



Food and Agriculture
Organization of the
United Nations



The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE

**Benefit-sharing Fund of the International Treaty on Plant Genetic
Resources for Food and Agriculture**

Project cycle 2014-2015

Window 2B

IMMEDIATE IMPACT PROJECTS

PR-41-Turkey

Fifth Results Report Instructions

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1. OVERVIEW

1.1 Project cover sheet

Project No. W2B-PR-41-Turkey

Project Title: Improving food security by enhancing wheat production and its resilience to climate change through maintaining the diversity of currently grown landraces

Project duration: 48 months

Start date: 16.12.2015

End date: 16.12.2019

Target crops: Wheat

Targeted developing country/ies: Afghanistan, Iran, Turkey

Other Contracting Party/ies involved: None

Project geographic extension (km²): ~35,000

Total requested funding: US\$785,400

Total co-funding received: US\$80,000

Total funding received from BSF: US\$471,240

Applicant institution

Name of applicant/lead institution: Alexey Morgunov, International Maize and Wheat Improvement Center (CIMMYT)

Type of organization: Non-government, non-profit, International Research Center

List of partnering institutions (subcontractors):

Name	Type	Total Funds Transferred
Bahri Dagdas International Agricultural Research Center (Turkey)	Government	25,146
Dryland Agricultural Research Center (Iran)	Government	61,041*
Agricultural Research Institute of Afghanistan	Government	46,355*

* - including funds spent by the project for specific country.

1.2 Executive summary

The main problem addressed by the project is vulnerability of the rural population in the face of the climate change resulting in unstable wheat production affecting the food security in the region of Central and West Asia. The project main objective is expansion of on-farm wheat diversity through introduction and promotion of improved wheat landraces, related capacity building of all stakeholders and establishment of community-based conservation systems. The project focuses on three countries where wheat plays very important role in food security and where wheat landraces are still cultivated: Afghanistan, Iran and Turkey. There are four essential elements of the project: a) Evaluation and selection of superior wheat landraces recently collected from the farmers; b) Crossing program to develop new germplasm using wheat landraces and technology transfer to breeding/research programs; c) Distribution of the seeds of improved landraces to the farming communities in the target provinces in three countries and promotion of on-farm wheat diversity; d) Training of all stakeholders on sustainable cultivation of wheat landraces and biodiversity maintenance. The project rationale is based on the assumption that wheat landraces selected and distributed by the project to the farmers are more superior and diverse compared to what they grow at present. They would be adopted and disperse to more farmers providing more stable yield and grain of good quality. This will enhance food security in the targeted regions. The project succeeded in meeting all the milestones and the outputs. More than 300 wheat landrace were selected and multiplied for promotion with the farmers. The crossing program resulted in the development of more than 100 segregating populations originating from wheat landraces. More than 650 farmers obtained the seeds of wheat landraces in two provinces of Afghanistan, two provinces of Iran and 12 provinces of Turkey. Gender group established by the project interviewed more than 300 farmers' wives. Training of all stakeholders involved more than 2,500 individuals. The number of direct project beneficiaries exceeded 1,250 while more than 21,500 benefitted from the project indirectly. Important project achievement is establishing of the formal and informal network on wheat landraces and on-farm diversity involving all stakeholders in each country and between the countries. The important lessons learnt: clear communication of the project objectives, activities and all details; well defined, written and signed sub-contracts with all organizations and individuals involved; fundamental importance of the Steering Committee and experienced outside consultants who can provide independent evaluation and valuable advises and suggestions; encouragement of cross-country visits on all levels: researchers, extension agents, policy-makers, farmers. Challenges: Afghanistan security situation is a constant constraint as CIMMYT staff is not allowed to travel; Iran sanctions from November 1, 2018 limit formal cooperation between Iran institutions and CIMMYT (the project asks the Treaty that the funds allocated to Iran are transferred through FAO office in Tehran); the movement of seeds across the borders is becoming increasingly difficult (the project needed one extra year to make an exchange of the landraces between the countries); due to cultural rules and traditions there are very few women farmers (the project established Gender Group to involve farmers wives into activities). Overall, the project meets all the commitments and will deliver all the planned outputs by the end of 2019.

