and keeping records of water consumption. There was a broken water pump mentioned in the June report, but its status now not mentioned

Fergana, Altıarık District – Vineyard ‘Cooperative Axadjon Ismatov Agro Logistika’

The work has been completed – no further recommendations. See Annex 5, for a full case study from the FE focus group discussion

Orchard and implementing of drip irrigation - Farm entity Quvasoy Nodirjon

Irrigation of 6 hectares is carried out by a drip irrigation system

Intensive orchard & greenhouse, plus drip irrigation - Farm entity Osiyo Zamin Sharbati

Creation of a new cherry orchard on an area of 5 hectares, construction of a greenhouse and growing vegetables on an area of 18 acres using drip irrigation. According to the reports installation has been completed, with no further recommendations

Agriculture services and development of vegetable cultivation - Company Ulug'bek Satkak Tomorqa

All contributions for the project have been completed. The agriculture machinery provides services to the farmers.

Analysis of agromet systems and their use in horticulture to reduce the impact of climate change

Result & Analysis

A study on the benefits of using micro-climate stations in horticulture was undertaken. It included recommendations on improving farmer services and on the most effective way to disseminate information to end users. The study (2019, pp25) assessed agromet systems on the market around the world, and recommended on the best options for the project and horticulture in the Fergana Valley

Study on the development of the agro-insurance sector

Result & Analysis

A study on agro-insurance was conducted and presented to CCI (2020, 30pp). Based on the results, three seminars were held with 89 participants. The study describes issues in the sector and provides recommendations for improvement on a farm / company level and on the insurance sector itself.

The project facilitated increased exposure of farmers to the agro-insurance sector. The insurance is usually weather-related cover. E.g. A late-frost coming early in the fruit tree flowering cycle, causes blossom-drop and the need for the trees to re-flower, causing a later and reduced quality and volume of fruit. Such an event occurred in spring 2021, and affected 50% of fruit farmers, however most were not insured. Whilst insurance is an adaptation measure, it treats the symptom and not the cause⁴².

⁴² Another issue is that in order to receive a pay out for crop damage, only official weather data from CHS can be used, and not from the project agromet stations.

Women (and Youth) engaged in pilot agriculture projects using best CCA practices

Result & Analysis

There were 14 new horticulture projects created, with 558 new jobs of which 282 were for women (and 228 for young people). The actual result for engaging women (and youth) in new horticulture cooperatives / enterprises was good⁴³. This was partly achieved by adhering to project selection criteria that included 'generation of new jobs for women' (see **Annex 5** for complete list of selection criteria). See also the analysis of the horticulture projects which considers cooperatives and women's engagement.

Agro-producers trained in marketing (with export opportunity, insurance)

Result & Analysis

The number of participants trained on marketing, export & insurance was 286, of which 22% were women. See next Section 3.3.3 Training

3.3.3 Training & Awareness

Twenty-one training events were held. In total 1983 participants were trained (14% were women) The events were held across the three regions [with number of participants trained in brackets]:

- Seminar – Information for Hokimiyats, Farmers Council, PPQA [118]
- Training - Advanced technologies for growing grapes [143]
- Training - Agrotechnical measures & preparation of the garden for winter [136]
- Seminar - Role of agromet stations in forecasting & combating agri pests / diseases [95]
- Seminar - The role of certification and standardization in the export of agriculture products [131]
- Seminar - Spring agro-technics [193]
- Training - Business planning and marketing [66]
- Training - The role of agromet stations in agriculture and the principles of work [27]
- Seminar - Pest and Disease Control of Agriculture Crops [117]
- Webinar - Improving efficiency of services to farmers on the use of forecasts of weather stations [20]
- Seminar - Agriculture Insurance and Climate Change [89]
- Seminar - Agrotechnical measures to prepare the garden for spring. Pruning fruit trees [95]
- Training - Skills in the development of regional development programs in the agriculture sector [77]
- Round table - Integrated pest management - application / integration with agromet stations – for PPQA staff [89]
- Seminar - Water-saving methods of agriculture irrigation [76]
- Round table - Climate Change and Agriculture [85]
- Seminar - Agriculture machinery for vegetables; garden care [137]
- Seminar - Technology of post-harvest storage of vegetables & fruits [86]
- Round table - Strategies for the development of Namangan region [40]
- Seminar - Climate change and its impact on agriculture development [78]
- Seminar - Growing and protecting agriculture products [85]

In most cases, each training course was held in each of the three regions, thus participant numbers were more manageable. The topics covered the project design requirements. For detail see **Annex 5**.

Awareness - Technical materials, publications & deliverables

- **Publications (manuals, booklets, leaflets)**
- Climate change impact assessment on fruit and vegetable production in the Fergana valley (2020, Russian, 26pp)
- Agro-planning – Climate change adaptation (CCA) in agriculture - Fergana region (Russian, 17pp)
- Agro-planning – CCA in agriculture – Andijan region (Russian, 14pp)
- Namangan strategy development (2021-30) (2021, English, 177pp)
- Disease & pest control in horticulture (Uzbek, 113pp – handbook)
- Home garden technical measures (Uzbek, 65pp - handbook)
- IPM (Uzbek, 7pp, Russian 5pp)
- Drip irrigation in horticulture (Uzbek, Russian, 1p)

⁴³ The number employed were not updated by the last project monitoring report, and could not be fully verified by the FE team

- Plant macro / micro nutrients (Uzbek, 2pp)
- Smart pheromone traps and use of its software (Uzbek, 17pp)
- Pheromone traps (Russian, 1p)
- Introducing agromet stations to agriculture (Uzbek, 22pp)
- Agromet stations (Russian, 2pp)
- Climate change in Fergana Valley (Russian, 1p)
- Agro insurance report (Uzbek, 30p)
- Phytopathology
- Vegetable diseases & pests (2019, Uzbek, pp34) – concerns common / rare diseases in mulberry orchards and vineyards
- Guideline (2020, Uzbek, 25pp) - concerns horticulture vegetable & fungal disease diagnosis
- Guideline (2020, Uzbek 83pp) [title of guideline missing] – Vegetable main diseases
- Entomology
- Guideline (2019, Uzbek, 69pp) – concerns fruit sucking insects and their life cycles with control methods
- Guideline (2019, Uzbek, 66pp, Uzbek – concerns greenhouse and melon insect pests
- Guideline (2020, Uzbek, 26pp) - concerns insect identification, classification and modelling of the lifecycle development of insect pests to match seasonal weather indicators
- Extension materials
- Intensive gardening (Russian, 38 pictures) - concerns fruit seedlings selection, planting, feeding, harvesting, marketing, irrigation; pest / disease control; crop picking and recommendations; investment for a 5 ha cherry orchard
- Plum / Apple / Pear orchard – disease / insect pest control (Uzbek, 6pp) – concerns e.g. for plum - preparation of buds for maximum wintering, boron / zinc, P & K feed; Spring disease control – trunk whitewash; use of drip irrigation
- Cherry management (Uzbek, 1 p) – concerns pruning and production within 3-4 years
- Bordeaux liquid use (Uzbek, 2pp)⁴⁴
- Fruit trees (2019, Uzbek, 8pp) - protection & fertilization of apple, pear, plum, almond, peach, apricot, cherry & grape

For the limited size of the project, the inputs in terms of training was good, and for the awareness materials the output was very good, and marked a significant uplift in availability of high quality agromet and disease / pest control advice to project farmers.

3.3.4 Efficiency, Relevance and Ownership

Efficiency

The agromet and extension measures would not have been undertaken without the project, nor put together in such a cohesive way. The project efficiently utilised funds in procuring a limited number of agromet systems and then reproducing a domestic version that was cheaper, and thus more sustainable / replicable for farming communities in the future⁴⁵. Furthermore, financial inputs were in excess of plan, by 50% extra funding being utilized. These inputs were from government, UNDP and the private / cooperative sector, which also indicated high project relevance. Thus, the (cost) efficiency was rated as **highly satisfactory**.

Relevance

The measures were relevant under a number of UN SDGs and UNDP country programming. The project was in-line with the national agriculture strategy, and a number of farming-based decrees. The project followed and implemented national policy in supporting regional development planning, in improving horticulture practices, and in upgrading extension services in their methods and skills. The project design remained highly relevant. Relevance was thus graded as **highly satisfactory**. (See Section 2.1 Development Context)

Ownership

The project worked in close cooperation with CCI as the main implementing partner, who despite not directly managing the funds, played a key role in steering the project, and in actively leading the process for the transparent selection of horticulture projects. Whilst improving, extension services was integral to the project design, it was not foreseen that the PPQA would also play such a leading and intrinsic role, in not only upgrading their own skills and expertise in agrometeorology, agronomy and horticulture, but also in managing and delivering

⁴⁴ Bordeaux mixture is a mixture of copper sulphate and quicklime used as a fungicide. It is used in vineyards, fruit-farms and gardens to prevent downy mildew, powdery mildew and other fungi. It is no longer on sale in the UK for example

⁴⁵ The cost of the locally-made agromet datalogger was much less, which allowed for the planning of a further 8 agromet stations on top of the 16 that were initially installed.

internet / app-based advice bulletins to farmers. PPQA post-project will also maintain the agromet hardware – the stations installed in the Fergana Valley.

In addition, Tashkent Inha University and a consultancy of theirs, took on the role of hosting the on-line agromet platforms to manage the data from the 24 stations, and the software to predict plant disease and pest problems. They also added to this with another system, to locally identify emerging pest problems, using a Smart camera-trap and insect identification software.

In terms of the horticulture projects, two of them were with regional agriculture research institutes, who used the project to not only develop their services, but also in terms of their research topics, and curricula taught in the fields of horticulture best practice, and in the use of modern agromet technologies.

The agromet stations and the services being delivered via telegram groups was popular with the horticulture farmers and brought them together with the government PPQA service.

Mainstreaming

A government policy has been to encourage the establishment and development of cooperatives. Out of the 14 horticulture projects supported, eight were cooperative ventures. In terms of mainstreaming climate change issues, the Namangan development strategy was prepared and included not only such issues, but also included activities for the green de-carbonising economy.

4. SUSTAINABILITY

The overall rating is that sustainability is **Moderately Unlikely**⁴⁶

4.1. Financial Risks to Sustainability

The rating is 'Financial Sustainability is Moderately Likely'

The PPQA was established in August 2021 from the two separate agencies for plant protection and for plant quarantine. The certification requirements for horticulture exports to neighbouring countries, including Russia have increased in recent years. This means that stopping disease and pests at source has become a much higher priority, and therefore the government is investing in such PPQA services. Also there are examples of donor collaboration in this field. In 2021, China government provided \$3 m for Tashkent, Andijan and Namangan for the upgrade of plant quarantine laboratories⁴⁷. UNDP also has a new €5 m agriculture project in the Fergana Valley and Karakalpakstan. After this present project, there is also an opportunity for UNDP to look again at a 2019 Green Climate Fund (GCF) funding proposal for providing farmer-based weather services.

There is also the long-term funding issue of Tashkent Inha University / Amudario being able to host the agromet platforms. After 2022, they will need either government or donor funds, or probably need to charge a subscription fee, which after all the effort to provide free and informative services for the pilot farmers in Fergana Valley, would undermine the trust of farmers and the true economic value of these agromet services.

4.2 Socio-economic Risks to Sustainability

The rating is 'Socio-economic Sustainability is Moderately Likely'

The proportion of women trained under the project was only 14% and bearing in mind women are responsible for probably 50% of agriculture work. In this respect, the project didn't really achieve gender equality or sufficient women's empowerment. However the number of women-led farms in the three regions is only around 5%.

UNDP has recently approved a new project – 'Digital Economy in the Fergana Valley' which dovetails with activities within the Namangan development plan in terms of agriculture and digital services provision. The expectation from UNDP is that they will attempt to achieve a better gender balance within this new project.

4.3. Institutional & Governance Risks to Sustainability

⁴⁶ Sustainability is considered to be the likelihood of continued benefits post funding. Under UNDP criteria each sustainability dimension is critical, i.e. the overall ranking cannot be higher than the lowest one.

⁴⁷ <http://agricultor.md/china-to-help-uzbekistan-improve-phytosanitary-laboratory-performance/>

The rating is 'Institutional & Governance Sustainability is Moderately Likely'

What the project has shown is that it is possible to be flexible with an interested government agency, namely PPQA, in their development of extension services, but also in using new technologies, such as the micro-climate weather stations, and disseminated advice using telegram groups. Traditionally, the role of all weather forecasting was with CHS, but these micro stations, are not under their remit. The challenge for the future is for farmers to meaningfully access both and for the government agencies to ensure that the forecasts don't contradict each other, which could erode farmer trust in these new systems. CHS also have agrometeorologists and technicians who maintain automatic weather stations, thus there could be a supportive role of CHS towards PPQA, as it develops its services. Also vice-versa, CHS could learn how the packaging of hydromet, agromet and early-warning advice for farmers could be improved.

4.3. Environmental Risks to Sustainability

The rating is 'Environmental Sustainability is Moderately Unlikely'

In the Fergana Valley, farmers irrigate their lands mainly through surface water - Syrdarya river (Norindarya and Koradarya), Namangan and Fergana canals. The water is managed by water consumer associations, who distribute water according to farm area / needs, and they get paid for it. Water is also pumped from low to higher regions which comes at an electricity (carbon?) cost. However, due to insufficient supply (and fighting over water), and due to the recent transition to a farm cluster system, the clusters themselves have begun to sink boreholes to supply water. Such boreholes are subject to drilling permission, and maintaining a sustainable flow rate

It was noted that ~50% of the project horticulture enterprises use aquifer water from boreholes, but it was not evident if this water is metered for measuring flow-rates and ultimately also aquifer re-charge levels and therefore sustainability. For surface water volume and flow rates, the CHS has sufficient hydro-stations along the canals and at the reservoirs, which is another important role of CHS

5. IMPACT & CATALYTIC EFFECT

5.1. Impact

Reduction in stress on ecological systems

The stress on ecological systems remains high. This report has repeated some of the climate change evidence which is described as acute. According to the UN WMO, Uzbekistan is warming-up and there is a marked change in rainfall pattern.

Water supply is a major issue, especially with farming systems that are horticulture-based (fruit & vegetables), and largely irrigated. However, water-use efficiency is low (hence project provision of drip irrigation for example), and squabbles often break-out, not only within the Uzbekistan part of the Fergana Valley, but also with neighbouring countries. At present farmers may not trust the weather forecast, as it is not specific to their district or catchment, thus they may irrigate, which is not efficient water use. Added to this, cycles of dry spells and over-watering (due to irrigation and rain) can cause plant disease problem.

Across the country, CHS have 131 hydro-stations and measure water levels against critical norms for drought and floods with the early-warning system (EWS) reported to the cabinet of ministers⁴⁸, but this doesn't stop the fact that too much water is being used, and that demand is greater than supply.

The project impact for pilot farmers was to improve their trust in national and local weather forecasts, especially as they became directly linked to agriculture advice bulletins on farming activities, and specifically on plant disease and pest control advice. This meant that the horticulture production volumes and their quality being increased for the demonstration farmers.

If we take an agromet station coverage to be ~100 km², and that the project will have installed 24 stations by end of project, that's a coverage of ~2,400 km², which in comparison to the area of the three regions ~18,000 km², then that equates with the project covering 13% of the territory. For a demonstration project of limited size, this is a significant impact.

Regulatory & policy change at national and local level

⁴⁸ There is also cooperation with neighboring countries (Kyrgyzstan, Kazakhstan, Turkmenistan) on flood forecasting

Regulatory and policy change has occurred in the last few years, and during the project period. The project was able to successfully put particular policies and regulations into practice.

5.2. Catalytic Effect

Theory of Change

Parameter	Agromet & Plant Protection Systems	Horticulture Projects
Concept	Using localised crop-based weather data with plant protection knowledge to inform farmers	Demonstrations of CCA measures in horticulture projects with a bias towards supporting women
Root causes & threats	Quality and timing of knowledge needs upgrading; Plant protection issues becoming acute due to changing weather patterns (climate change)	Water supply is less than demand Rainfall not easily predictable
Solution (Input to Output)	To demonstrate new agrometeorology-based farmer advice systems – improved quality / user-friendly / timely advice	Demonstrate horticulture projects using agromet advice linked to water control systems such as drip irrigation
Outcome required	To rise higher on the political agenda, so that the systems can be refined and scaled-up to more areas	Using CCA measures, including the farmer bulletins, to generate greater horticulture crop exports
Result	Software applications linking micro-climate weather with plant pest & disease predictions Pilot farmers are taking up new technologies via telegram groups	14 horticulture projects, including 8 operating as cooperatives are successful Women made up 52% of the employment generated
Impact	Agromet stations cover 13% of the 3 regions	Export volume and quality expected to increase

Scaling-up and Replication

- Due to the limited duration / size of the project, there were no plans to scale-up the project itself, only introduce pilots⁴⁹
- There is a good opportunity to scale-up the agromet stations and app system, by the cooperatives if they work with Amudario.

Demonstration

- Due to covid, the opportunity for awareness raising – field extension / outreach, such as farmer to farmer exchange visits was limited, but this was also because of the timing of the installations (and software) and horticulture projects only coming in 2021
- An international off-the-shelf agromet forecasting system was deployed and demonstrated together with an app that predicts plant disease and pest problems
- Using drip irrigation together with improved farmer advice to improve horticulture output; and the value of post-harvest cold-storage to improve quality for export
- The inclusion of climate change impacts, and green economy directions described in a regional development plan

Production of a new technologies / approaches

- An Uzbekistan and project-designed agromet forecasting system was developed that predicts Fergana Valley-specific plant disease and pest problems
- Smart insect pest trap and identification system was developed by the project and is being tested
- PPQA showed its interest in providing improved extension services with the aid of new micro-climate weather stations, software predicting plant diseases & pests, and telegram channels with subscriber groups as the delivery mechanism

6. CONCLUSIONS AND RECOMMENDATIONS

⁴⁹ However UNDP will share project materials / experiences with other regions, and UNDP will use lessons to replicate within other UNDP initiatives

6.1 Conclusions

One of the impacts of climate change has been that winter cold weather snaps are less common now (compared with even five years ago), so this means that there is less natural control of particular plant diseases and pests. Also insect disease and pests are also becoming climate adapted (e.g. earlier breeding season due to earlier higher spring temperatures), thus the software algorithms based on particular 'breeding' dates need to be monitored and updated periodically (based on pest breeding cycle knowledge and the weather data).

The project work with the two universities and two agriculture research institutes proved valuable, because they are now using the knowledge of new agromet technologies and predictive software to train the next generation of researchers and students, in the methods and benefits of such systems. This was an important aspect of the project.

The project installed 24 micro-climate agromet stations, compared with the 12 planned. This was made possible by through collaboration with Tashkent University / Amudario who designed a much cheaper 'datalogger', allowing more stations to be procured. They also designed the software, Amudar to go with this datalogger. The coverage of agromet stations, supplied by the project reached 13%, but more are needed to create this finer granularity of agro-based weather forecast.

The project has proved to be successful in just three years, and this in spite of covid restrictions. There is a need to improve the horticulture export value-chain, but this was mostly outside the scope of this project, except to demonstrate post-harvest cold-storage facilities. Whilst, the improvement in PPQA services and in their disease / pest control has taken a clear step up for the three regions, the step to create export phytosanitary green corridors is for another project.

Whilst CHS holds ~100 years of historical weather data for the Fergana Valley, it is unclear if it has as yet effectively digitized the data. There are however, plans to manage and archive the project stations' agromet data under their new software platform. The purpose is to provide trends in weather changes

6.2. Lessons Learned

In July 2021, there was a presidential resolution for the amalgamation of plant protection and quarantine services, to become PPQA. Therefore a new mandate has been set for PPQA services. The project has demonstrated the need not only for traditional specialists (e.g. agronomists, entomologists) to be recruited to keep up with climate change impacts, but also that new types of specialists, such as agrometeorologists and IPM / biological pest control specialists are needed. It is useful that PPQA maintains its in-house training institute to train its inspectors. CHS also have professional agrometeorologists, but the link with PPQA agromet specialists in continued professional development was not apparent.

Embedding project innovations into two universities and two agriculture research institutes showed foresight and is having a very positive impact on agriculture research topics, student curricula, and ultimately on producing the next generation of agrometeorologists, agronomists, plant pathologists, and agromet software designers.

PPQA is expected to maintain the agromet stations, but the forecasting system include is still under development. Thus, there is a need to ensure that it will be completed and its sustainability built in. The main concern here is for continuing to fine-tune the forecasting (weather and pest-problem) software, and for hosting the platform and for providing its services after 2022.

For joining up the agriculture information network, from a farmer's point of view, there is no plan at present. CHS provide agromet services, directly to MoA who pass on to their DoAs, especially seasonal, monthly, and 10-day windows, on a regional level. However, the farmers at present have to hunt down this information separately. It would be a benefit to farmers, if they could concurrently receive official CHS user-friendly weather forecasts to compare with the more localised agromet services.

The value of providing a free access service of agromet information should be understood in the context of improved economic value of horticulture exports. If these new services became fee-paying, then it would be a regressive step.

6.3. Recommendations

The recommendations are listed with the responsible party identified in brackets.

1. The crop yield prediction software needs to further developed and piloted, or at least handed over [CCI with UNDP]

2. There is an agromet based GCF concept proposal that could be re-visited, in order to further develop agromet systems [UNDP with CCI, PPQA, CHS]
3. The project supported 14 horticulture projects, but there is a need to provide more detailed lessons-learned [UNDP with CCI]

7. ANNEXES

Annex 1: Delivery of Project Objective and Outcomes against Performance Indicators

Assessment Key:

Green: Completed / Achieved

Yellow: On target to be completed / achieved

Red: Not on target to be completed / achieved

Extracted from UNDP webpage			IP to fill out this column with detail text on achievement	FE team	FE team fills out
Indicator	Baseline	End of Project target	2021 End term Level & Assessment	Achievement Rating	Justification for Rating
Objective:					
n/a				n/a	
Outcome 1: Equipping policy makers and institutions with the tools for sustainable use of natural resources and dealing with climate risks in agro-production in the horticulture and vegetable sectors					
1.1 Availability of the baseline assessment/ analysis of the economic impact of climate change to agriculture sector, export potential and regional development including gender considerations	No baseline assessment / analysis of the economic impact of climate change to agriculture sector is available	Baseline created and Impact Assessment submitted to project counterparts	The impact assessment of climate change on agricultural sector and export potential has been conducted and presented to counterparts in 2019.	MU	There was nothing wrong with the assessment, as written on CC risk, except it missed on gender, and it didn't link CC impacts to CCA measures. This was more a short-coming in the ToR for the study, as it would have been useful to show officials a link between impact through to an adaptation measure. Hence the moderately unsatisfactory rating given. Note MU means a 3 out of 6 rating (which is classified as 'the activity had significant shortcomings) – which where those two missing links

1.2 # of recommendations on consideration of climate induced risks in regional development planning with focus on agro-business, export, and gender	No recommendations exist on consideration of climate induced risks in regional development planning	2 recommendations on consideration of climate-induced risks in regional development planning	20 recommendations developed and shared with departments of agriculture of three regions	MU	The rating of MU (3 out of 6) was due to significant shortcomings. These were that the recommendations on CC risk were weak on CCA, seemed not to stand on their own, and their presentation was poor. This was in fact, because they were superseded by the next output which was incorporating CC risk into regional planning
1.3 Availability of Regional Development Strategies and Action plan to integrate adaptive measures against climate change risks in agricultural sector	Existing Regional Development Strategies with no climate change considerations	Draft revised Regional Strategy/Action Plan proposed for Government	The project developed the methodology and recommendations for inclusion to the existing strategies/plans.	S	A demonstration regional development plan was prepared for Namangan, with the inclusion of sections on climate change risk and adapting to the green economy. It wasn't quite so strong on example / actual CCA measures
1.4 # of counterparts (30/70 ratio from overall number) trained on issues of integrating climate change and sustainable use of natural resources into local and sector development programmes	No representatives of local counterparts are trained on issues of integrating climate change and sustainable use of natural resources into local and sector development programmes	30 counterparts (30/70 ratio from overall number) trained on issues of integrating climate change and sustainable use of natural resources into local and sector development programmes	77 representatives (17 women) of government organizations were trained on development of plans/strategies with integration of climate change issues through 2-days trainings conducted in three regions.	S	The training figures were generally good
1.5 Availability of the concept on integrated pest management (IPM) /control through the introduction of local agro-meteo stations	No concept on IPM / control is available	Draft Concept on IPM has been developed and submitted to the counterparts for consideration	The IPM concept has been developed shared with the State Plants Quarantine Inspection for further promotion/implementation of IPM approach.	S	Advice was provided via training events

1.6 # of recommendations on location specific adaptive agricultural systems to climate risks for agro-development planning and forecasting	No recommendations on localised adaptive agricultural systems to climate risks for agro-development planning and forecasting	5 recommendations on location specific adaptive agricultural systems to climate risks	1,582 recommendations on disease/pest control, agrotechniques, improvement of soil and other issues were also provided to farmers through Telegram groups and Phytoconsulting centers.	MS	The indicator is a somewhat similar to indicators 1.3 and 1.4
1.7 Availability of software for land planning, forecasting of crop yield and export volumes for agro-planners	No software exists for land planning, forecasting of crop yield and export volumes for agro-planners	First pilot version of software developed and tested	The concept and TOR developed and agreed with the counterpart. The project is in process of contracting an IT company for development of the software.	MU	Should have been commissioned from project start, although it was difficult to determine if the project really had sufficient funds to develop this on top of the agromet systems software
Outcome 2: Enhancing the export of smallholder farmers through agriculture and post-harvest production and improved ability to cope with climate vulnerabilities and climate-related risks, to ensure food security and resilient livelihoods, while engaging women and youth					
2.1 Availability of the assessment/study on benefits of using modern meteo-stations in horticulture and other agricultural activities to mitigate the climate risks to livelihoods of rural agriculture producers	No assessment/study available on benefits of using modern meteo-stations in horticulture and other agricultural activities	Study	Conducted a study on benefits of using agrometeorological stations in horticulture and agricultural in general. The study also includes recommendation for improving agrometeorological services and the most effective ways to disseminate information to end users.	HS	Identified which agromet system was best suited for the project / FV
2.2 Established network of extension services to provide assistance to agro-producing clients to be more risk informed and prepared for climate change impacts	No network of extension services exist to provide assistance to agro-producing clients	The extension network established and service provider(s) equipped with required basic equipment	In cooperation with the State Plants Quarantine Inspection a system of extension services has been established. The system consists of two parts. The first part is the network of Phytoconsulting Centers, which were established at the regional offices of Quarantine Inspections of FV (Namangan, Andijan and Fergana regions). The 2 nd part consists from the Agrometeorological Forecasting Network, which includes 24 agro-meteo-stations established by the project. The local prototype of the agrometeorological station with a	HS	Develop materials on the diseases / pests of main fruits / grapes, including susceptibility to climate impacts and planning of harvest, planting, cultivation (inc. disease outbreak alerts), spraying and logistics based on the measured climate data (prodoc p13)

			<p>software for generating forecasts has been developed. In addition, 24 telegram groups created, which are used for provision of data, forecasts and recommendations to user-farmers.</p> <p>The number of user-farmers in telegram groups is ~750 (531 from the original 16 groups, plus an estimated 200 from the 8 new station groups.)</p>		
2.3 Availability of a study with recommendations on development of the agro-insurance sector	No study with recommendations on development of the agro-insurance sector	The study on agro-insurance sector held, and report submitted to CCI	The study on agro-insurance has been developed and presented to counterparts. In addition, 3 seminars on agro-insurance were conducted for farmers and agro-producers of three regions of FV.	MS	Whilst insurance is an adaptation measure, it treats the symptom and not the cause. Also at present, in order to receive a pay out for crop damage, only official weather data from CHS can be used, and not from the project agromet stations. Lastly the agro-insurance sector study was not sufficiently focused on smallholders
2.4 # of pilot projects supported with cost sharing contribution to support small scale agro-production	No pilot projects supported in small scale agro-production	6 pilot projects supported with cost sharing contribution to support small scale agro-production	14 pilot business projects supported with cost sharing contribution to support small-scale agro-production. 7 business projects supported within the framework of the project and 7 projects supported through the Japanese funds.	HS	The projects virtually all seem to be operational, however the project M&E reports could have also included evidence of the project holders contributions, which was mainly in agriculture hardware and equipment. It was obviously difficult for the FE team to verify, especially with one team member working by remote
2.5 # of women/youth engaged in pilot projects (30/70 ratio from overall number) using efficient	No women/youth using efficient agricultural practices/innovative	10 women/youth engaged in pilot projects (30/70 ratio from overall number)	Total = 558 (Number of created new work places in the pilot projects – number of people engaged to the pilot projects)	S	The project collected formal employment records from

agricultural practices/innovative solutions with consideration of climate change risks;	solutions with consideration of climate change risks	using efficient agricultural practices/innovative solutions with consideration of climate change risks	<i>From the total:</i> Women = 282; Men = 276; Including youth = 228 ; Ratio = 5:5		horticulture projects as evidence
2.6 # of agro-meteo-stations established to provide local meteo-data for farmers and households	No agro-meteo-stations established to provide local meteo-data for farmers and households in target areas	9 agrometeorological stations installed to provide local meteo-data for farmers and households	Total number of established agro-meteo-station =24	HS	Not only installed, but more are planned. Added to this a new software platform for locally designed stations is being prepared to avoid paying high subscription costs
2.7 # of agro-producers trained on marketing	No agro-producers trained on marketing, export opportunities, insurance	60 agro-producers trained on advanced agricultural practices, marketing and agro-meteorological stations (with women's participation – 30/70 ratio)	1,943 people improved their knowledge and skills through 20 trainings/workshop organized by the project. Total man = 1623; Total women = 320 Ratio: 16,5/83,5	S	The numbers of people training was good

Annex 2: Delivery of Outputs

Outputs	Achievements Reported by IP	TE Comment
Project Objective:		
Component 1: Resilience of agro-sector & farmers to climate change is enhanced through improved access to markets & sustainable agricultural management		
Output 1.1: Regional development strategies & action plan to integrate adaptive measures against climate change risks in agricultural sector [Target - strategy & plan]	There are no strategies or plans development by the project are envisaged in the project document. There is a misinterpretation (not proper reflection) in the Logframe. Therefore, the project developed a methodology on inclusion of adaptation measures and recommendations (Output 1.2.) for inclusion of them to the development strategies/plans of agricultural sectors of target regions. The documents were shared with regional departments of agriculture of Andijan and Fergana regions. - Draft strategy of Development of Namangan region until 2030 has been developed and shared with the beneficiary on the request of hokimiyat of Namangan region and MFA. Currently, additional revision of the document is being done for inclusion of green elements to the strategy by international and national experts.	A regional development strategy for Namangan was produced
Output 1.2: Number of recommendations on consideration of climate induced risks in regional development planning with focus on agro-business and export potential and gender considerations [5]	The project developed and shared with regional departments of agriculture of all 3 regions the document, where 20 recommendations on adaptation measures provided for inclusion to the development plans/strategies.	Recommendations were made
Output 1.3: Integrated pest management / control through the introduction of local agro-meteo stations [IPM system in use]	IPM concept has been developed and shared with the State Plants Quarantine Inspection for promoting this approach through recommendations and information provided through Telegram groups and Phytoconsulting centers.	An IPM guide was prepared and training provided
Output 1.4: Number of recommendations on location-specific adaptive agricultural systems to climate risks for agro-development planning and forecasting (<i>also numbered 1.3 in the prodoc</i>) [13]	749 forecasts on risks of disease and pest outbreaks were provided through Telegram groups to user-farmers. In addition, 1,582 recommendations on disease/pest control, agrotechniques, improvement of soil and other issues were also provided to farmers through Telegram groups and Phytoconsulting centers.	Recommendations were provided
Output 1.5: Software for land planning, forecasting of crop yield and export volumes for agro-planners [software]	Taking into account the complexity and large amount of data required for collection and creating the database required for IT Tool, it was decided to pilot it on a district level first with ability to inclusion other districts of the region. In consultation with the department of agriculture of Namangan region, it was agreed to pilot it in Yangikurgan district of Namangan region. The project agreed the IT Tool concept and launched RFP for contracting with IT company to develop the tool. The tool is expected to be developed by mid October 2021 and tested by the department of agriculture of Namangan region.	Software is under development
Output 1.6: Number of women/youth engaged in pilot projects (3:7 ratio from overall number) using efficient agricultural practices/innovative solutions with consideration of climate change [15]	The total number of created new workplaces within 14 pilot business projects is 558: Women = 282; Men = 276; Including youth: 228; Ratio = 5:5	Ratio is over 50%

Outputs	Achievements Reported by IP	TE Comment
Output 1.7: Number of agro-meteo-stations established to provide local meteo-data for farmers [12 agromet stations with farmer text / app / other system]	<p>The total number of agrometeorological stations installed in target districts is 24 (including 15 foreign and 9 local agro-meteostations). Additional 8 local agro-meteostations were installed.</p> <p>In addition, weather and disease/pest forecasts modeling software has been developed in local language, which takes into account local specifics (variety of pests and diseases). The respective information, forecasts and recommendations are disseminated through 16 Telegram groups created for users of agrometeorological services located nearby.</p>	24 agromet stations installed. A further 8 are planned
Output 1.8: A study on the development of the agro-insurance sector [1 study]	Analysis of agro-insurance sector has been conducted and study document developed. Based on the results of the study 3 informational seminars on agro-insurance were conducted and an infographic on agro-insurance with training materials, developed by project, have been shared with 89 participants.	A study was undertaken and training provided
Output 1.9: Number of agro-producers trained on marketing, export opportunities, insurance (with women's participation 3:7 ratio) [100]	<p>Total number of people trained on marketing, export opportunities and insurance topics is 286 people.</p> <p>Total man = 224 (78%); Total women = 62 (22%); Ratio: 2.2/7.8</p>	Training was undertaken

Annex 3: Co-financing Table

Note – this table includes all funding for the purposes of clarity

Sources of Co-financing ¹	Name of Co-financer	Description of Co-financing	Type of Co-financing ²	Confirmed at CEO Endorsement (US\$)	Amount Contributed at Stage of MTR (USD)	Expected Amount by Project Closure USD	New Investment or Recurrent Expenditure	Actual % of Expected Amount USD
UNDP, Co-financing signatories	UNDP Russia Trust Fund	Trust Fund for Development	Grant	\$800,000	\$800,000	\$800,000	new	100
	UNDP	Covid Rapid Response Facility (Gov't of Japan)	Grant		\$278,130	\$278,130	new	n/a
		Towards Green Recovery project	Grant		\$8,563	\$23,563	new	n/a
UNDP & Partner Sub-Total				\$800,000	\$1,086,692	\$1,101,692		138
National Government	CCI		In-kind		\$69,430	\$81,360	new	n/a
	Plant Protection & Quarantine Agency		In-kind		\$33,965	\$43,022	new	n/a
Other	Farmers/business-projects		Grant	\$800,000	\$1,135,767	\$1,135,767	new	142
Government / Other Sub-Total				\$800,000	\$1,239,162	\$1,260,149		158
Total				\$1,600,000	\$2,325,854	\$2,361,841		148

1. Sources of Co-financing may include: Bilateral Aid Agencies, Foundation, Partner Agency, Local Government, National Government, Civil Society Organization, Multi-lateral agencies, Private Sector, Other
2. Type of Co-financing may include: Grant, Soft Loan, Hard Loan, Guarantee, In-Kind, Other
3. Government funding was not audited by the project

Annex 4: Planned Budget and Expenditures at End-term

Outcome	2019 USD	2020 USD	2021 USD	Cumulative Totals to 15/8/2021
Annual Work Plan Budgets and Actual Expenditures Incurred through Endterm:				
Outcome 1:				
Annual Work Plan	\$59,218	\$70,308	\$84,173	\$197,458
Disbursed	\$53,184	\$60,100	\$35,398	\$148,683
Balance (AWP-Disbursed)	\$6,034	\$10,208	\$48,775	\$48,775
Outcome 2:				
Annual Work Plan	\$84,996	\$292,152	\$122,931	\$488,398
Disbursed	\$90,424	\$275,043	\$86,704	\$452,171
Balance (AWP-Disbursed)	-\$5,428	\$17,110	\$36,227	\$36,227
Project Management				
Annual Work Plan	\$45,144	\$38,340	\$42,070	\$118,044
Disbursed	\$40,610	\$35,365	\$25,074	\$101,048
Balance (AWP-Disbursed)	\$4,534	\$2,975	\$16,996	\$16,996
Grand Totals:				
Annual Work Plan	\$189,358	\$400,800	\$249,175	\$803,900
Total Disbursed	\$184,218	\$370,507	\$147,176	\$701,901
Balance (AWP-Disbursed)	\$5,140	\$30,293	\$101,999	\$101,999

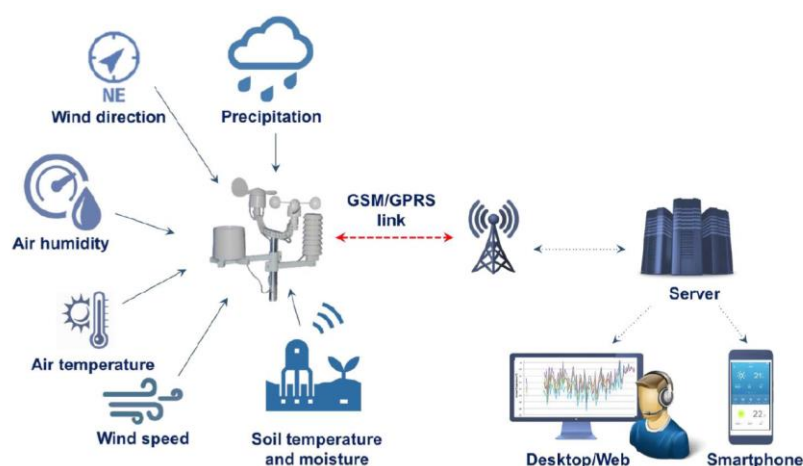
Note – End term taken as End to 15th August 2021, not end of project

Annex 5: Brief review of Extra information, Technical reports, Training materials, Misc.