2. EFFECTIVENESS

2.1. Attainment of planned outputs and methodology of implemented activities

The project outputs are delivered on time as described in the table below.

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Planned outputs/targets	Applied methodology	Quantity and Quality	Who	Where
Output 1: Drought and heat tolerant wheat landraces selected using on-station and on-farm trials and participatory approach.				
<p>Output 1.1. At least 35 currently grown wheat landraces documented, evaluated and characterized.</p> <p>Output 1.2. At least 30 wheat superior landraces selected for seed production and promotion with the farmers, characterized and deposited to the national gene banks.</p> <p>Output 1.3. At least 20 useful alleles for drought and heat tolerance, disease resistance and grain quality identified in landraces.</p> <p>Output 1.4. “Passport” and associated genomic and phenotypic information on wheat landraces systematized and disseminated to research communities.</p>	<p>Output 1.1. On-station replicated trials and on-farm trials.</p> <p>Output 1.2. On-station replicated trials, hot-spot disease locations, grain quality labs and on-farm trials.</p> <p>Output 1.3. Application of KASP functional markers on exchange set of landraces. Genome-wide association analysis.</p> <p>Output 1.4. Database establishment for the project exchange set using MS Excel software and GLIS-DOI assignment. Made available through the project web site.</p>	<p>Output 1.1. 550 landraces recently collected from farmers.</p> <p>Output 1.2. 300 landraces with superior agronomic performance.</p> <p>Output 1.3. Landraces exchange set (87 landraces from 3 countries) characterized for 50+ KASP markers.</p> <p>Output 1.4. Landraces exchange set (87 landraces from 3 countries) genomic and phenomic data systematized and placed on the web site.</p>	<p>Output 1.1. Researchers from partner institutions.</p> <p>Output 1.2. Researchers from partner institutions, farmers, extensionists.</p> <p>Output 1.3. Project staff. Genotyping outsourced to private company in UK.</p> <p>Output 1.4. Researchers from partner institutions. Project staff.</p>	<p>Output 1.1. AFG-Kabul, Balkh, Great. IRN-Maragheh, E.Azerbaijan, N. Khorasan.</p> <p>Output 1.2. TUR- Konya, 12 provinces</p> <p>Output 1.2. The same as 1.1.</p> <p>Output 1.3. The same as 1.1.</p> <p>Output 1.4. Ankara, Turkey</p>
Outputs 2: Wheat germplasm combining drought and heat tolerance with disease resistance developed through crosses and selection.				
<p>Output 2.1. At least 30 useful segregating populations developed and distributed to the breeding programs in the region.</p>	<p>Output 2.1. Classical crossing program with top- and back-crosses in F1 and selection of superior plants in F2-F3.</p>	<p>Output 2.1. 100 segregating populations combining tolerance to</p>	<p>Output 2.1. Researchers from partner institutions. Project staff.</p>	<p>Output 2.1. AFG-Kabul, IRN-Maragheh, TUR-Konya</p>