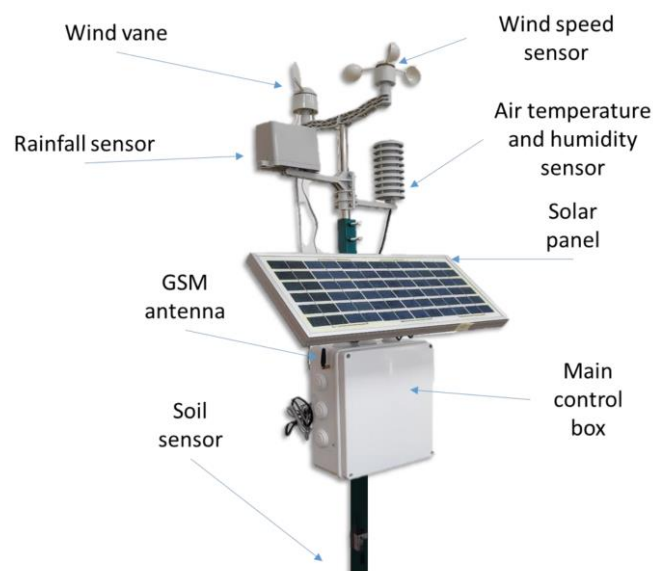
Contents

- Agromet system and Agromet station design
- How the agromet system works
- Example Telegram messages for one agromet station in August 2021
- Horticulture project selection criteria
- Horticulture businesses developed
- Project Board (PB) Attendance
- History of PB key decisions
- Case Study - Focus group discussion - Fergana Region, Altairik District - Viticulture – install drip irrigation
- Training data
- Impact of Training
- Namangan Development Plan – Climate risk sub-chapter
- A few background notes by the TE on the Centre for Hydrometeorological Services (CHS, Uzhydromet)

Agromet system



Agromet Station



How the agromet system works:

- Uses 11 weather parameters (Air temperature, Relative humidity, Soil temperature, Soil humidity, Precipitation, Wind direction, Wind speed, GPS location, Dew point, Evapotranspiration, Vapour Pressure Deficit)
- Meteoblue provide a 7-day weather forecast with 10 parameters (air temperature, soil temperature and wetness, relative humidity, precipitation, probability of precipitation, wind direction and speed, daylight time, leaf wetness index and probability, solar radiation, UV-index)
- Based on historical agromet data, online weather forecasts and accumulated knowledge from agronomists, a unique prediction model is developed for evaluating the risk of disease and pest contamination of plants.
- The model uses time-series forecasting involving the agromet parameters (e.g. temperature, humidity, precipitation, wind speed and calendar date)
- The model predicts the development stage of each insect and disease at any given calendar date.

All diseases and pests are evaluated using the indicators (last 14 days):

- Cumulative heat units for air and soil temperatures for any given period of time
- Average daily humidity for any given period of time
- Average daily air and soil temperatures for any given period of time
- Average precipitation for any given period of time

Following parameters are used for evaluating the risk of diseases in plants:

- General risk of disease development (%)
- Days past since the last life cycle of the disease (in days)
- The number of life cycles of the disease elapsed since the beginning of the season (units)
- Average daily temperature during the current life cycle of the disease (in C degrees)
- Average daily humidity during the current life cycle of the disease (in RH percentage)
- Average daily precipitation during the current life cycle of the disease (in mm)

Following parameters are used for evaluating the risk of pests in plants:

- General risk of pest contagion (in percent)
- Days past since the last life cycle of the pest (in days)
- The number of life cycles of the pest elapsed since the beginning of the season (units)
- Probability of insect being in its egg stage (in percent)
- Probability of insect being in its larva stage (in percent)
- Probability of insect being in its pupa stage (in percent)
- Probability of insect being in its imago stage (in percent)
- Cumulative heat units for air temperature since the last life of the pest (in C degrees)
- Average daily humidity during the current life-cycle of the insect (in RH percent)

Example Telegram messages for one agromet station in August 2021

Namangan – Chartak-2 Agromet Station Telegram Group - August 2021 messages¹

The English translation of the August 2021 messages came to 72 pages. List of messages sent (from the PPQA unless otherwise stated)

5th August 2021

Agrotechnical measures carried out in August

Mustard cultivation

Bordeaux fluid application

Eight foods to prevent obesity

Video about the principle of action of chemicals against pests

Dangerous diseases of cucumbers

Doctors recommend consuming grapes with seeds

Traditional methods of drying grapes

¹ Ссылка для скачивания файлов: <https://cloud.mail.ru/stock/3KwUtt7hMnFkBFY7M5H9bHi>

use of ammonia against onion and carrot flies
 Israel has developed a flying robot for use in harvesting
 7th August
 About “*Quadraspidiotus perniciosus* Comstock”
 About “*Eriosoma lanigerum* Hausm”
 10th August
 Forecast of the risk of spreading the main diseases and pests

80% of the total risk of apple flour dew
 Vine dew overall risk 57%
 The overall risk of clasteroporoiosis is 96%
 Vine is 90% of the overall risk of bacterial cancer
 The overall risk of apples is 94%
 The overall risk of apple cider vinegar is 77%
 Plum fruit total risk 60%
 60% of the total risk of silkworms
 The overall risk of apple cider vinegar is 77%
 Comma shield overall risk 97%
 Pear dessert overall risk 91%
 The overall risk of spider mites is 94%
 Apple red cane total risk 80%
 The overall risk of cherry flies is 92%
 Allecto brajnigi total risk 93%
 The overall risk of a medium wine brew is 93%
 Vine duct total risk 56%

Weather Forecast

Is a Meteoblue screenshot – set on ‘today’ Tuesday 10th August

Then Meteoblue screenshots for forecast of temperature, rain and wind for 5 days 10th-14th August

The next weather forecast is on 24th August, with screenshots of temperature, rain and wind for 24th-28th August

Many more messages follow from the PPQA / Agroblogger for the rest of August

Horticulture project selection criteria

Selection council members: at all regional levels included: Khokimiyat, DoA, CCI, Farmers’ Council, BWA, Project manager, Task Manager

Criteria for the selection of Business projects:

1. influence on improving the living standards of project participants
2. influence on environment
3. applying measures to adapt and increase resilience to climate change
4. demand for the produced product or offered service
5. export orientation of product to be produced (rendered service)
6. initiator’ s (Initiative group) work experience in the field of proposed business project
7. availability (access to) raw materials in the region (district, region, republic)
8. project implementation timeframe
9. number of jobs created
10. proportion of jobs created for women
11. financial- economic efficiency and sustainability of the Project
12. the ability to scale and replicate the project
13. innovative ideas

Horticulture Businesses Developed

Horticulture Activity	Project Supply & Project Investment	Owner and Total investment	Employment generated
Namangan			
Cold storage of fruits & vegetables	Refrigeration units x 3 \$23,023	Farm entity- Ne'matjon Ikromjon Dilnoza (\$225,500)	Total - 10 For women – 10; For youth - 8
Honey production	Honey processing equipment \$20,846	Unitary enterprise - Valley Fruits Yangoqo'rg'on (\$60,846)	Total - 2 For women – 0; For youth – 1
Cold storage of fruits & vegetables	Refrigeration units x 4 \$26,016	Farm entity Boburjon Javohir Sohibjon \$206,016	Total - 50 For women – 40; For youth - 50
Orchard establishment & vegetable cultivation	3-wheel 80 hp tractor; mini-tractor 40 hp; mounted sprayer & boom- 400 litres (\$40,017)	Production Co-op Pop Yong'oqzorlari Agrofirma (\$254,998)	Total - 120 For women – 50; For youth – 22
Lemon seedling cultivation	two heat furnaces; filter & control panel for green house drip irrigation system; 66 fans (\$33,920)	Company Radivon Citrus Mevasi Tomorqa Xizmati (\$140,205)	Total - 8 For women – 3; For youth - 4
Andijan			
Orchard establishment with drip irrigation	Drip irrigation equipment for 10 ha \$18,777	Production Co-op Single Woman (\$64,293)	Total - 50 For women – 25; For youth - 12
Tomato seed production	Tomato seed production (cleaning, treating, packing etc) equipment \$19,600	Andijan Institute of Vegetable, Melon and Potato Production (\$50,000)	Total - 19 For women – 11; For youth - 6
Almonds & walnut production	Drip system 15 ha; Mini tractor 40 hp \$35,643	Production Co-op Bog'bon TRAM Agro \$66,673	Total - 50 For women – 28; For youth - 12
Vegetable cultivation	Tractor 80 hp; disc harrow; fertilizer spreader; cultivator; mounted sprayer; 3-share plough \$28,820	Production Co-op Solih Ziyo Zoda \$93,820	Total - 50 For women – 19; For youth - 20
Fergana			
Orchard establishment & drip irrigation	Mini tractor 50 hp; mounted sprayer; mounted fertilizer spreader; 3-share plough \$14,650	Farm entity Quvasoy Nodirjon \$53,236	Total - 30 For women – 20; For youth - 20
Cherry orchard establish, greenhouse, with drip irrigation	drip irrigation 5.2 ha for orchard & greenhouse \$8,708	Farm entity "Osiyo Zamin Sharbati" \$45,000	Total - 35 For women – 27; For youth - 20
Vineyard establishment	Drip irrigation for 11 ha \$21,670	Production Co-op Axadjon Ismatov Agro Logistika (\$62,670)	Total - 50 For women – 21; For youth - 22
Vineyard establishment	Drip irrigation for 8.1 ha; tractor 70 hp; trailer sprayer (\$38,952)	Production Co-op Damir Oltiariq Agro Invest (\$97,333)	Total - 50 For women – 22; For youth - 23
Agricultural services development	Mini tractor 50 hp x 3 set; 2-wheeled mini tractor with attachments x 3 (\$39,840)	Company "Ulug'bek Satkak Tomorqa" \$82,636	Total - 14 For women – 6; For youth - 8

Project Board

Project Board Attendance - 2019 (33 persons): CCI x 4, Russia Embassy (RE); UNDP x 4; PT and consultants x 8; Government x 11 (Ministry of Foreign Affairs MFA, Ministry of Investment & Foreign Trade (MIFT), Ministry of Water Resources (MWR), Ministry of Agriculture (MoA), Ministry of Innovation (MoI), Hydrometeorological Services Centre (Uzhydromet), Plant Protection & Quarantine Agency¹ x 3, Namangan government x 2 (Export & legal), Fergana government - Agriculture); Other x 2 (Economic development research centre, Ergo research company), Andijan Farmers Council

Project Team (PT)

Project Manager (PM), Regional Task Managers x 2, Mobilization & Outreach, Admin & Finance, Specialist, Assistant, Trainer

Project Board Attendance - 2020 (31 persons): CCI x 4 (inc. 1 from Namangan branch); RE x 2; UNDP x 3; PT and consultants x 6; Government - MFA, MIFT, MWR, MoA, MITC, MoI, Uzhydromet², Farmers Council x 2 (inc. 1 from Andijan), Fruit & Vegetable Export Association, State Quarantine x 2, Department of Agriculture x 2 (DoA – Andijan & Fergana); Other - Inha University

Of interest from 2020 PB meeting

Approval / resolution of points from 2nd PB meeting

- Approval of AWPB 2021; Approval of 7 + 7 horticulture / agro-business projects; Support the development of Smart pheromone insect traps (camera linked to internet via SIM card and software developed) to complement agromet data to provide early-warning on insect pests; To assess the feasibility of nine added agromet stations

Points from meeting

- plant disease / quarantine information centres (phyto consulting centres) – established in each region (as a result of the project – co-financing? I don't think project funded? – but added value / sustainability / leveraged support / government higher priority?

- UNDP say work with state plant quarantine gone well (call PPQA) and footnote that they used to be State.....and that phyto centres together with agromet stations were providing farmers better early-warning knowledge to control plant diseases and pests

- says plans for automatization and localisation of information to farmers

- Expected approval of CC into agriculture in Namangan dev strategy to occur early in 2021.

- Network of agromet stations

- Agrarian and Inha Universities – developed prototype agromet stations and corresponding automatic telemetric data transmission with software that provides analysis to be used in agromet bulletins.

- noted that the domestic data loggers were only 20% of cost of the corresponding int'l components

- forecast from 1st 7 projects that 135 permanent and 145 seasonal jobs will be created.

- Japan funds added \$280,000 for seven additional horticulture enterprises – with a planned 400 new jobs

-2021 AWPB – included capacity building, introducing IPM, agromet stations, integrating network of agromet stations, business projects, smart insect traps

- PPQA supports 15 agromet stations, For sustainability, PPQA will take over the responsibility for annual subscriptions for weather, disease / pest forecast models

- PPQA three phyto-consulting centers purpose – managing the operation of the agromet stations and data in each of the three regions, and provision of plant pest / disease advice (based on the weather forecasts and models

- PPQA have a mobile app (Efito.uz)

Software developer (Sarvar from Inha Uni) – by monitoring weather parameters – with algorithm predict risk of a plant disease / pest (need because – lack of localised weather data to make accurate predictions, lack of timely information and therefore late plant protection measures

- called them mini-agromet stations – seven weather parameters –data transmitted to via internet to data storage servers and ('cloud')

Large remote servers hosting the data storage, data platform and data app (the three aspects of so-called 'cloud computing'); Weather data is represented as interactive graphs; with forecasts on spread of plant disease / pests (for 6 types of crop and 30 diseases)

Plan for smart traps to remotely assess pest density from camera photos and provide a risk of pestilence forecast

Russia Embassy – contribution of business projects [this should be in the co-financing]

\$700,000 from the farms compared to 140,000 from UNDP and added 280,000 from Japan so more than 50% co-funding CCI support (two offices & equipment)

¹Formerly State Plant Quarantine Inspection, who joined with Plant Protection in August 2021

² Note, the Uzhydromet representative for both meeting was from within their Environmental Pollution Service Centre, which appears somewhat of a mis-match with the project design concerning early-warning weather forecasting for farmers.

Points from 1st PB meeting

- CCI other projects concerning innovation in agriculture with both the WB and EU.
- One of the SDGs concerns doubling of agriculture productivity and increasing farmer income from horticulture – so inline with project
- Agriculture main source of income for 50% of the population, with 20% employed in the sector
- CC – rate of temperature rise had doubled since 1951, so CCA important for farmers
- Namangan Development Strategy (2020-30) – project supporting inclusion of climate change solutions in the agriculture chapter (being jointly supported by the MoForeign Affairs (MFA), and written by Tashkent Economics University
- An analysis of extension service providers had been undertaken, resulting in a project ‘best-fit’ with the PPQA (under the Cabinet of Ministers) for capacity and potential development
- Selection procedures for business projects had been developed
- Climate change impact assessment (120 interviewees) conducted with result – CC factors included: high summer temperature, mild winter temperature (lack of snow or cold snap /secondary frosts to kill and reduce plant diseases / pests, and heavy rainfall in the spring causing blossom drop / damage.
- Adaptation measures include crop / variety selection, establishing forest-strips as wind-breaks, water conservation measures, IPM including biological control methods
- Approval of AWPB 2020, including approval of project selected nine target districts in the three regions, support for the Namangan Development Strategy, an cooperation with PPQA, and launch of seven business projects
- In-vitro plant propagation laboratories exist in Fergana and Namangan, which could be supported by the project to develop climate adapted horticulture crops
- MoA indicated there 22 organic inputs (agents and fertilizers) to control plant disease / pests
- PPQA cooperation approved for: development of IPM based on the agromet data; development of extension services; and improving the technical capacity / skills of the extension centres
- Software development (agromet data to analysis (algorithms) to app services for plant protection from disease / pests)

Case Study - Focus group discussion - Fergana Region, Altiriek District - Viticulture – install drip irrigation

- **Participants:** 9 (Coop members) / Jobs created: 50 (20 women) - Production Coop Axadjon Ismatov Agro Logistika
- **Contributions:**
 - Initiators contribution - All materials necessary for, and works related to supply of irrigation water to the orchard; Provide and plant grape seedlings in 11 hectares of land; Construction of vineyard in 11 hectares (concrete poles, metal structures, metal wires, transportation costs and installation work).
 - UNDP contribution - Purchase, delivery and installation of drip irrigation system in the orchard (11 hectares).
- **Selection process:**
 - **How the selection happened? Where did you get to know about the Project? Was the selection fair?**
 - announced at big Farmers meetings, through telegram channels; participated at Business planning seminar; selection committee, criteria
 - **Who participated in Business Plan development?**
 - All. There was a training on business plan writing and our head participated there. Mostly the head himself prepared the BP. Here the main goal was involvement of unemployed, needy families and create income generation opportunities, jobs.
 - **How the cooperative was created?**
 - Under presidential resolution; submitted applications to MCCs (local Mahalla administration); -based on the type of crop
- **Relevance**
 - **Why the viticulture is urgent?**
 - All. Grapes is suitable for Oltiriek because of climate conditions. We cannot grow other crops like apples or other
 - served as encouragement during quarantine period
- **Project process**
 - **How was communication set with Project team?**
 - A. Even during pandemic they tried to visit us, come and consult
 - b. We set a telegram group. All 50 members are included in this group. It is a very easy and quick communication

- c. for example we give exact commands with the crop. Someone has to weed grapes. Someone tomatoes, other work. We write in a telegram group and the member comes immediately and does his work.
- **What about quality of materials? Were the material really new or some old ones**
- All: the materials contained really the latest information. We learnt what we even hadn't seen or heard in farming.
- **What about supply of materials from project site? To what extent it was transparent, on time and the quality provided? Procurement issues and installation Timely and quality provision of materials and installation works**
- All: we got materials timely. We are happy with the quality of materials since we compared with other farmers who are installing. If the guarantee for their material around 3 years which is not realistic I think, maybe in a year or two they will have to replace the system. In our case the guarantee is 5 years and we are sure that the system will serve for at least 10 years.
- A: we were surprised by the openness, transparency and honesty of project activities. The system was installed, we were ready to burying the trench the Project staff called us and told not to hurry with that since they wanted to make sure that the constructor installed the exact materials indicated in project estimation. They came took photos, checked and after that we continued burying.
- B. The constructors work was also very good in terms of quality. Besides some of us learnt welding, we are helping others to install drip irrigation
- C. we saw everything, all stages of work and learnt new skills
- **Efficiency -What can you say about the efficiency of UNDP Project efficient? What activities?**
- -generally all activities the Project runs
- -Capacity building had a significant effect on the cooperative members
- -piloting a project as a sample how to proper organize the work
- -communication and timely consulting
- -installation of drip irrigation
- -brining all together as a team
- **To what extent the Project met your needs?**
- Project directs activities to people's needs
- -we are trained in farming
- -learnt pest diseases control, agriculture production increased
- -income opportunities provided
- -learnt best practices in pruning, grafting trees
- **What do you think of capacity building activities of the project? Were they really useful? What trainings did you participate?**
- they were effective / we learned innovations in agriculture development which we even didn't hear / -best practices with pest control, diseases management / -agro techniques, their timely application / -water saving / export related news / -Agro insurance and procedures / Trainings and seminars, exchange experience on cold saving in Altirik were really practical.
- **Trainings and seminars**
- -pest and diseases control; pruning (was practical, we went to the garden and they showed everything); the same with grafting; export issues; certification; agro insurance; business planning; agro techniques; around 18
- **Usefulness of visibility materials**
- All: everything is written in them as instruction. We can just read and apply in practice.
- A; The given manuals are convenient and useful, practical and very easy to use
- B. Friendly use. Even those who are not project targeted can easily use it.
- C. Useful, even dieses are given with their treatments.
- D. Very practical
- **What about the partnership in your business initiative? Who were your partners; what was their contribution?**
- District agriculture department, Khokimiyat reps, Farmers Council they all just visit our project, when necessary consult us; participate at our opening ceremonies or celebrations; Conduct seminars for other farmers
- **Effectiveness**
- **What did you learn?**
- All: How to install drip irrigation, fighting with pesticides, crop treatment, practical seminars on pruning, grafting grapes if the grapes are not yielding well. So we have even change the king of grapes which means fast yielding. There won't be a need to wait for 3 years as with new seedlings –
- we had experience exchange activities also. We went to Altirik and saw cooling. We realized if we are having 5000 sums/kilo now with cooling facilities we will be able to keep grapes and sell later at a price 15000 s/k
- B. we had practical activities just on grapes yard and how to feed, water, fertilize, pruning
- C. we learned greenhouses, growing other crops under grapes. People from other districts came to us to learn viticulture. We had very useful practical experience sharing opportunities, and we now can teach others

- **Participating at project trainings, introducing drip irrigation on your cooperative, agriculture best practices, what can you say about the effectiveness of the Project?**
- approach (working with people, the ability to listen to others, not to impose their ideas, to take into account the interests and needs of others) / farmers can trust and rely on project team
- -planning events (everything was timely planned with consideration of our potential even in contributions)
- **Can you speak about the situation before and after?**
- **Qodirjon:** These lands had been undeveloped for many years, rocky, muddy. We have spent a lot of money and energy to develop this land. When you looked at the stones here, you would have concluded that the land could not be exploited. But we all worked together, finished picking up the stones, and then spent all our efforts to soil, land. These lands are irrigated from the collector. During irrigation season there is a long queue and a lot of fights to get water. With 6-7 males at night, we had to water for a few days without even going home. Every 15 days we had to stand on queue to get water. Besides, watering from the irrigation ditch led to the fact that the soil quickly dried out, but there were a lot of weeds and all the families went out to weed.
- As for now with drip irrigation in 24 hours all 11 hectares is watered and 1 person is enough for that. The moisture content of the earth is preserved because the roots are irrigated. There are almost no weeds, there are no extra costs, electricity is saved, there is no need to fertilize a lot either. We sowed inter-row crops to get some income before the grapes bear fruit.
- **Savings in the result of project:** time, energy, electricity pay around 10-15 dollars /month, for 5 years cooperative members are tax free,
- **The project is ongoing. What about your living you haven't sold any crop yet**
- All: We started planting grapes. In addition were planted other crops tomatoes, corn, beans between rows. In fall we'll start selling the harvest. Approximately each member of cooperative will have around 6-7-8 million sums income. Besides we all have land in our households where we grow grapes and other crop. So we have this cooperatives as additional income generation means.
- Handicapped: I get two crops from the land of cooperative. Approximately I will get 7 mln or more, from one crop 2-3 mln. For now I have monthly retirement fee. And I also have some crop in my house hold land.
- these cooperatives are additional income generation opportunities. We have about 10-20 acres of land in our house holds
- -We planted from March. We will get the income after 3 years from cooperative. But we have other crops in our household lands. For example from a 10 acre land we get 5-7 tons of grapes. We sell them at a price of 5000sums/kilo. Total is around 30-35 mln sums.
- Others: the same with us
- **Sustainability:**
- **What are your plans for future? Will you keep it ongoing or you will go in different directions**
- -. We will further develop viticulture
- -. We will think of refrigerators
- -. think of drying grapes and get raisings
- -. we are now coaching other how to increase crop, and drip irrigation techniques, pesticide issues. We will continue
- -. When a person sees the harvest in three years he will not live the cooperative instead he will work further on how to extend his business
- All: we will work together on how to improve yield, how to make our product marketable, attract additional funds if possible, involve more people to our activities and assist them in installation of drip irrigation techniques, share our experience and knowledge about pesticides, fertilization and etc
- -we applied our project proposal to USAID funding, if we get that grant we will extend our land and increase the capacity of cooperative with other services
- **Dissemination of best practice**
- **Are there farmers who visit your cooperative and learn best practices? How do you share with others?**
- **There is a telegram group**
- Land is being allocated to families also. They have constructed houses and live here. Right after our cooperative's land these households start. We installed drip irrigation on 70 acres of land for them and shared our best practices on pest and disease control, viticulture, agro techniques, fertilizers
- We assisted in installation of drip irrigation to 8-10-15 neighbors each.
- Not only these muddy lands lack water but mahallas also. People have greenhouses in their home lands but lack water. That's why around 25 families came to cooperative and learnt the best practice.
- I provided extension service to people in the installation of drip irrigation. I worked closely together with Project constructor and learnt all techniques. Learnt even welding. For now I installed 8 systems
- I shared pest and diseases control best practices to around 12 people
- Farmers from other communities also come to our cooperative to see the system.
- **Are there any resolutions to support you?**

- we receive subsidies for the organization of greenhouses, viticulture. about 7 million sums per a hectare.
- **Impact**
- **What changed? In you yourself? In your work?**
- The attitude to life / Self confidence / -ability to speak and address the need / Thinking changed / Self-improvement in farming, always seek for best practices / Now we know what to do? When to do? How to do?
- Built capacity in agriculture (all aspects starting from agro techniques to selling and exporting)
- We consider ourselves as skilled specialists in agriculture since we provide services to others on district level
- Scientific approach in our undertakings (use latest informational materials from reliable sources)
- Learned welding and installation of drip irrigation system, greenhouse
- pruning and grafting to have more productive crop. Before we cut down the grapes if the yield wasn't good. Now learned grafting. We can graft any variety of grapes. Before if cut down the grapes we had to wait at least 3 years to get crop. After grafting we can get crop right the next year
- we were illiterate in farming. Now we have changed approach to our work.
- We know when to undertake agro techniques for the crop, how do it, what fertilizers to use. We even did not know about some fertilizers.
- **The Khokim of Oltiari district- Xolmirza Niyazov:**
- "If we look at the history of these lands, these lands were hilly, rocky places. They haven't been cultivated here for 30 years. The government didn't believe that the land can be cultivated, even didn't know what to do with these lands. But realized If the government believes in the people, the people will justify the trust. We should thank UNDP. Their generous investment has encouraged farmers here to do more to increase the farmers' share and a fruitful result. The UNDP introduced best practices are widely studied and applied by the farmers, home land owners. 583 households are provided with water, lots of drip irrigation best practices applied on farms, greenhouses and homes."

The FE undertook seven focus group discussions, all with the same depth of content. However, in order to keep the report as brief as possible, the other six are not repeated here.

Training Data

#	Activity name	Date / Place	# of participants						Trainer / company
			Total	1 sem	Men	%	Women	%	
1	Information seminar (Hokimiyats, Farmers Council, Quarantine inspection etc)	23.07.2019 Namangan	28	118	25	89.3%	3	10.7%	Project staff
		24.07.2019 Andijan	47		35	74.5%	12	25.5%	
		25.07.2019 Fergana	43		29	67.4%	14	32.6%	
2	Training "Advanced technologies for growing grapes" (farmers, gardeners and other interested persons)	30.09.2019 Namangan	69	143	65	94.2%	4	5.8%	Erkin Usmanhodjaev
		01.10.2019 Andijan	37		34	91.9%	3	8.1%	
		02.10.2019 Fergana	37		32	86.5%	5	13.5%	
3	Training "Agrotechnical measures and preparation of the garden for winter" (farmers, gardeners and other interested persons)	28.10.2019 Namangan	51	136	46	90.2%	5	9.8%	Erkin Usmanhodjaev
		29.10.2019 Andijan	41		32	78.0%	9	22.0%	
		30.10.2019 Fergana	44		28	63.6%	16	36.4%	
4	Seminar "The role of the meteorological station in forecasting and combating pests and diseases of agricultural crops" (farmers, gardeners and other interested persons)	27.11.2019 Namangan	37	95	27	73.0%	10	27.0%	Erkin Usmanhodjaev
		28.11.2019 Andijan	28		26	92.9%	2	7.1%	
		29.11.2019 Fergana	30		26	86.7%	4	13.3%	
5	Seminar "The role of certification and standardization in the export of agricultural products" (farmers, gardeners and other interested persons)	17.12.2019 Namangan	37	131	30	81.1%	7	18.9%	PPQA, Export Promotion Bureau (State Enterprise Center for Testing & Certification, Institute for certification of management systems - Center - State Enterprise for Testing & Certification)
		28.01.2020 Andijan	47		32	68.1%	15	31.9%	
		29.01.2020 Fergana	47		41	87.2%	6	12.8%	
6	Seminar "Spring agrotechnics" (farmers, gardeners and other interested persons)"	11.02.2020 Namangan	60	193	52	86.7%	8	13.3%	Erkin Usmanhodjaev
		12.02.2020 Andijan	64		58	90.6%	6	9.4%	
		13.02.2020 Fergana	69		62	89.9%	7	10.1%	
7	Training "Business planning and marketing" (participants in the selection of business projects, farmers and gardeners)	24-25.02.2020 Namangan	21	66	8	38.1%	13	61.9%	Elbek Rixsiev
		26-27.02.2020	27		21	77.8%	6	22.2%	

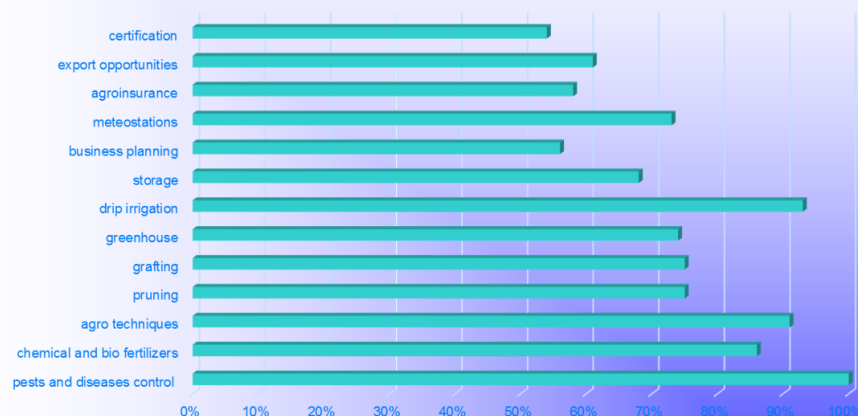
		Andijan							
		28-29.02.2020 Fergana	18		12	66.7%	6	33.3%	
8	Training "The role of the meteorological station in agriculture and the principles of work" (plant quarantine inspection staff)	09.03.2020 Namangan	27	27	26	96.3%	1	3.7%	Erkin Usmanhodjaev
9	Seminar "Pest and Disease Control of Agricultural Crops" (farmers, gardeners and other interested persons)	10.03.2020 Namangan	37	117	20	54.1%	17	45.9%	Erkin Usmanhodjaev
		11.03.2020 Andijan	42		37	88.1%	5	11.9%	
		12.03.2020 Fergana	38		30	78.9%	8	21.1%	
10	Webinar "Improving the efficiency of providing services to farmers on the use of data and forecasts of weather stations" (employees of the quarantine inspection serving agromet stations)	30.09.2020 Namangan Andijan; Fergana	20	20	19	95.0%	1	5.0%	Bakhtiyorjon Toshtemirov
11	Seminar "Agricultural Insurance and Climate Change" (farmers, gardeners and other interested persons)	15.02.2021 Namangan	30	89	29	96.7%	1	3.3%	Akmaljon Keldiyev
		16.02.2021 Andijan	29		23	79.3%	6	20.7%	
		17.02.2021 Fergana	30		28	93.3%	2	6.7%	
12	Seminar "Agrotechnical measures to prepare the garden for spring. Pruning fruit trees." (participants of business projects selection, farmers, gardeners and other interested persons)	23.02.2021 Namangan	28	95	27	96.4%	1	3.6%	Erkin Usmanhodjaev
		25.02.2021 Andijan	34		32	94.1%	2	5.9%	
		24.02.2021 Fergana	33		28	84.8%	5	15.2%	
13	Training "Skills in the development of regional development programs in the agricultural sector" (participants in the selection of business projects, farmers and gardeners)	05-06.03.2021 Namangan	22	77	20	90.9%	2	9.1%	Research Center "Scientific bases and issues of economic development of Uzbekistan" under the Tashkent State University of Economics
		01-02.03.2021 Andijan	31		26	83.9%	5	16.1%	
		03-04.03.2021 Fergana	24		14	58.3%	10	41.7%	
14	Integrated Plant Protection(IPP) round table - the importance of application, ways of integration with agrometeorological stations (plant quarantine inspection staff)	10.03.2021 Namangan	30	89	29	96.7%	1	3.3%	Rasuljon Kholmiraev
		11.03.2021 Andijan	30		29	96.7%	1	3.3%	
		12.03.2021 Fergana	29		27	93.1%	2	6.9%	
15	Seminar "Water-saving methods of agricultural irrigation." (farmers, gardeners and other interested persons)	16.03.2021 Namangan	37	76	20	54.1%	17	45.9%	Erkin Usmanhodjaev
		17.03.2021 Andijan	20		18	90.0%	2	10.0%	

		18.03.2021 Fergana	19		17	89.5%	2	10.5%	
16	Roundtable meetings "Climate Change and Agriculture"	23.03.2021 Namangan	25	85	20	80.0%	5	20.0%	Project staff
		24.03.2021 Andijan	30		17	56.7%	13	43.3%	
		25.03.2021 Fergana	30		25	83.3%	5	16.7%	
17	Seminar "Agricultural machinery for vegetables. Garden care"	05.04.2021 Fergana	36	137	28	77.8%	8	22.2%	Erkin Usmanhodjaev
		06.04.2021 Andijan	46		37	80.4%	9	19.6%	
		07.04.2021 Namangan	55		39	70.9%	16	29.1%	
18	Seminar "Technology of post-harvest storage of vegetables and fruits"	17.05.2021 Namangan	32	86	31	96.9%	1	3.1%	Erkin Usmanhodjaev
		18.05.2021 Andijan	30		26	86.7%	4	13.3%	
		19.05.2021 Fergana	24		23	95.8%	1	4.2%	
19	Roundtable meetings "Strategies for the development of Namangan region"	24.05.2021 Namangan	40	40	36	96.9%	4	13.3%	Project staff Georgiy Safonov
20	Seminar "Climate change and its impact on agricultural development"	28.06.2021 Namangan	25	78	24	96.0%	1	4.0%	Project staff
		29.06.2021 Andijan	25		24	96.0%	1	4.0%	
		30.06.2021 Fergana	28		25	89.3%	3	10.7%	
21	"Growing and protecting agricultural products"	27.07.2021 Andijan	25	85	25	100.0%	0	0.0%	Sarvar Abdullaev, Jasur Khodjaev
		28.07.2021 Andijan	15		15	100.0%	0	0.0%	
		29.07.2021 Fergana	25		25	100.0%	0	0.0%	
		30.07.2021 Namangan	20		19	95.0%	1	5.0%	
	Total		1983	1983	1659	83.6%	324	16.4%	

Impact of Training

Efficiency of project activities/ building the capacity of farmers in innovative approaches of farming

Bar chart #1: Most frequently mentioned trainings: What did you learn at the trainings?

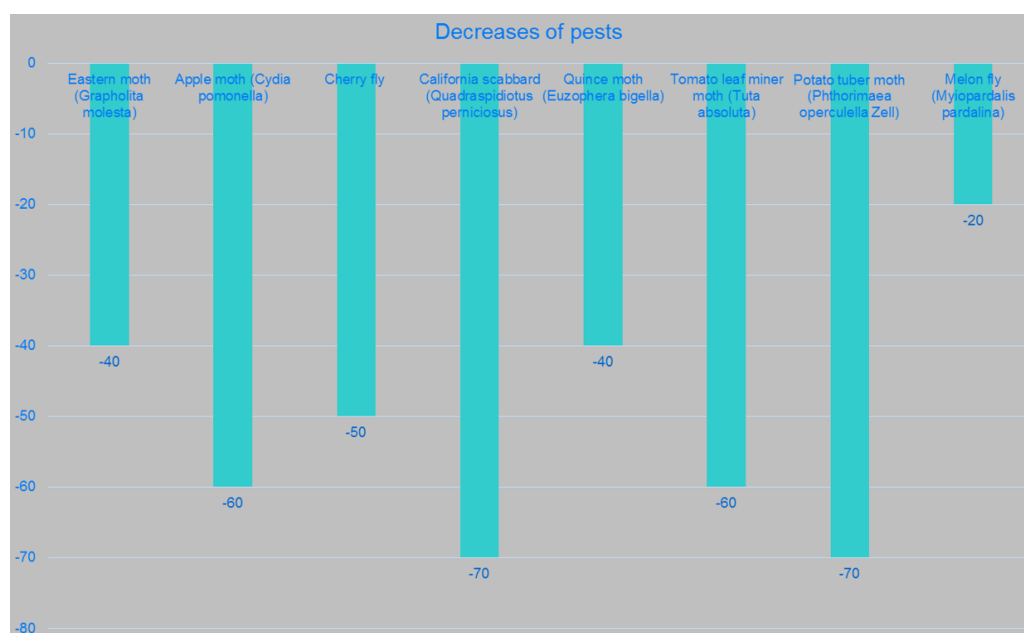


How useful were the trainings?