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<p>Output 2.2. At least 3 modern technologies for characterization and improvement of PGRFA introduced and disseminated in the region.</p>	<p>Output 2.2. Training courses and hands-on applications. Provision of training manuals and materials. Individual coaching.</p>	<p>abiotic and biotic stresses.</p> <p>Output 2.2. 1. Use of genomic tools. 2. Use of physiological tools. 3. Marker assisted gene transfer.</p>	<p>Output 2.2. Trainers from USA, Japan, Europe. Researchers from partner institutions. Project staff.</p>	<p>Output 2.2. AFG-Delhi, IRN-Tabriz, Maragheh, TUR-Konya, Ankara, Bolu. Bologna, Italy.</p>
<p>Output 3: Improved drought and heat tolerant landraces adopted by resource poor farmers in the targeted project regions.</p>				
<p>Output 3.1. At least 30 wheat landraces are subjected to seed production and promotion activities.</p> <p>Output 3.2. At least 3,000 subsistence farmers (10% women) will adopt improved wheat landraces and technologies.</p>	<p>Output 3.1. 1st year on-station, 2nd and 3rd years – on-farm trial/ multiplication.</p> <p>Output 3.2. On-farm trials and demonstrations, field days. Formal and informal meetings and training. Province and district workshops. Mother-baby trials.</p>	<p>Output 3.1. 300 landraces with superior agronomic performance.</p> <p>Output 3.2. Estimated 500 subsistence farmers in remote and mountainous communities adopted the landraces.</p>	<p>Output 3.1. Partners and project staff, universities, extension agents.</p> <p>Output 3.2. The same as 3.1.</p>	<p>Output 3.1. target provinces of the project: AFG-Balkh and Herat, IRN-E.Azerbaijan and N.Khorasan. TUR-12 provinces.</p> <p>Output 3.2. The same as 3.1.</p>
<p>Output 4. Farmers, extension services and local administration, policy-makers, NGOs and researchers trained on sustainable cultivation of wheat landraces and biodiversity maintenance.</p>				
<p>Output 4.1. Community conservation systems recognizing gender roles developed in all target countries and provinces.</p> <p>Output 4.2. Sustainable linkages developed between the farmers, researchers, extension</p>	<p>Output 4.1. Communication is the key methodology for this output. Identification of champion farmers is another important methodology. Commitment from the project is important.</p> <p>Output 4.2. Methodology of establishing sustainable linkages</p>	<p>Output 4.1. Community conservation systems are being established in 62 villages.</p> <p>Output 4.2. Sustainable linkages are being</p>	<p>Output 4.1. Farmers participating in the project activities, farmers wives, village elders, extensionists, researchers, project staff.</p> <p>Output 4.2. All stakeholders from the</p>	<p>Output 4.1. All target villages included in the project in all three countries.</p> <p>Output 4.2. Three project</p>

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services, NGO and policy makers; the national and international institutions.	between all the stakeholders is based on combination of workshops, visits, training events, application of social media and visibility activities.	established in three countries.	target countries, national and international institutions, universities in Europe and USA	countries: AFG, IRN, TUR.
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2.2. Activities not completed

The only activity, which is one year behind the schedule, is Output 1.3 Genome-Wide Association Mapping. It has been delayed to 2019 due to difficulties in exchange of the landraces between three countries and their multiplication to obtain enough seeds for replicated field trial. Now the trial has been planted in the fall of 2018 and the GWAS will be completed in 2019 within the project timeframe.

2.3. Project partnerships and stakeholders' involvement

The project partnership strategy is based on involvement of relevant strong national and international intuitions contributing to the outputs in a complementary manner through a consortium. The basis of the project is International Winter Wheat Improvement Program (Turkey-CIMMYT-ICARDA) with a long-term history of collaboration in all three participating countries (www.iwwip.org) and established operational framework in Turkey since 1986. The project is led by CIMMYT-Turkey (Dr. A. Morgunov), a non-government, non-profit international research organization established in Turkey in 1981. CIMMYT HQ in Mexico provide technical and administrative backstopping to implementation of this project. CIMMYT offices in Afghanistan (Dr. Rajiv Sharma) and Iran (Dr. Jalal Kamali) are partners of the project with excellent technical knowledge to contribute to the project. So far the IWWIP framework and CIMMYT network (Ankara-Kabul-Tehran) has worked very well for the project.

The lead partner from Afghanistan is Agricultural Research Institute of Afghanistan (ARIA) - the leading crop research institution in the country with the research staff of over 100. ARIA headquarters are located in Kabul and it has access to stations situated in 16 provinces. A number of young research staff went through training at CIMMYT-Mexico or undertook degree study in India, Pakistan and Japan. ARIA staff is very familiar with wheat growing environments in the country and has been involved in collection and evaluation of the landraces. The Director of ARIA Mr. Mohammad Qasem Obaidi serves as a Country Coordinator for this project. ARIA works in cooperation with CIMMYT-Afghanistan (Dr. R. Sharma).

The lead partner in Iran is Dryland Agricultural Research Institute (DARI) located in Maragheh, East Azerbaijan province. There are 57 researchers in DARI including 10 PhD. The institute has a network of 12 research stations in 7 provinces including project target provinces. The Cereals Department was an excellent collaborator in the project with high commitment and good technical expertise. DARI works in close cooperation with CIMMYT-Iran (Dr. Jalal Kamali) and other stakeholders.