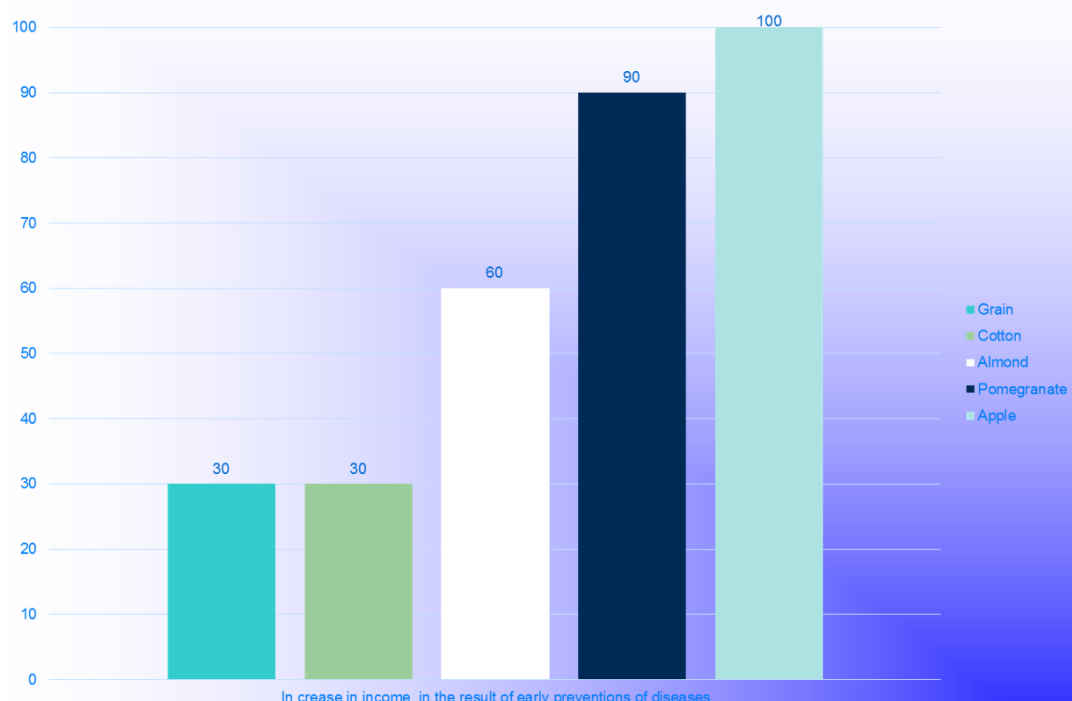
"We learnt new diseases, new agro techniques pest and disease control measures. We can take a sick leaf from the tree and compare it with the one given in the manual, identify the disease and think of its treatment" Focus group participants: Sharipova Matluba, a farmer, Kuva district

Impact

1/ Reported Decrease in Disease as result of project agromet stations and training



2/ Revenue increase as a result of Early prevention of diseases



Built capacity in pest and diseases control contributed to crop productivity and profit

3/ Impact – What changed

Project introduced best practices: building the capacity of farmers to efficiently organize productive farming and demonstration of these best practices by piloting projects led to changes which have a notable value for the farmers



Namangan Development Strategy (2020-30) sub-chapters on: 'Risks associated with the impact of climate change'

Climate change impacts in the Fergana Valley, including Namangan region:

- climate change and seasonal change will lead to an increase in the number of diseases and pests. About 30% of farmers estimate that the number of diseases and pests has increased dramatically over the past four years. The lack of cold air in winter is very harmful to plants, because the pests do not die and after awakening plants start to spoil.
- since 2015 the seasonal shifts have been observed. The fruit trees start blooming earlier, and the secondary frost and

precipitation destroy the blooming trees. Stronger winds, as well as hail and mudflows are also the increasingly important risk factors for local agriculture.

- due to the increase in warm air temperature in winter and the early onset of spring, the sowing time of crops changes. For example, if in the past the sowing season began in April, then in 2019 - it began in March. Depending on weather conditions, farmers have to calculate the time of sowing crops, especially if there is a lot of rain, the sowing time can take 10-15 days. Since the harvest period depends on the sowing period, it also moves forward or backward. Coldstorage units allow to harvest earlier.

- the trend of switching crops by farmers due to climate change is uneven in the region. The main reason for switching to other crops is market price and demand. For example, due to the low price for apricots, farmers are switching to growing grapes. In addition, farmers' choice of agricultural crops is based on soil characteristics, i.e. what culture is best suited and yields the most. Citrus fruits, bananas and kiwis have begun to be grown in new crops. But forecasts are uncertain due to climate change.

- climate change has a negative impact on the volume of export products. Secondary frosts and precipitation adversely affect the quality of crops and spoil the variety. Due to climate change and seasonal changes in Yangiurgan district, it was not possible to export the crop in 2018. To improve the appearance of the crop, farmers in the district are increasing the use of mineral fertilizers. Excessive heat can cause the fruit to crack or hit the fruit hot, resulting in loss of variety. As farmers in some areas point out, insect pests as one of the main problems they face, are a major obstacle to the development of export. Despite the abundant pomegranate harvest, the farmers of the Chust district were unable to export their products because it did not meet quality requirements due to diseases and fungi. In addition to climate change, lack of water resources has a negative impact on crop quality and appearance, which in turn affects export volumes.

Based on the analysis results, a number of the following conclusions can be drawn:

In the average summer, high air temperatures have a negative impact on yields, i.e.:

- high air temperature was a favorable environment for insect pests, which led to the usage of chemicals 8-10 times;
- the appearance and taste of fruit and vegetables deteriorate, as some species crack due to high air temperatures, which leads to a loss of product variety by 15-20%;
- high air temperatures also lead to increased demand for water in summer, and, as a result, there is a sharp shortage of water, which may bring to reduced yields by 30% or more.

In addition, starting from 2015, the lack of snow and frost in winter brought to:

- reproduction of insect pests. Such combating measures as the use of chemicals and biological methods (insect-entomophages), do not produce the desired effect due to poor coordination among farmers. If one farmer treats plants with chemicals and a neighboring farm applies biological control by using helpful insects, the insect-entomophage will be killed by the chemicals of a neighboring farm. In spring, cold and excessively rainy days are one of the most dangerous events for crops, and frost can destroy up to 100% of crops. In spring, repeated frosts are common. Excessive rains in spring or summer ruin flowers, and already flowering plants have a negative impact on the pollination process. The increase in diseases due to excess moisture in the summer is one of the common problems faced by farmers. As a result: lack of specialists in the agricultural sector; lack of usage of biological fertilizers due to the lack of knowledge of farmers; difficulty in obtaining bank loans and a small number of subsidies; lack of freedom of the farmer in the choice of agricultural products; ineffective cooperation of farmers; ineffective weather forecasting system; lack of attention to the specific condition of the soil (soil bonitet), regardless of the yields; lack of built-in agro-industrial system; lack of contact to the direct importers; ineffective system of using temporary adaptation methods. Improved quality of agricultural machinery has eased the work of farmers. It is necessary to improve land reclamation techniques, to improve the ability to import the necessary seeds and seedlings; as a result of numerous seminars and trainings conducted by international organizations, the impact on efficiency should be strengthened.

To reduce the impact of complex adverse conditions, it is necessary to use soil protection technologies, introduce and expand drip irrigation areas, improve land reclamation, maintain crop rotation, introduce innovative methods of biological pest control and improve agro-cultural skills among local farmers. It is also recommended to adapt to climate change via planting several agricultural species, application of plastic cover and smoking method, planting of intensive gardening, planting the soil protecting forest lines on agricultural land. The main barrier for adaptation is high cost of switching to climate change resilient technologies for farmers. The agricultural insurance and debt financing schemes could be improved and expanded to support farmers in adapting to climate change.

The scientifically sound solutions of excessive use of chemical fertilizers and other chemical substances can provide the foundations for implementation of carbon emission reduction projects in local agriculture, which may have high potential of reduction of N₂O and CO₂ emissions. Such projects can be realized via mechanisms of climate finance, voluntary carbon

schemes or under art. 6 of the Paris Agreement (mechanisms of sustainable development). At the current level of carbon emission allowances (\$22 /tCO₂ world average, \$70 /tCO₂ in the EU ETS) such projects may provide substantial additional revenue to the project owners (farmers).

In the period of 2021-2023 the portfolio of climate change adaptation and mitigation projects can be developed for the priority challenges of Namangan region. These projects can cover all sectors that are vulnerable to climate change impacts or have significant potential for carbon emission reduction or increase of carbon removals (water management, agriculture, energy, transport, forestry). Such project portfolio can be proposed to the Green Climate Fund and other adaptation funds, International Financial Institutions, private carbon and climate investors. This is especially important regarding expected adoption of the rules of art. 6 of the Paris Agreement under UNFCCC, which will open access to the international carbon market.

Source Namangan Development Plan (2021)

The plan's priority actions with indicators are also listed, including:

- Targets for the innovative renewal of agri-foods through the organization / development of competitive clusters in the value-added chain
 - o Under Resolution PP-4941 – for smallholders - 2,400 ha of under-utilized gardens and 454 ha of vineyards will be renovated; for enterprises - 4,600 ha of new orchards & vineyards will be created
 - o Development of independent agri-producers & protection of state producers¹ – e.g. 2021 – to create 29 cooperatives, with 15 ha allocated to each (total 435 ha) for 50 unemployed women / youths per cooperative (~1,450 new jobs)
- Targets in Exports
 - o Exports of fruit / vegetables to the value of \$130 million dollars

A few background notes by the TE on the Centre for Hydrometeorological Services (CHS, Uzhydromet)

There is a draft resolution on the provision of weather information (including use of water data). In order to maintain standards, it identifies which legal entities can provide weather information, for the certification (calibration of weather instruments), and for CHS (Uzhydromet) to provide 'permission' to the particular entities².

However, there needs to be an understanding of the differences between: global weather services, such as those provided by Meteoblue, who use the global weather satellite system, and in particular the satellites that cover the Fergana Valley and surrounding areas; the WMO-standard automatic weather stations (AWSs) in the Fergana Valley that transmit data to the global weather satellite grid – which Meteoblue use for example; and the micro-climate agromet stations, that are working on a sub-catchment / local farm cluster scale to provide localised weather information and services. These are used for example to forecast local frost, or rainfall to negate the need to irrigate³, and soil moisture levels for when to plant. So, it is not so much about the quality of the equipment, but the accuracy and granularity of the forecast, and moreover the interpretation of the forecast on a telegram channel web-based app.

CHS has 84 automatic weather stations (AWSs), 50 of which have recently been provided by World Bank. A number of these provide synoptic transmission (every 3 hours) to the UN WMO's Global Telecom System (GTS) for global and national weather forecasting. Uzbekistan is part of North Eurasian Climate Outlook Forum (NEACOF)⁴ which provides (long-range) seasonal forecasts.

CHS have an agrometeorology department, with the main users of weather forecast information being the MoA, and MWR. Their 10-day forecast most widely used, particularly for vegetable / fodder crops from March – August, and then for grain crops from November – April. The (medium-range) 10-day bulletin (last 5 days and forecast for the next 5 days) includes agriculture advice for regions, with the line agencies (DoA) to provide to district level. Advice is on crops (especially grain & cotton), horticulture, insect pest assessment, and seasonal tasks⁵. During the main crop watering period (July-August), and main crop harvesting periods, additional bulletin information is provided to MoA. They also have directives to provide

¹ Following the State agriculture development strategy, 2030

² One of the reasons is that agro-insurance claims against crop loss (due to temperature, drought, frost etc) are not honoured if 'unofficial weather data' is provided

³ For example if a farmer irrigates his tomatoes, and then it rains, then the tomatoes take up too much water and split

⁴ May 21st 2021 statement provides a review & forecast – utilizing 5 models, and predicted correctly for winter 20/21, a lack of rain

⁵ In cases, where severe weather is forecast, a SMS message is sent to ministries three days beforehand

other specialized information. E.g. Olives in Surhandarya; Cherry in Turakurgan district (Namangan)¹.

However as they work mainly on a regional level forecast (e.g. Namangan), and not district or sub-district, the forecasts lack granularity or accuracy. For example, whilst using precipitation is a proxy for soil moisture is OK, if the precipitation is uneven across the region, then the advice on when to plant seed or transplant to outdoors will not be accurate.

Interestingly, CHS have five agrometeorologists, and for the last four years have had links with MoA and PPQA in order to produce the 10-day agromet bulletins.

CHS do not have access to the project agromet station data, nor expect that the data could be used to transmit to the WMO's GTS system, due to WMO standards issues.

Andijan Hydromet Centre

The Andijan Hydromet Centre provides a monthly, 5-day and a 1-day forecast to 14 offices / organisations in their region. They have seven AWSs, four of which transmit to the WMO system, and two of which also collect agromet data. Soil moisture is directly determined eight times / year, mostly in the spring period. For horticulture, frost forecast is provided within the day and 10-day forecast (5-day previous, 5-day looking ahead). The historical archive of weather data is 100 years, so deviation from norms can be observed. However, the bulletin information provided, is mostly collated from the international weather satellite system for Europe and Central Asia.

Analysis of CHS

The CHS was not mentioned in the project design, although the availability of localized and timely weather information was described as a bottleneck. CHS were approached during the design, but were reluctant to join the project, as the agromet stations were not WMO standard AWSs, and so were unable to provide data to transmit into the global weather forecasting grid.

Andijan hydromet doesn't presently work with PPQA in the same region, so experiences on the agromet stations, data management and the agromet forecasts is not being shared.² Cooperation should be increased again. Fergana PPQA also reported no connection with the CHS, although the sharing of weather data would be beneficial

¹ Uzhydromet have an AWS there, due to the valuable cherry crop – to forecast for it, and to verify weather information for farmer crop loss insurance claims

² Ten years ago, PPQA had a agreement with Uzhydromet to receive rain, temperature and humidity information

Annex 5a: Location Data

Agromet Stations

#	District (region)	Places and responsible persons	Location	Telegram group
NAMANGAN REGION				
1.	Chartak district (T-Warner 300 meteostation)	<u>Orchard:</u> Orchard of “Nematjon Ikromjon Dilnoza” farm entity. <u>Responsible person:</u> Head of the farm - Ne’matjon Boltaboev (+998-94 153-65-36)	https://goo.gl/maps/CCFAZuZce1MssWdW6	51 users
2.	Yangikurgan district (T-Warner 300 meteostation)	<u>Orchard:</u> Orchard of “Toshmatova Saodat Nosirjonovna” farm entity. <u>Responsible person:</u> Manager - Alisher (+998 97 217-13-77)	https://maps.google.com/maps?q=41.194180,71.763668&ll=41.194180,71.763668&z=16	25 users
3.	Chust district (T-Warner 300 meteostation)	<u>Orchard:</u> Orchard of “Chavandoz Akbar Polvon” farm entity. <u>Responsible person:</u> Head of the farm - Akhadjon aka (+998 99 728-83-33)	https://maps.google.com/maps?q=41.053668,71.210861&ll=41.053668,71.210861&z=16	38 users
4	Chartak district (Local meteostation)	<u>Orchard:</u> Orchard of Chartak district forestry department. <u>Responsible person:</u> Head of the department - Khabibullaev Khurshidbek (+998 94 575-80-88).	https://maps.google.com/maps?q=41.354388,71.821561&ll=41.354388,71.821561&z=16	41 users
5	Yangikurgan district (Local meteostation)	<u>Orchard:</u> Orchard of LLC “Yangikurgan Fruits Export”. <u>Responsible person:</u> Agronomist - Buriboev Abdikayum (+998 97 594-75-72).		12 users
6	Turakurgan district (Local mete-station)	<u>Orchard:</u> Orchard of “Yahyokhon-Khasankhon” farm entity. <u>Responsible person:</u> Manager - Majidkhon Akhmedov (+998 94 277-25-64).	https://www.google.com/maps/place/40%C2%B054'15.1%22N+71%C2%B022'08.4%22E/@40.9636734,71.2590112,11.75z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.9042!4d71.369	32 users
Andijan region				
1	Andijan district (T-Warner 300 meteostation)	<u>Orchard:</u> Orchard of LLC “Agroproduct Export Tomorqa Xizmati”. <u>Responsible person:</u> Director - Odina Saidova (+998 94 567 86 68)	https://maps.google.com/maps?q=40.755108,72.441351&ll=40.755108,72.441351&z=16	22 users
2	Asaka district (T-Warner 300 meteostation)	<u>Orchard:</u> Orchard of LLC “MASK”. <u>Responsible person:</u> Manager - Fitratbek Dadakhodjaev (+998 93 252-71-30)	https://maps.google.com/maps?q=40.672415,72.274686&ll=40.672415,72.274686&z=16	35 users
3	Khodjaabad district (T-Warner 300 meteostation)	<u>Orchard:</u> “Jalil Ota” farm entity. <u>Responsible person:</u> Head of the farm - Azizillo aka (+998 90 543-43-69).	https://goo.gl/maps/5Q2FLdgYxhkUvUnV9	48 users
4	Andijan district (Local meteostation)	<u>Orchard:</u> Orchard of LLC “Inter Garden Asaka”. <u>Responsible person:</u> Manager - Ulugbek Ahmadaliev (+998 93 786-13-22).	https://maps.google.com/maps?q=40.715259,72.368762&ll=40.715259,72.368762&z=16	17 users
5	Asaka district (Local meteostation)	<u>Orchard:</u> Orchard of “Green Yard” farm entity. <u>Responsible person:</u> Head of the farm – Lochinbek Andurakhimov (+998 97 473-10-00).	https://maps.google.com/maps?q=40.745832,72.231810&ll=40.745832,72.231810&z=16	16 users
Fergana region				

1	Altirik district (T-Warner 300 meteostation)	<u>Orchard:</u> "Shavkatjon Chordara Bogi" farm entity. <u>Responsible person:</u> Abdumutalib Gafurov (+998 91 157-17-12)	https://goo.gl/maps/CwyMCQ5MSQuHuhVM7	41 users
2	Kuvasay city (T-Warner 300 meteostation)	<u>Orchard:</u> "Azizbek AXA" farm entity. <u>Responsible person:</u> Azizjon Hamraliev (+998-94-550-10-70).	https://maps.google.com/maps?q=40.355706,71.878516&ll=40.355706,71.878516&z=16	42 users
3	Kuva district (T-Warner 300 meteostation)	<u>Orchard:</u> "Farmers Training Center". <u>Responsible person:</u> Manager - Khojiakbar (+998 90 633-66-44).	https://goo.gl/maps/bCQypLVMvcoWG24w8	40 users
4	Altirik district (Local meteostation)	<u>Orchard:</u> Orchard of "Abdulkarim Hoji Ugli Abduvali Hoji" farm entity. <u>Responsible person:</u> Head of the farm – Rustam Sofiev (+998 90 272-38-90).	https://maps.google.com/maps?q=40.423205,71.470928&ll=40.423205,71.470928&z=16	31 users
5	Kuvasay city (Local meteostation)	<u>Orchard:</u> Orchard of "Hayrat Muruvvat Sahovati" farm entity. <u>Responsible person:</u> Head of the farm - Lazizjon Ahmedov (+998 93 645-00-55).	https://maps.google.com/maps?q=40.330573,71.961027&ll=40.330573,71.961027&z=16	40 users
16	Total number of users			531 users

Agromet Stations - Additionally planned

#	District (region)	Place and responsible persons	Location
NAMANGAN REGION			
1.	Chartak district	<u>Orchard:</u> Orchard of LLC "Chortok Rezort". <u>Responsible person:</u> Manager – Juraev Boydada (+998 95 006-26-50).	https://www.google.com/maps/place/41%C2%B007'49.9%22N+71%C2%B047'34.7%22E/@41.130518,71.792963,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d41.130518!4d71.792963
2.	Turakurgan district	<u>Orchard:</u> Orchard of LLC "GDF". <u>Responsible person:</u> Manager – Murodjon Ikromov (+998 97 562-80-00)	https://maps.google.com/maps?q=40.962255,71.370964&ll=40.962255,71.370964&z=16
ANDIJAN REGION			
1	Andijan district	<u>Orchard:</u> Orchard of Andijan Agriculture and Agro technologies Institute. <u>Responsible person:</u> Head of Consulting Center of the Institute – Doniyor Ganiev (+998 90 170-37-77)	https://maps.google.com/maps?q=40.856709,72.301629&ll=40.856709,72.301629&z=16
2	Asaka district	<u>Orchard:</u> Orchard of "And Eko Fruits" farm entity. <u>Responsible person:</u> Head of the farm – Boburjon Abdupattoev (+998 93 447-50-00)	https://www.google.com/maps/place/40%C2%B044'01.0%22N+72%C2%B010'39.2%22E/@40.733611,72.177562,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.733611!4d72.177562
3	Khodjaabad district	<u>Orchard:</u> Orchard of LLC "Navigul". <u>Responsible person:</u> Manager – Erkin Yokubov (+998 97 581-70-10)	https://www.google.com/maps/place/40%C2%B038'09.2%22N+72%C2%B036'00.4%22E/@40.6361214,72.5988788,323m/data=!3m1!1e3!4m5!3m4!1s0x0:0x0!8m2!3d40.635885!4d72.600117
FERGANA REGION			

1	Kuva district	<i>Orchard:</i> Orchard of "Olchin HDS" farm entity. <i>Responsible person:</i> Head of the farm – Dilmurod Khojimurodov (+998 90 634-39-64)	https://maps.google.com/maps?q=40.490462,72.107217&ll=40.490462,72.107217&z=16
2	Altirik district	<i>Orchard:</i> Orchard of production cooperative "Fayzli Boglar Sari". <i>Responsible person:</i> Manager - Ilkhomjon (+998 91 109-86-87).	https://www.google.com/maps/place/40%C2%B023'42.7%22N+71%C2%B031'00.4%22E/@40.395188,71.516765,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.395188!4d71.516765
3	Kuvasay city	<i>Orchard:</i> Orchard of "Quvasoy Nodirjon" farm entity. <i>Responsible person:</i> Murodjon Mamatkhalilov (+998 97 206-15-25).	https://www.google.com/maps/place/40%C2%B021'51.8%22N+71%C2%B058'26.9%22E/@40.364379,71.974132,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.364379!4d71.974132

List of Smart Insect (Pheromone) Traps

#	District (region)	Place and responsible person	Location
NAMANGAN REGION			
1	Chartak district	<i>Orchard:</i> Orchard of LLC "Chortok Rezort". <i>Responsible person:</i> Manager – Juraev Boydada (+998 95 006-26-50).	https://www.google.com/maps/place/41%C2%B007'49.9%22N+71%C2%B047'34.7%22E/@41.130518,71.792963,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d41.130518!4d71.792963
2	Turakurgan district	<i>Orchard:</i> Orchard of LLC "GDF". <i>Responsible person:</i> Manager – Murodjon Ikromov (+998 97 562-80-00)	https://maps.google.com/maps?q=40.962255,71.370964&ll=40.962255,71.370964&z=16
3	Yangikurgan district	<i>Orchard:</i> Orchard of LLC "Yangikurgan Fruits Export". <i>Responsible person:</i> Agronomist - Buriboev Abdikayum (+998 97 594-75-72).	https://www.google.com/maps/place/41%C2%B017'22.5%22N+71%C2%B043'43.9%22E/@41.289585,71.728867,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d41.289585!4d71.728867
4	Turakurgan district	<i>Orchard:</i> Orchard of "Yahyokhon-Khasankhon" farm entity. <i>Responsible person:</i> Manager - Majidkhon Akhmedov (+998 94 277-25-64).	https://www.google.com/maps/place/40%C2%B054'15.1%22N+71%C2%B022'08.4%22E/@40.9636734,71.2590112,11.75z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.9042!4d71.369
ANDIJAN REGION			
1	Andijan district	<i>Orchard:</i> Orchard of Andijan Agriculture and Agro technologies Institute. <i>Responsible person:</i> Head of Consulting Center of the Institute – Doniyor Ganiev (+998 90 170-37-77)	https://maps.google.com/maps?q=40.856709,72.301629&ll=40.856709,72.301629&z=16
2	Asaka district	<i>Orchard:</i> Orchard of "And Eko Fruits" farm entity. <i>Responsible person:</i> Head of the farm – Boburjon Abdupattoev (+998 93 447-50-00)	https://www.google.com/maps/place/40%C2%B044'01.0%22N+72%C2%B010'39.2%22E/@40.733611,72.177562,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.733611!4d72.177562

3	Khodjaabad district	<i>Orchard:</i> Orchard of LLC "Navigul". <i>Responsible person:</i> Manager – Erkin Yokubov (+998 97 581-70-10)	https://www.google.com/maps/place/40%C2%B038'09.2%22N+72%C2%B036'00.4%22E/@40.6361214,72.5988788,323m/data=!3m1!1e3!4m5!3m4!1s0x0:0x0!8m2!3d40.635885!4d72.600117
4	Andijan district	<i>Orchard:</i> Orchard of LLC "Inter Garden Asaka". <i>Responsible person:</i> Manager - Ulugbek Ahmadaliev (+998 93 786-13-22).	https://maps.google.com/maps?q=40.715259,72.368762&ll=40.715259,72.368762&z=16
FERGANA REGION			
1	Kuva district	<i>Orchard:</i> Orchard of "Olchin HDS" farm entity. <i>Responsible person:</i> Head of the farm – Dilmurod Khojimurodov (+998 90 634-39-64)	https://maps.google.com/maps?q=40.490462,72.107217&ll=40.490462,72.107217&z=16
2	Altirik district	<i>Orchard:</i> Orchard of production cooperative "Fayzli Boglar Sari". <i>Responsible person:</i> Manager - Ilkhomjon (+998 91 109-86-87).	https://www.google.com/maps/place/40%C2%B023'42.7%22N+71%C2%B031'00.4%22E/@40.395188,71.516765,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.395188!4d71.516765
3	Kuvasay city	<i>Orchard:</i> Orchard of "Quvasoy Nodirjon" farm entity. <i>Responsible person:</i> Murodjon Mamatkhalilov (+998 97 206-15-25).	https://www.google.com/maps/place/40%C2%B021'51.8%22N+71%C2%B058'26.9%22E/@40.364379,71.974132,16z/data=!4m5!3m4!1s0x0:0x0!8m2!3d40.364379!4d71.974132
4	Altirik district	<i>Orchard:</i> Orchard of "Abdukarim Hoji Ugli Abduvali Hoji" farm entity. <i>Responsible person:</i> Head of the farm – Rustam Sofiev (+998 90 272-38-90).	https://maps.google.com/maps?q=40.423205,71.470928&ll=40.423205,71.470928&z=16

Annex 6: List of Persons Interviewed

Summary List

Location	Stakeholder
Tashkent	<ul style="list-style-type: none"> - UNDP, Chamber of Commerce & Industry (CCI), Russia Embassy, - Plant Protection & Quarantine Agency (PPQA), Uzhydromet, Export Association for Fruit & Vegetables, Project staff & 4 project experts
Fergana	<ul style="list-style-type: none"> - Fergana Regional Admin. (Khokimiyat), Department of Agriculture (DoA) - Fergana - Kuvasay District Administration (Khokimiyat) - Plant Quarantine & Protection Agency (PQPA), CCI, Farmers Council
Andijan	<ul style="list-style-type: none"> - DoA, Andijan - Asaka District Administration (Khokimiyat) - PPQA, CCI, Business Women Association (BWA)
Namangan	<ul style="list-style-type: none"> - Namangan Regional Administration (Khokimiyat), DoA - Namanga Yangikurgan District Administration Khokimiyat - PPQA, BWA, Uzagrosugurta JSC (insurance company)
Interventions	<p><u>Fergana</u></p> <ul style="list-style-type: none"> - Agromet station - T-Warner (Scientific & Practical Centre for Smallholders) - Drip irrigation 11 ha (Production Co-op 'Akhadjon Ismatov Agro Logistics') - Agri equipment, 10 ha drip irrigation (Farm 'Kuvasoy Nodirjon') <p><u>Andijan</u></p> <ul style="list-style-type: none"> - Agromet station – local (Orchard 'Inter Garden Asaka' LLC) - Agromet station - T-Warner (Horticultural LLC 'MASK') - Processing equip / Seed packaging (Institute of Vegetables, Melon & Potatoes) - Drip irrigation 10 ha for orchard (Production Co-op 'Single Women') <p><u>Namangan</u></p> <ul style="list-style-type: none"> - Agromet station - T-Warner (Farm "Nematjon Ikromjon Dilnoza') - Agromet station -local (Orchard of 'Yangikurgan Fruits Export' LLC) - Cold storage unit - 300 ton (Farm "Boburjon Javokhir Sokhibjon') - Lemon grove 1 ha (Farm LLC 'Radivon Citrus Mevasi Tomorka Hizmati')

Name	Position / Organization	Location
Matilda Dimovska, Doina Munteanu, Diyora Kabulova, Elvira Izamova, Ilhom Aliev,	Resident Representative of UNDP Deputy RR of UNDP, Inclusive Growth Cluster Leader, UNDP, Programme Associate, UNDP Chief Specialist, CCI	National level
Oleg Ryjichenko	Chamber of Commerce & Industry (Chairman)	National level
Vadim Mitrofanov, Ivan Prokopenko	Russian Embassy (donor) - Minister-Counselor of Russia Embassy / First Secretary Russia Embassy	National level
Umidjon Abdujalilov	Plant Plant Protection & Quarantine Agency (PPQA)	National level
Nadezhda Gavrilenko, Kahramon Zaxidov, Natalya Agaltseva	Hydrometeorological Service (Uzhydromet)	National level
Husan Khaydarov	Export Association for Fruit & Vegetables	National level
Ulugbek Dadabaev	Project manager	National level
Jasur Khodjaev; Sarvar Abdullaev ; Azimjon Anorbaev & Erkin Usmankhodjaev	National experts - (Development Engineer), (Software Developer), (Entomologist), (Agriculture expert)	National level
Gulomjon Boypulatov	Fergana Regional Administration (Khokimiyat)	Fergana region
Azizbek Zununov	Department of Agriculture	Fergana region
Mirzhalilov Iqbol	Farmers Council	Fergana region
Mirzaliyev Doniyor	State Unitary Enterprise "Uztest"	Fergana region
Mehmonova Dilorom	Business Women Association (BWA) (cancelled)	Fergana region
Umidjon Abdujalilov	Plant Quarantine & Protection Agency (PQPA)	Fergana region
Rahimjonov Ravshan	Fergana, Kuvasay District Administration (Khokimiyat)	Fergana region

Ismatov Samandar	" Ahadjon Ismatov Agro logistics cooperative/ manager	Fergana region, Oltiariq district
Masobirov Abdufattokh	" Ahadjon Ismatov Agro logistics Coop - accountant	Fergana region, Oltiariq district
Bobojonv Shavkat	" Ahadjon Ismatov Agro logistics Coop – farm worker	Fergana region, Oltiariq district
Asabkhonov Jahkhongir	" Ahadjon Ismatov Agro logistics cooperative	Fergana region, Oltiariq district
Rakhmonov Kodirali	" Ahadjon Ismatov Agro logistics cooperative	Fergana region, Oltiariq district
Rashidov Tukhtamurod	" Ahadjon Ismatov Agro logistics cooperative	Fergana region, Oltiariq district
Kosimov Kahramon	" Ahadjon Ismatov Agro logistics cooperative	Fergana region, Oltiariq district
Masobirov Azizbek	" Ahadjon Ismatov Agro logistics cooperative	Fergana region, Oltiariq district
Madaminov Jumaboy	" Ahadjon Ismatov Agro logistics cooperative	Fergana region, Oltiariq district
Mamatkhalilov Abduljalil	founder of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Khudayberdiev Mahmud	"Kuvasoy Nodirjon" farm/ neighbor farmer	Fergana region, Kuvasay city
Turdiбоеv Komiljon	"Kuvasoy Nodirjon" farm/ neighbor farmer	Fergana region, Kuvasay city
Sulaymonov Suyunboy	"Kuvasoy Nodirjon" farm/ neighbor farmer	Fergana region, Kuvasay city
Mamadaliyev Shukurali	"Kuvasoy Nodirjon" farm/ neighbor farmer	Fergana region, Kuvasay city
Mamatkhalilov Murodjon	head of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Abdijalilov Nodirbek	worker of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Abdujalilov Pahlavon	tractor driver of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Mamatkhalilov Abdurahim	engineer of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Tuhtayeva Farida	founder of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Mamatkhalilova Shohida	worker of the "Kuvasoy Nodirjon" farm entity	Fergana region, Kuvasay city
Abdurahimov Botirjon	Fergana Scientific and Practical Center for the development of Homeland plots	Fergana region, Kuva district
Sharipova Matluba	Agromet (T-Warner) is installed	Fergana region, Kuva district
Abduazizov Aligavharxon	Agromet (T-Warner) is installed	Fergana region, Kuva district
Maxmudov Abdurauf	Agromet (T-Warner) is installed	Fergana region, Kuva district
Ibrohimov Mirzobek	Agromet (T-Warner) is installed	Fergana region, Kuva district
	Agromet (T-Warner) is installed	Fergana region, Kuva district
Axmadjon Musaev	Agromet (T-Warner) is installed	Fergana region, Kuva district
O'rinboev Muxtor	Agromet (T-Warner) is installed	Fergana region, Kuva district
Jabborov Gulom	Agromet (T-Warner) is installed	Fergana region, Kuva district
Xasanov	Agromet (T-Warner) is installed	Fergana region, Kuva district
Sultonov Ulugbek	Andijan, Asaka District Administration (Khokimiyat)	Andijan region, Asaka District
Tadjibaev Umirbek; Yuldasheva Shahzoda; Sokiev Bakhtiyor & Jalilov Doniyor	Chamber of Commerce & Industry/Head Worker x 3	Andijan region
Sulaymonov Abdumutalib	Department of Agriculture	Andijan region
Mirzaolimova Nargiza	Business Women Association	Andijan region
Kimsanbaev Ghiyosiddin	PPQA/ Andijan district agronomist inspector	Andijan region
Najmiddinov Doniyor	Asaka district agronomist inspector	
Soliev Mansurbek	External quarantine & Agronomist inspector	
Ahmadjonov Akmal		
Mahmudov Israel	Hydromet Service (Uzhydromet)	Andijan region
Turdieva Gulbahor, Rakhmonova Guljamol, Ergasheva Husnida, Kamilov Murodjon	Scientific Research Institute of Vegetables, Melon & Potato crops, Test Station (equipment for processing / packaging tomato seed)/ Doctoral student, Deputy head	
Saidona Odina	Production cooperative "Single Women"/ manager	Andijan region, Andijan district
Hakimova Nigora	The production cooperative "Single Women"	Andijan region, Andijan district
Hakimova Gulsorahon	The production cooperative "Single Women"	Andijan region, Andijan district
Yuldasheva Nozima	The production cooperative "Single Women"	Andijan region, Andijan district
Asranova Nilufar	The production cooperative "Single Women"	Andijan region, Andijan district
Yuldasheva Matluba	The production cooperative "Single Women"	Andijan region, Andijan district
Ulugbek Ahmadaliyev; Hakimov Hayotbek; Sobirov Gayrat	Orchard of "Inter Garden Asaka" LLC (agromet station (local) was installed)	Andijan region, Asaka district
Djurayev Soyibjon	"MASK" specialized horticultural LLC/ group member	Andijan region, Asaka district
Yuldashev Muxiddin	"MASK" specialized horticultural LLC/ group member	Andijan region, Asaka district
Rahmatullayev Sherzod	"MASK" specialized horticultural LLC/ group member	Andijan region, Asaka district
Sh. Rasulov	"MASK" specialized horticultural LLC/ group member	Andijan region, Asaka district
Mingboyev Saidjon	"MASK" specialized horticultural LLC/ group member	Andijan region, Asaka district
Lola Abduhalilova	Namangan Business Women Association	Namangan region
Ilhom Abduganiev, Hakimov Javlon	Namangan Administration (Khokimiyat)/ Deputy Head of Regional Directorate for Economic Development and Poverty Reduction; Head of Industry Department	Namangan region
Azizbek Abdusalomov	Namangan Department of Agriculture (short meeting, no remote)/ Head	Namangan region

Akmaljon Keldiyev	Namangan Department of Uzagrosugurta JSC (insurance company)	Namangan region
Azamjon Kochkarov, Abdurasul Kholmiraev, Sherzodjon Yusupov, Alisher Rahimov, &Azizbek Isroilov.	Agency of Plant Quarantine and Protection of Namangan region/ Head agronomist inspector x 4	Namangan region
Boltaboyev Ne'matjon	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Yuldashev Abdulkarim	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Matisaqov Shuhratjon	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Tilanoval Jaloliddin	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Umuhonov Bobir	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Haydarov Madamin	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Satimov Uktamjon	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Hayitov Samadjon	"Nematjon Ikromjon Dilnoza" farm	Namangan region, Chartak district
Muhammadzaribova Gulasal	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Ikromjonova Oydiyov	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Qurbonaliyeva Mahfuza	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Nizomiddinova Hurshida	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Karimjonova Hayothon	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Abdusalomova Mohichehra	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Mamajonova Shahrizoda	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Boltaboyeva Oydiyeva	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Boltaboyev Ne'matjon	"Boburjon Javokhir Sokhibjon" farm	Namangan region, Chartak district
Pulatov Muzaffar; Bo'riboev Abduqayum; Rahimov Alisher	orchard of "Yangikurgan Fruits Export" LLC, Head agronomist	Namangan region, Yangikurgan district
Najmiddinov Asad	Khokimiyat of Yangikurgan district of Namangan region	Namangan region, Yangikurgan district
Buronboy Asraev, Qayumov Jamoliddin, Sultonov Saidolim	Greenhouse farm of LLC "Radivon Citrus Mevasi Tomorka Hizmati" / LLC manager, Cluster clerk, District agriculture department head	Namangan region, Yangikurgan district