The lead partner in Turkey is Bahri Dagdas International Agricultural Research Institute (BDIARI) situated in Konya - very representative of wheat production environments of Central Anatolian Plateau. The institute staff played a key role in landraces collection in 2009-2014. All 1400 wheat

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landraces collected in Turkey were planted and evaluated in Konya. The institute Director Dr. Fatih Özdemir is a Country Coordinator of the Project. The institute contribution to on-station activities and on-farm work in the target provinces has been tremendous so far.

The other important partner in Turkey is ICARDA (Dr. Mesut Keser) which was involved in wheat landraces activities from the very beginning and provided technical support to the lead partner especially in technical area.

In the course of the project implementation several additional and important partners were involved in the project in Turkey:

- Turkey
 - General Directorate of Policy and Agricultural research, Turkey - Steering Committee participation
 - FAO-SEC, Turkey office - Steering Committee participation
 - Hacettepe University (Ankara) – leader of the project gender activities.
 - East Anatolia Agric. Research Inst. (Erzurum) – landraces promotion in Erzurum Province
 - Aegean Agric. Research Inst. (Izmir) – landraces promotion in Manisa province
 - Artuklu University (Mardin) – landraces promotion in Mardin, Siirt and Sinal provinces
 - Aksaray University (Aksaray) – landraces promotion in Aksaray province.
 - Extension agencies in all provinces are directly involved with the farmers.
 - Siyez Evi – NGO promoting wheat landraces in Kastamonu province
- Iran
 - Agricultural Research and Extension Organization, Iran - Steering Committee participation
 - Seed and Plant Improvement Institute
 - East Azerbaijan Agricultural Research Center
 - Agricultural Jihad Organization of East Azarbaijan
 - Agricultural Jihad Organization of North Khorasan
 - West Azerbaijan Agricultural Research Center
 - Tabriz University
 - Mashhad University
 - Gorgan University
 - North Khorasan Agricultural Research center
 - Agricultural Jihad Organization of Horand
 - Agricultural Jihad Organization of Majid-Abad
- Afghanistan
 - Dehdadi Farm, Mazar
 - Balkh Provincial Extension Dept.
 - Urdu Khan Farm, Herat
 - Herat Provincial Extension Dept.
 - Badam Bagh Farm, Kabul
- External partners
 - University of California, Davis, USA – Calvin Qualset, consultant on participatory approaches and research component
 - Kihara Institute, Yokohama City University, Japan – Tomohiro Ban, consultant on genomic technologies
 - Norway Agricultural University – Asmund Bjornstad, Steering Committee participation

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The project implementation involves all the stakeholders in three project countries. Each country conducted the National Stakeholders workshop. The workshops recommendations are guiding for the project implementation. The stakeholders are also routinely consulted during the project implementation activities.

2.4. Contribution to the implementation of the International Treaty

The project contributed to implementation of the following Treaty articles:

5.1.a. Survey and inventory of wheat landraces in three countries – Afghanistan, Iran and Turkey. Though in Turkey the inventory was largely completed before the project, still during the project some survey and inventory activities continued. The same was done in two other countries.

5.1.c. On-farm management and conservation of wheat landraces – one of the key project components.

6.2.a. Diverse farming systems are maintained due to project activities promoting diverse wheat landraces with the farmers.

6.2.b. The project strengthens research to maximize biodiversity by promoting different wheat species and conducting intra and inter-species crosses to develop diverse varieties for the farmers.

6.2.c. Promotion of wheat breeding efforts with farmers participation for marginal areas. The crossing and selection program conducted within the project does apply this methodology.

6.2.d. The project contributes to broadening wheat genetic base by widely involving landrace sin the crossing programs.

6.2.e. Promotion of locally adapted wheat landraces is important activity of the project as well as underutilized crops such as rare wheat species Einkorn (Tr. monococcum), Tr. polonicum and Tr. turgidum ssp. turgidum landraces.

6.2.f. Wider use of diversity is promoted in the project through communication to all stakeholders including policy-makers.