117 persons met

Annex 7: List of Documents Reviewed

1. UNDP Implementing/Executing partner arrangements / contract
2. UNDP Project Document and Logframe (with revisions if any)
3. UNDP Environmental and Social Screening results
4. Project Inception Report
5. Annual Project Reports
6. Minutes of the Project Board Meetings and other meetings (i.e. Project Appraisal Committee meetings)
7. Risk Register
8. Progress reports
9. Annual Work Plans
10. M&E Data management system
11. Audit reports
12. Tracking Tools (if applicable)
13. Oversight mission reports by the project manager, RTA, and others
14. Monitoring reports prepared by the project
15. Financial and Administration guidelines used by Project Team
16. Co-financing realized, itemized according to template provided by TE team
17. Financial expenditures, itemized according to template provided by TE team
18. Project operational guidelines, manuals and systems
19. UNDP Development Assistance Framework (UNDAF)
20. UNDP Country Programme Document (CPD) and Country Programme Action Plan (CPAP)
21. Project site location maps
22. Project activity maps with management actions and intervention
23. Technical consultancy reports
24. Training materials (PPTs etc.)
25. News and Awareness materials

Annex 8: Stakeholder List

Stakeholder	FE Interest
National level	
Russia Embassy	Donor – Senior supplier
Chamber of Commerce and Industry	National project partner
State Plants Quarantine Inspection	Project partner (Agrometeorological stations network / forecasts / delivery mechanisms)
Project staff (PM, Finance, M&E)	
Project consultants (Agrometeorology Station Designer and Agricultural Specialist)	
Uzhydromet	Agromet services / bulletins / delivery mechanisms
Ministry of Agriculture	
UNFCCC office – local representative	
UNDP	Financial oversight - HACT method / M&E / gender etc
PB members	
Fergana region (oblast) / province	
Agriculture Department of Fergana region	Services provided / bottlenecks / successes / future plans
CCI branch office in Fergana region	
Farmers' Council branch office in Fergana region	
Regional branch office of the Quarantine Inspection	
Business Women Association	
Business projects in pilot districts of Fergana region	At least 2 projects (intensive orchard/vineyard, drip irrigation)
Agrometeorological station in Fergana region	Foreign or local station
Market visit	To see what vegetables / fruits / seed is on sale – talk to a few stall owners about the sector Ask about IPM products to agro-chemical stall holder
Andijan region (oblast) / province	
Agriculture Department of Andijan region	Services provided / bottlenecks / successes / future plans
CCI branch office in Andijan region	
Farmers' Council branch office in Andijan region	
Regional branch office of the Quarantine Inspection	
Business Women Association	
Business projects in pilot districts of Andijan region	2 projects (tomato seeds breeding, intensive orchard/drip irrigation)
Agrometeorological stations in Andijan region	Foreign and local stations
Namangan region (oblast) / province	
Hokimiyat of Namangan region	Strategy of Development of Namangan region until 2030
Agriculture Department of Namangan region	
CCI branch office in Namangan region	
Farmers' Council branch office in Namangan region	
Regional branch office of the Quarantine Inspection	
Business Women Association	
Business projects in pilot districts of Namangan region	At least 2 projects (Cold storage, lemon/drip irrigation/heating)
Agrometeorological stations in Namangan region	Foreign and local stations

Annex 9: Rating Scales

The following UNDP grading scales were applied in the evaluation

Evaluation Criteria

Criteria	Definition
Effectiveness - Objective	- The extent to which an objective has been achieved or how likely it is to be achieved.
Effectiveness - Outcomes	- Results include direct project outputs, short to medium-term outcomes
Relevance	<ul style="list-style-type: none"> - The extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time. - The extent to which the project is in line with the GEF Operational Programs or the strategic priorities under which the project was funded. <p>(Retrospectively, relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.)</p>
Efficiency	- The extent to which results have been delivered with the least costly resources possible; also called cost effectiveness or efficacy.
Sustainability	<ul style="list-style-type: none"> - The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion - Projects need to be environmentally, as well as financially and socially sustainable
Impact	<ul style="list-style-type: none"> - The positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention. - Longer term impact including global environmental benefits, replication effects and other local effects.

Evaluation Indicators¹

1. Monitoring & Evaluation	Rating	2. Implementing Agency (UNDP) & Executive / Implementing Partner Execution	Rating
Overall quality of M&E	HS-HU	Overall quality of Implementation / Execution	HS-HU
M&E Design at entry	HS-HU	Quality of UNDP Implementation	HS-HU
M&E Implementation	HS-HU	Quality of Partner Execution (CCI)	HS-HU
3. Assessment of Outcomes	Rating	4. Sustainability	Rating
Overall Project Outcome	HS-HU	Overall Likelihood of Sustainability	L-U
Overall Effectiveness of Results	HS-HU	Financial resources	L-U
- Objective	HS-HU	Socio-economic	L-U
- Outcome 1	HS-HU	Institutional framework & governance	L-U
- Outcome 2 etc	HS-HU	Environmental	L-U
Efficiency (cost)	HS-HU		
Relevance	HS-HU		

NB: Assessment of Overall Project Outcome includes Effectiveness of Results (Objective, Outcomes), Efficiency and Relevance

(For rating definitions – see ToR and Guidance for conducting Terminal Evaluations of UNDP-supported, GEF-financed projects (2020) – Highly Satisfactory is a ‘6’, with the Highly Unsatisfactory is a ‘1’.

Rating Scales - Description

Rating Scales: for Monitoring & Evaluation; for Implementing Agency (IA) & Implementing Partner) Execution; and for Outcomes (Overall, Effectiveness & Efficiency, & Relevance)	
Highly Satisfactory (HS)	The project had no shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency

¹ As per the ToR

Satisfactory (S)	There were only minor shortcomings
Moderately Satisfactory (MS)	There were moderate shortcomings
Moderately Unsatisfactory (MU)	The project had significant shortcomings
Unsatisfactory (U)	There were major shortcomings in the achievement of project objectives in terms of relevance, effectiveness, or efficiency
Highly Unsatisfactory (HU)	The project had severe shortcomings

Or Not Applicable (N/A); Unable to Assess (U/A)

Important Note

Overall Outcome: Achievement of the project objective will be rated HS to HU.

Effectiveness: Each of the project's three outcomes will be rated HS to HU. (The colour coding of the individual indicator targets in Annex 1 will partially help determine the grade, however the professional judgement of the FE team will also be a major consideration.

Efficiency: Will be rated HS to HU

Relevance Will be rated HS to HU

Rating Scale for Sustainability

Likely (L)	Negligible risks to sustainability
Moderately Likely (ML)	Moderate risks
Moderately Unlikely (MU)	Significant risks
Unlikely (U)	Severe risks

According to the UNDP evaluation guidelines, all risk dimensions of sustainability are critical: i.e., the overall rating for sustainability is not higher than the lowest-rated dimension.

Ratings should take into account both the probability of a risk materializing and the anticipated magnitude of its effect on the continuance of project benefits.

Risk definitions:

- a) whether financial resources will be available to continue activities resulting in continued benefits
- b) whether sufficient public stakeholder awareness and support is present for the continuation of activities providing benefit
- c) whether required systems for accountability and transparency plus technical know-how are in place
- d) whether environmental risks are present that can undermine the future flow of the project benefits.

Rating Scale for Impact

There is no longer a rating for 'Impact', however, project impact will be discussed

Annex 10: Mission Agenda

Time	Events / Participants	Location
Monday-Tuesday, August 16-17		
	Acquaintance with project documentation and planning of visits to pilot sites of the project	Online, remote work
Wednesday, 18 August		
9:00 - 15: 00	Acquaintance with project documentation and planning of visits to the pilot sites of the project	Online, remote work
16:00 - 17:00	Meeting with representatives of the UNDP Country Office Participants: Mr. Richard Sobey, Adila Tadjibaeva, UNDP CO and Project Staff	Online meeting via Zoom conference call
Thursday, 19 August		
11:30 - 12:30	Meeting with representatives of the Agency of Plant Quarantine and Protection of the Republic of Uzbekistan to discuss issues of cooperation with the UNDP project Participants: Mr. Richard Sobey, Adila Tadjibaeva, Agency representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	Online meeting via Zoom conference call
13:00 - 14:00	Lunch	
14:00 - 14:45	Meeting with representatives of the Center for Hydrometeorological Service of the Republic of Uzbekistan (Uzhydromet) Participants: Mr. Richard Sobey, Adila Tadjibaeva, representatives Uzhydromet, UNDP project staff <i>The interpreter will be provided by the project</i>	Online meeting via Zoom conference call
15:00 - 15:45	Meeting with a representative of the Association of Exporters of Fruit and Vegetable Products of Uzbekistan Participants: Mr. Richard Sobey, Adila Tadjibaeva, representatives of Exporters Association, UNDP project staff <i>The interpreter will be provided by the project</i>	Online meeting via Zoom conference call
16:00 - 17:30	Meeting with national project experts: Jasur Khodjaev (Developing Engineer), Sarvar Abdullaev (Software Developer), Azimjon Anorbaev (Entomologist), Erkin Usmankhodjaev (Agriculture expert) Participants: Mr. Richard Sobey, Adila Tadjibaeva, UNDP project experts and staff <i>The interpreter will be provided by the project</i>	Online meeting via Zoom conference call
Friday, 20 August		
10:00-10:45	Meeting with representatives of the Territorial Department of the Chamber of Commerce and Industry of Fergana region Participants: Adila Tadjibaeva, CCI representatives, UNDP project staff	58, B. Margiloniy str., Fergana
11:00-11:45	Meeting with representatives of the Khokimiyat of Fergana region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, Khokimiyat representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	15 A.Navoi str., Fergana, including Zoom conference call
12:00 - 13:00	Lunch	
13:00 - 13:45	Meeting with representatives of the Department of Agriculture of Fergana region Participants: Mr. Sobey (online), Adila Tadjibaeva, representatives of Agriculture Department, UNDP project staff	64 Al-Fergani str., Fergana, including Zoom conference call

	<u>The interpreter will be provided by the project</u>	
14:00 - 14:45	Meeting with representatives of the Farmers Council of Fergana region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, Council representatives, UNDP project staff <u>The interpreter will be provided by the project</u>	64 Al-Fergani str., Fergana, including Zoom conference call
15:00 - 15:45	Meeting with representatives of the Fergana branch of the State Unitary Enterprise "Uztest" Participants: Mr Richard Sobey (online), Adila Tadjibaeva, representatives of Uztest, staff of the UNDP project <u>The interpreter will be provided by the project</u>	119 B. Margiloniy str., Fergana, including Zoom conference call
16:00 - 16:45	Meeting with representatives of the regional branch of Business Women Association (BWA) of Fergana Region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, BWA representatives, UNDP project staff <u>The interpreter will be provided by the project</u>	Fergana, including Zoom conference call
17:00 - 18:00	Meeting with representatives of the territorial branch of the Agency of Plant Quarantine and Protection of Fergana region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, Agency representatives, UNDP project staff <u>The interpreter will be provided by the project</u>	Fergana, including Zoom conference call
Saturday, 21 August		
9:30 - 10:30	Visit to the production cooperative "Akhadjon Ismatov Agro Logistics", where a drip irrigation system was installed on 11 hectares. Conducting focus groups meetings with the management and members of the cooperative (women) Participants: Adila Tadjibaeva, cooperative representatives, UNDP project staff	Makhalla "Zilol", s. Burbonlik, Altyark district, Fergana region
11:30 - 12:15	Meeting with representatives of the Khokimiyat of Kuvasay district of Fergana region Participants: Adila Tadjibaeva, khokimiyat representatives, UNDP project staff	st. Mustakillik, 45, Kuvasay, Fergana region
12:30 - 13:30	Lunch	
14:00 - 15:00	Visit to the farm "Kuvason Nodirjon", where agricultural equipment was procured, and also a drip irrigation system was installed on 10 Ha. Conducting focus groups meetings with management and employees of the farm Participants: Adila Tadjibaeva, farm representatives, UNDP project staff	108 Shodiyona str., Valik SSG, Kuvasay city, Fergana region
16:00 - 17:00	Visit to the Fergana Scientific and Practical Center for the Development of Home Land Plots, where an agrometeorological station (T-Warner) was installed within the framework of the project. Conducting focus groups meetings with the staff of the center and farmers who use the services of the agrometeorological station Participants: Adila Tadjibaeva, representatives of the center and farms, UNDP project staff	42, Mezon str., Guliston SSG, Kuva district, Fergana region
Sunday, 22 August		
	Day off	
Monday, 23 August		
09:30-10:10	Visit to the Andijan Scientific Test Station of the Scientific Research Institute of Vegetable and Melon Crops and Potatoes, where equipment for processing and packaging tomato seeds is installed. Conducting an interview meeting with the station management Participants: Adila Tadjibaeva, Station representatives, UNDP project staff	Mahalla Ailanpa, s. Naiman, Andijan region, Andijan region

10:30-11:30	Visit to the production cooperative "Single Women", where a drip irrigation system was installed on 10 Ha of intensive orchard. Conducting focus groups meetings with the management and members of the cooperative (women) Participants: Adila Tadjibaeva, cooperative representatives, UNDP project staff	88, Temir yul str., MSG Khakikat, Andijan district, Andijan region
11:50-12:50	Visit to the orchard of "Inter Garden Asaka" LLC, where an agrometeorological station (local) was installed within the framework of the project. Conducting interviews and meetings with employees of the enterprise Participants: Adila Tadjibaeva, garden and farm representatives, UNDP project staff	SSG Ovullik, Andijan region, Andijan region
13:00 - 14:00	Lunch	
14:00-14:45	Meeting with representatives of the Hydrometeorological Department (Uzhydromet) of Andijan region Participants: Adila Tadjibaeva, Andijan hydromet representatives, UNDP project staff	Andijan city, Andijan region
15:15 - 16:00	Visit to the specialized horticultural LLC "MASK", where an agrometeorological station (T-Warner) was installed within the framework of the project. Conducting focus groups meetings with employees of the enterprise and farmers who use the services of the agrometeorological station Participants: Adila Tadjibaeva, orchard and farm representatives, UNDP project staff	MSG Yangisor, Asaka district, Andijan region
16:30 - 17:15	Meeting with representatives of the Khokimiyat of Asaka district of Andijan region Participants: Adila Tadjibaeva, Khokimiyat representatives, UNDP project staff	2, Sokhil buyi str., Asaka district, Andijan region
Tuesday, 24 August		
10:00 - 10:45	Meeting with representatives of the Territorial Department of the Chamber of Commerce and Industry of Andijan region Participants: Adila Tadjibaeva, CCI representatives, UNDP project staff	122, A. Navoi str., Andijan, Andijan region
11:00 - 11:45	Meeting with representatives of the Department of Agriculture of Andijan region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, representatives of the department, UNDP project staff <i>The interpreter will be provided by the project</i>	8, Tinchlik str., Andijan as well as Zoom conferencing
12:00 - 12:45	Meeting with representatives of the Farmers Council of Andijan region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, representatives of the Council, UNDP project staff <i>The interpreter will be provided by the project</i>	8, Tinchlik str., Andijan, including Zoom conference call
13:00 - 14:00	Lunch	
14:30 - 15:15	Meeting with representatives of the regional branch of Business Women Association (BWA) of Andijan region Participants: Mr Richard Sobey (online), Adila Tadjibaeva, BWA representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	Andijan city, including Zoom conference call
15:30 - 16:30	Meeting with representatives of the territorial branch of the Agency of Plant Quarantine and Protection of Andijan region Participants: Mr Richard Sobey (online), Adila Tadjibaeva, Agency representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	Andijan city, including Zoom conference call
Wednesday, 25 August		
10:00 - 10:45	Meeting with representatives of the regional branch of the Association of Business Women of Namangan region	9, Bankovskaya str., Namangan

	Participants: Adila Tadjibaeva, BWA representatives, UNDP project staff	
11:00 - 11:45	Meeting with representatives of the Khokimiyat of Namangan region Participants: Mr Richard Sobey (online), Adila Tadjibaeva, Khokimiyat representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	57 Istiklol, Namangan, including Zoom conference call
12:00 - 12:45	Meeting with representatives of the Department of Agriculture of Namangan region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, Department representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	66 Hamrokh, Namangan, including Zoom conference call
13:00 - 14:00	Lunch	
14:00 - 14:45	Meeting with representatives of the Farmers Council of Namangan region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, representatives of the Council, UNDP project staff <i>The interpreter will be provided by the project</i>	10 Margilan str., Namangan, including Zoom conference call
15:00 - 15:45	Meeting with representatives of the Namangan Department of Uzagrosugurta JSC (insurance company) Participants: Mr Richard Sobey (online), Adila Tadjibaeva, representatives of Uzagrosugurta, UNDP project staff <i>The interpreter will be provided by the project</i>	9 Navoi str., Namangan, including Zoom conference call
16:00 - 17:00	Meeting with representatives of the territorial branch of the Agency of Plant Quarantine and Protection of Namangan region Participants: Mr. Richard Sobey (online), Adila Tadjibaeva, Agency representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	Namangan, including Zoom conference call
Thursday 26 August		
10:00 - 10:45	Visit to the farm "Nematjon Ikromjon Dilnoza", where an agrometeorological station (T-Warner) was installed within the framework of the project. Conducting focus groups meetings with employees of the enterprise and farmers-users of the services of the agrometeorological station Participants: Adila Tadjibaeva, farm representatives, UNDP project staff	Olmazor str, vill. Arbagish, Chartak district, Namangan region
11:00 - 11:45	Visit to the farm "Boburjon Javokhir Sokhibjon", where a 300-ton cold storage facility was established. Conducting focus group meetings with the management and staff of the farm (women) Participants: Adila Tadjibaeva, farm representatives, UNDP project staff	Merganov str., s. Khazratishokh, Chartak district, Namangan region
12:10 - 12:40	Visit to the orchard of "Yangikurgan Fruits Export" LLC, where an agrometeorological station (local) was installed within the framework of the project. Conducting interviews and meetings with employees of the enterprise Participants: Adila Tadjibaeva, representatives of the enterprise, UNDP project staff	v. Iskovot, Yangikurgan district, Namangan region
13:00 - 14:00	Lunch	
14:30 - 15:15	Meeting with representatives of the Khokimiyat of Yangikurgan district of Namangan region Participants: Adila Tadjibaeva, khokimiyat representatives, UNDP project staff	Mustakillik str., building 1, Yangikurgan, Namangan region
15:30 - 16:15	Visit to the greenhouse farm of LLC "Radivon Citrus Mevasi Tomorka Hizmati", where a lemonarium is being created on an area of 1 hectare. Interview meeting with farm employees Participants: Adila Tadjibaeva, farm representatives, UNDP project staff	Kattakurgan str., house 97, p. Radivon, Yangikurgan region, Namangan region