7.2.a. Strengthen the developing countries capacity in PGRFA – the current project directly contributes to it.

7.2.b. The project contributes greatly to enhancement of international activities on wheat genetic resources – primarily landraces.

7.2.c. Cooperation between the project partners contributes to strengthening of institutional arrangements.

8. Technical assistance to developing countries is provided within this project through advanced institutions in the country and outside and by international centers.

9. By working directly with the farmers the project in promotion of on-farm diversity and expanding their knowledge the project contributes to implementation of the farmer's rights.

10, 11, 12. The landraces from three countries included the project have become part of MLS and available to all contracting parties.

13.2.a. Exchange of information. All the data generated during the project is made publicly available.

13.2.b. Access to and transfer of technology: the project output 2.2 specifically targets three technology to be transferred and adapted by the countries.

13.2.c. Capacity building is a key components of all project activities and covers wide range of stakeholders.

15.2. The wheat landraces from three countries included in the project will be transferred to the gene banks of ICARDA and CIMMYT, this, enriching their collection.

17. The wheat landraces from three countries included in the project have been registered with the GLIS and assigned DOIs.

3. RELEVANCE

3.1. Consistency of project objectives with local needs

Output 1: Drought and heat tolerant wheat landraces selected using on-station and on-farm trials and participatory approach.

The climate change is a reality in the region including Afghanistan, Iran and Turkey as presented in relevant government documents and numerous papers. The landraces are proven to withstand better extreme abiotic stresses. The surveys in three countries and field observations demonstrated that wheat landraces are still grown due to their resistance to drought, heat and end-use quality. For this matter this objective and respective activities serve the needs of the targeted population.

Outputs 2: Wheat germplasm combining drought and heat tolerance with disease resistance developed through crosses and selection.

Several recent paper published by CIMMYT-Turkey on wheat genetic gains in Turkey demonstrated that the breeding progress for dry rainfed conditions is much more slower compared to irrigated production. The recent volatility in wheat production in Turkey and Iran is largely caused by the severe moisture stress in April in May (2016). Formal and informal interviews with the farming communities, researchers and policy-makers undoubtedly demonstrates that there is lack of wheat varieties well adapted to drought and heat stresses. There is no doubt that this objective reflects the local needs.

Output 3: Improved drought and heat tolerant landraces adopted by resource poor farmers in the targeted project regions.

During the wheat landraces inventory in Turkey in 2009-2014 the survey and interviews were conducted with more than 1500 farmers in 60 provinces of Turkey covering very diverse sociological and environments landscape. The survey form had several questions of the farmers perception of what is needed to keep the wheat landraces diversity on-farm. More than 90% of the farmers were happy with the grain quality and more than 70% were satisfied with the drought and cold tolerance. It indicates the importance of these traits for landraces maintenance. Most of the respondents wanted to have new and clean seeds of the landraces. During the project implementation the farmers interest in wheat landraces was confirmed as all of them willingly took the seeds and started testing.

Output 4. Farmers, extension services and local administration, policy-makers, NGOs and researchers trained on sustainable cultivation of wheat landraces and biodiversity maintenance.

CIMMYT is present in Turkey since 1981 and in Iran and Afghanistan during the last 10-15 years. CIMMYT staff knows the situation very well through communication to all stakeholders and being part of national-international cooperative activities. Training has been identified as high priority for each of the countries. CIMMYT strength has always been in training of wheat researchers. In this project the training expanded to much wider audience and covering much wider agenda. Based on the training events conducted so far this objective and related activities are well justified and serve the target audience needs.

3.2. Beneficiaries

The main project partner institutions in three countries (listed in chapter 2.3 of this report) are the main institutional beneficiaries of the project. They benefitted being through project involvement which provided access to work with the farmers, communicate with the wide range of stakeholders, be trained on a range of topics and receive some necessary equipment and services.