Friday 27 August		
9:00 - 11:00	Analysis and consolidation of the collected information.	Online, remote operation
11:00 – 11:45	Meeting with the Chairman of the Chamber of Commerce and Industry of the Republic of Uzbekistan, Mr. Ikramov Adham Ilkhamovich Participants: Mr. Richard Sobey, Adila Tadjibaeva, CCI representatives, UNDP project staff <i>The interpreter will be provided by the project</i>	Online meeting via Zoom conference call
13:00 - 14:00	Lunch	
14:00 - 14:45	Meeting with representatives of the Embassy of the Russian Federation in the Republic of Uzbekistan Participants: Mr. Richard Sobey, Adila Tadjibaeva, Embassy staff, UNDP CO and UNDP project staff	Online meeting via Zoom conference call
15:00 - 15:45	Meeting with representatives of the Ministry of Foreign Affairs of the Republic of Uzbekistan Participants: Mr Richard Sobey, Adila Tadjibaeva, Ministry staff, UNDP CO and UNDP project staff	Online meeting via Zoom conference call
16:00 - 18:00	Meeting with project staff. Discussion and clarification of project implementation Participants: Mr. Richard Sobey, Adila Tadjibaeva, UNDP project	Online meeting via Zoom conference call
Saturday 28 August		
	Analysis of the collected information. Preparation of the presentation of initial findings of the project evaluation	Online, remote operation
Sunday 29 August		
	Day off	
Monday 30 August		
	Analysis of the collected information. Preparation of the presentation of initial findings of project evaluation	Online, remote operation
Tuesday August 31st		
11:00 - 12:00	Meeting with staff of the Inclusive Growth Cluster and UNDP Senior Management. Wrap-up discussion of results and next steps / plans. Participants: Mr. Richard Sobey, Adila Tadjibaeva, CCI, UNDP CO and UNDP project staff	Online meeting via Zoom conference call
13:00 - 14:00	Lunch	
14:00 - 18:00	Analysis of the collected information and preparation of the initial version of the evaluation mission report	Internal (no meeting)
Wednesday September 1st		
	Independence Day of Uzbekistan.	
Tuesday September 7th		
14:00 - 14:30	Presentation and discussion of the initial findings of the project evaluation. Participants: Mr. Richard Sobey, Adila Tadjibaeva, country office and UNDP project staff, Russia Embassy, CCI	Online meeting via Zoom conference call
	Completion of the project appraisal mission	

Annex 11: Map

https://www.google.com/maps/d/viewer?mid=1zP8_Xw4EhmzIJgs6Ci-AcvYjk4qSgt9R&ll=40.83126307294445%2C71.93844449999999&z=8

Annex 12: Indicative FE Evaluation Matrix

This questionnaire was used as a general aid during the field visit with the results described in section 3. (Note there is no further information to be presented in the blank boxes.)

Evaluation Question	Response / Finding	Conclusion/ Recommend
Relevance: How does the project relate to the main objectives of the FA, and to the environment and development priorities at the local, regional and national levels?		
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?		
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?		
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?		
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and / or improved ecological status		
Findings discussion – 3 areas - Project formulation, project implementation, and project results.		
Project Strategy		
Project Design Formulation		
To what extent is the project in line with national and local priorities?		
To what extent is the Project aligned to the main objectives of the relevant focal area?		
Have synergies with other projects and initiatives been incorporated in the design?		
Were lessons from other relevant projects properly incorporated into the project design?		
Decision-making processes: were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process, taken into account during project design processes?		
Have issues materialized due to incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document?		
Were the project's objectives and components clear, practicable and feasible within its time frame? Were the capacities of the executing institution(s) and its counterparts properly considered when the project was designed? Were the partnership arrangements properly identified and roles and responsibilities negotiated prior to project approval? Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place at project entry? Were the project assumptions and risks articulated in the PIF and project document?		
Results Framework:		
Are the project objective / outcomes clear, practicable, & feasible within its time frame?		
Were the project's logframe indicators and targets appropriate? How "SMART" were the midterm and end-of-project targets (Specific, Measurable, Attainable, Relevant, Time-bound)? Any amendments?		
Progress towards Results		
Progress towards Outcomes Analysis:		
Review the logframe indicators against delivery at end-of-project targets using the Results Matrix (see Annex).		
Compare and analyse the Tracking Tools (e.g. METT, PMAT, AMAT, Capacity Dev., Financial) at the Baseline, MTR and End.	n/a	n/a
Which barriers hindered achievement of the project objective		
ASSUMPTIONS AND RISKS		
As per logframe - Logical and robust, and have helped to determine activities and planned outputs.		
Externalities (i.e. effects of climate change, global economic crisis, etc.) which are relevant to the findings.		
Project Implementation & Adaptive Management		
Partner Agency / Implementing Entity – UNDP		
Has there been an appropriate focus on results?		

Evaluation Question	Response / Finding	Conclusion/ Recommend
Has the UNDP support to the Executing Agency/Implementing Partner and Project Team been adequate?		
Has the quality and timeliness of technical support to the Executing Agency/ Implementing Partner and Project Team been adequate?		
How has the responsiveness of the managing parties to significant implementation problems (if any) been?		
Has overall risk management been proactive, participatory, and effective?		
Are there salient issues regarding project duration, for instance to note project delays? And, how have they affected project outcomes and sustainability?		
Candor and realism in annual reporting		
Executing Agency/ Implementing Partner Execution		
Were the capacities of the executing institution(s) and its counterparts properly considered when the Project was designed?		
Were partnership arrangements properly identified and roles and responsibilities negotiated prior to Project approval?		
Were counterpart resources, enabling legislation, and adequate project management arrangements in place at Project entry?		
Have management inputs and processes, including budgeting and procurement been adequate?		
Has there been adequate mitigation and management of environmental and social risks as identified through the UNDP Environmental and Social screening procedure?		
Whether there was an appropriate focus on results and timeliness?		
Quality of risk management?		
Candor and realism in reporting?		
Government ownership or level of support if 'in cooperation with' the IP.		
Work Planning / PROJECT IMPLEMENTATION		
Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country/region, including the formation of a Project Board. Lessons from other relevant projects incorporated into project implementation.		
Feedback from M&E activities used for adaptive management.		
Has the project experienced delays in start-up and/or implementation? What were the causes of the delays? And, have the issues been resolved?		
Were work-planning processes results-based?		
Did the project team use the results framework/ logframe as an M&E and a management tool?		
Were there any changes to the logframe since project start, and have these changes been documented and approved by the project board?		
FINANCE & CO-FINANCE		
<u>Prodoc</u> Did the prodoc identify potential sources of co-financing as well as leveraged and associated financing? Prodoc include strong financial controls that allowed the project management to make informed decisions regarding the budget, allow for the timely flow of funds and for the payment of project deliverables Did the prodoc demonstrate due diligence in the management of funds, including periodic audits.		
Sufficient clarity in the reported co-financing to substantiate in-kind and cash co-financing from all listed sources. The reasons for differences in the level of expected and actual co-financing. The extent to which project components supported by external funders were integrated into the overall project. Effect on project outcomes and/or sustainability from the extent of materialization of co-financing. Evidence of additional, leveraged resources that have been committed as a result of the project. (Leveraged resources can be financial or in-kind and may be from other donors, NGOs, foundations, governments, communities or the private sector)		
<u>Cost-effective factors</u> Compliance with the incremental cost criteria and securing co-funding and associated funding. Project completed the planned activities and met or exceeded the expected outcomes in terms of achievement of Global Environmental and Development Objectives according to schedule, and as cost-effective as initially planned. The project used either a benchmark approach or a comparison approach (did not exceed the costs levels of similar projects in similar contexts)?		
<u>Standard Finance questions</u> Have strong financial controls been established allow the project management to make informed decisions regarding the budget at any time, and allow for the timely flow of funds and the payment of satisfactory project deliverables?		
Are there variances between planned and actual expenditures? If yes, what are the reasons behind these variances?		

Evaluation Question	Response / Finding	Conclusion/ Recommend
Has the project demonstrated due diligence in the management of funds, including annual audits?		
Have there been any changes made to the fund allocations as a result of budget revisions? Assess the appropriateness and relevance of such revisions.		
Has pledged cofinancing materialized? If not, what are the reasons behind the cofinancing not materializing or falling short of targets?		
Project-level Monitoring and Evaluation Systems		
The quality of the Monitoring and Evaluation (M&E) plan's design and implementation: An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators and data analysis systems, MTR, TE, and adequate funding for M&E activities.		
M&E plan at project start up, considering whether baseline conditions, methodology and roles and responsibilities are well articulated. Is the M&E plan appreciated? Is it articulated sufficiently to monitor results and track progress toward achieving objectives?		
Were sufficient resources allocated effectively to M&E?		
Were there changes to project implementation / M&E as a result of the MTR recommendations?		
Are the M&E systems appropriate to the project's specific context? - effectiveness of monitoring indicators from the project document for measuring progress and performance		
Do the monitoring tools provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective?		
To what extent has the Project Team been using inclusive, innovative, and participatory monitoring systems?		
To what extent have follow-up actions, and/or adaptive management measures, been taken in response to the PIRs? Check to see whether APR/PIR self-evaluation ratings were consistent with the MTR and TE findings. If not, were these discrepancies identified by the project steering committee and addressed?		
Compliance with the progress and financial reporting requirements/ schedule, including quality and timeliness of reports		
The value and effectiveness of the monitoring reports and evidence that these were discussed with stakeholders and project staff		
The extent to which development objectives are built into monitoring systems: How are perspectives of women and men involved and affected by the project monitored and assessed?		
How are relevant groups' (including women, indigenous peoples, children, elderly, disabled, and poor) involvement with the project and the impact on them monitored?		
Has there been adequate mitigation and management of environmental and social risks as identified through the UNDP Environmental and Social screening procedure?		
STAKEHOLDER ENGAGEMENT		
Are the interactions as per the prodoc? Stakeholder interactions include information dissemination, consultation, and active participation in the project.		
Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?		
Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?		
Participation and public awareness: How has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?		
Are there any limitations to stakeholder awareness of project outcomes or to stakeholder participation in project activities? Is there invested interest of stakeholders in the project's long-term success and sustainability?		
Reporting:		
How have adaptive management changes been reported by the Project Team and shared with the Project Board?		
How well have the Project Team and partners undertaken and fulfil UNDP reporting requirements (i.e. how have they addressed poorly-rated PIRs?), and suggest trainings etc. if needed?		
How have PIRs been shared with the Project Board and other key stakeholders?		
How have lessons derived from the adaptive management process been documented, shared with key partners and internalized by partners, and incorporated into project implementation?		
Communication:		
Internal project communication with stakeholders: Is communication regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and long-term investment in the sustainability of project results?		

Evaluation Question	Response / Finding	Conclusion/ Recommend
External project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)		
Are there possibilities for expansion of educational or awareness aspects of the project to solidify a communications program, with mention of proper funding for education and awareness activities? What aspects of the project might yield excellent communications material, if applicable?		
ADAPTIVE MANAGEMENT		
Changes in the environmental and development objectives of the project during implementation, why these changes were made and what was the approval process. Causes for adaptive management: a) original objectives were not sufficiently articulated; b) exogenous conditions changed, due to which a change in objectives was needed; c) project was restructured because original objectives were overambitious; d) project was restructured because of a lack of progress; e) Other (specify).		
How these changes were instigated and how these changes affected project results: - Did the project undergo significant changes as a result of recommendations from the MTR? Or as a result of other review procedures? Explain the process and implications. - If the changes were extensive, did they materially change the expected project outcomes? - Were the project changes articulated in writing and then considered and approved by the project steering committee?		
PROJECT RESULTS		
A 'result' is defined as a describable or measurable development change resulting from a cause-and-effect relationship. In UNDP terms, results include direct project outputs, short- to medium-term outcomes, and longer-term impact including global environmental benefits, replication effects, and other local effects. Assess the results based management (RBM) chain, from inputs to activities, to outputs, outcomes and impacts. Assess the project results using indicators and relevant tracking tools		
BROADER ASPECTS OF PROJECT OUTCOMES		
Country Ownership		
Project concept had its origin within the national sectoral and development plans?		
Have Outcomes (or potential outcomes) from the project have been incorporated into the national sectoral and development plans? Has the government enacted legislation and/or developed policies and regulations in line with the project's objectives?		
Relevant country representatives (e.g., governmental official, civil society, etc.) were actively involved in project identification, planning and/or implementation, part of steering committee?		
Was an intergovernmental committee given responsibility to liaise with the project team, recognizing that more than one ministry should be involved?		
The recipient government has maintained financial commitment to the project?		
Mainstreaming (Broader Development and Gender)		
Whether broader development and gender issues had been taken into account in project design and implementation?		
In what way has the project contributed to greater consideration of gender aspects, (i.e. project team composition, gender-related aspects of environmental impacts, stakeholder outreach to women's groups, etc). If so, indicate how.		
Did the MTR recommend improvements to the logframe with SMART 'development' indicators, including sex-disaggregated indicators and indicators that capture development benefits? - Were these taken up?		
1. Whether it is possible to identify and define positive or negative effects of the project on local populations (e.g. income generation/ job creation, improved natural resource management arrangements with local groups, improvement in policy frameworks for resource allocation and distribution, regeneration of natural resources for long term sustainability).		
2. If the project objectives conform to agreed priorities in the UNDP country programme document (CPD) and country programme action plan (CPAP).		
3. Whether there is evidence that the project outcomes have contributed to better preparations to cope with natural disasters.		
The mainstreaming assessment should take note of the points of convergence between UNDP environment-related and other development programming.		
Sustainability		
Risk Management		
Are the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Management Module the most important? And, are the risk ratings applied appropriate and up to date? If not, explain why.		

Evaluation Question	Response / Finding	Conclusion/ Recommend
Financial Risks to Sustainability (of the project outcomes)		
What is the likelihood of financial and economic resources not being available once the UNDP assistance ends? (This might include funding through government - in the form of direct subsidies, or tax incentives, it may involve support from other donors, and also the private sector. The analysis could also point to macroeconomic factors.)		
What opportunities for financial sustainability exist?		
What additional factors are needed to create an enabling environment for continued financing?		
Has there been the establishment of financial and economic instruments and mechanisms to ensure the ongoing flow of benefits once the UNDP assistance ends (i.e. from the public and private sectors, income generating activities, and market transformations to promote the project's objectives)?		
Socio-Economic Risks to Sustainability:		
Are there social or political risks that may threaten the sustainability of project outcomes?		
What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow?		
Is there sufficient public/ stakeholder awareness in support of the project's long-term objectives?		
Have lessons learned been documented by the Project Team on a continual basis?		
Are the project's successful aspects being transferred to appropriate parties, potential future beneficiaries, and others who could learn from the project and potentially replicate and/or scale it in the future?		
Institutional Framework and Governance Risks to Sustainability:		
Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize project benefits?		
Has the project put in place frameworks, policies, governance structures and processes that will create mechanisms for accountability, transparency, and technical knowledge transfer after the project's closure?		
How has the project developed appropriate institutional capacity (systems, structures, staff, expertise, etc.) that will be self-sufficient after the project closure date?		
How has the project identified and involved champions (i.e. individuals in government and civil society) who can promote sustainability of project outcomes?		
Has the project achieved stakeholders' (including government stakeholders') consensus regarding courses of action on project activities after the project's closure date?		
Does the project leadership have the ability to respond to future institutional and governance changes (i.e. foreseeable changes to local or national political leadership)? Can the project strategies effectively be incorporated/mainstreamed into future planning?		
Environmental Risks to Sustainability:		
Are there environmental factors that could undermine and reverse the project's outcomes and results, including factors that have been identified by project stakeholders? E.g. climate change risk to biodiversity		
Impact - Progress towards the achievement of impacts		
Verifiable improvements in ecological status (or via process indicators to show it is likely in the future)? Verifiable reductions in stress on ecological systems (via process indicators)? E.g. as a result of the project, there have been regulatory and policy changes at regional, national and/or local levels? (Use tracking tools and indications from baseline to target)		
Identify the mechanisms at work (i.e. the causal links to project outputs and outcomes);		
Assess the extent to which changes are taking place at scales commensurate to natural system boundaries; and		
Assess the likely permanence (long lasting nature) of the impacts.		
On the basis of the outcome and sustainability analyses, identify key missing elements as that are likely to obstruct further progress.		
<u>Theory of Change</u> – Identify project intended impacts – verify logic – analyse project outcome to impact pathway		
Based on the theory of change (building blocks, catalysts etc), has the progress towards impact has been significant, minimal or negligible.		
<u>Catalytic role</u>		
Scaling up - Approaches developed through the project are taken up on a regional / national scale, becoming widely accepted, and perhaps legally required		
Replication - Activities, demonstrations, and/or techniques are repeated within or outside the project, nationally or internationally		
Demonstration - Steps have been taken to catalyze the public good, for instance through the development of demonstration sites, successful information dissemination		

Evaluation Question	Response / Finding	Conclusion/ Recommend
and training		
Producing a public good – (a) Development of new technologies and approaches. (b) No significant actions were taken to build on this achievement, so the catalytic effect is left to ‘market forces’		

Annex 13: Signed UNDP Code of Conduct Agreement Form

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and: respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/ or oral presentation of study limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System

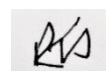
Name of Consultants: Adila Tadjibaeva, Richard Sobey

We confirm that we have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed 13th August 2021

Signed 13th August 2021

Adila Tadjibaeva
National Consultant / Team Specialist



Richard Sobey
International Consultant, Team Leader

Annex 14: Signed FE Final Report Clearance Form

Final Evaluation Report Reviewed and Cleared By:	
Commissioning Unit	
Name:	
Signature:	Date:
UNDP Regional Technical Advisor	
Name:	
Signature:	Date:

Annex 15: Terms of Reference

As the presented on the UNDP ERC webpage