The key project direct beneficiaries are the farmers who received the seeds of the landraces and relevant training as well as the researchers involved in the project activities. The project maintains a database of all direct beneficiaries and this information as of October 1, 2018 has been summarized in the table below:

Direct beneficiaries group	Key benefit	Total number	Including ladies
Policy makers	Understanding the importance of diversity	12	1
Researchers	Training, access to farmers, equipment	243	26
Farmers	Seeds of wheat landraces, inputs, training	638	15
Extension agents	Training, access to farmers, capacity	224	43
Industry/private sector	Knowledge, access to wheat grain/products	25	1
NGOs	Knowledge, access to farmers, seeds	16	2
Universities teachers	Knowledge, access to farmers, seeds	62	21
Total		1220	109

There is a large number of indirect beneficiaries of the project. These indirect beneficiaries represent three groups: 1) Farmers from the same villages where the project has activities. Since at least one farmer in the village obtained the wheat landraces seeds from the project and conducted on-farm trial and demonstrations – within 3-5 years the seeds of selected landraces will spread to all village. As of October 1, 2018 the number of such indirect beneficiaries is 9,130 in Turkey, 1,200 In Afghanistan and 6,700 in Iran. 2) Wide range of the stakeholders attending different project activities like field days, workshops, training, demonstrations, formal and informal meetings. Normally the participants receive the project flyers and/or promotional items. These indirect beneficiaries are likely to get in touch with the project and obtain the seeds or receive training or information. Some of them become direct beneficiaries. As of October 1, 2018 there were 1,440 such indirect beneficiaries in Turkey, 350 in Iran and 1,100 in Afghanistan. 3) When the project staff attends different workshops, conferences and meetings and makes presentations about the project – the audience also indirectly benefits from the project by gaining knowledge about PGRFA, wheat landrace and project activities. This knowledge may transform into projects and activities promoting biodiversity. As of October 1, 2018 there were 1,790 indirect beneficiaries of this group including 556 ladies. The overall number of indirect beneficiaries is 21,710.

3.3. Targeted PGRFA

The project has been working with bread wheat landraces currently collected from the farmers' fields in Afghanistan, Iran and Turkey. The landraces have been purified, improved through selection, multiplied and returned back to farmers. Wheat listed in the Annex 1 of the International Treaty. All 87 wheat landraces exchanged between three countries will be made available according to the terms and conditions of MLS including the data. Overall more than 300 bread and durum wheat landraces were included into project activities by making them available to the farming communities.

4. EFFICIENCY

4.1. Project management and administration

The overall implementation concept is based on cooperative and collective decision-making process, implementation teams, communication, involvement of all stakeholders, reporting and monitoring as reflected in the Figure below. The Steering Committee (SC) has been established (composed of 8 members and described in previous reports) and met two times. The SC reviews the project implementation and provide strategic recommendations for the activities and methodology. Some SC members annually participate in the project activities and know it very well.



The project management team has been assembled and presented in the table below. The management system works very well and there is excellent communication among the members. Annually, each country conducts the reporting and planning meeting in September to summarize the results and plan activities. Annually, there is a monitoring visit in each country involving other countries staff and outside consultants. Three project co-leaders meet regularly on a monthly or bi-monthly basis to access the project implementation and adjust the plans. Normally, the communication goes from the project leader to the project country coordinator with a copy to respective CIMMYT colleagues for technical or administrative support if needed. There is only one full time project staff (young Master degree level individual) whose main task is coordination, monitoring and data collection.

Position	Name	Location	Institution	Responsibility
Leader	Alex Morgunov	Turkey	CIMMYT	Overall project leadership and coordination
Co-Leader, Turkey Coordinator	Fatih Ozdemir	Turkey	BDIARI	Communication. Turkey technical implementation
Co-Leader	Mesut Keser	Turkey	ICARDA	Technical support
Financial Officer	Bahar Erdemel	Turkey	CIMMYT	Sub-contracts, financial disbursement and audit
Training/Monitoring Officer*	Emrah Koc	Turkey	CIMMYT	Coordination of all technical activities, monitoring, data collection.
Consultant	Calvin Qualset	USA	UC-Davis	Consultation on technical issues
Technology Coordinator	Tomohiro Ban	Japan	KIBR	Genomic technology application and transfer
Afghanistan Coordinator	M. Qasem Obaidi	Afghanistan	ARIA	Afghanistan technical implementation
Afghanistan Int. Expert	Rajiv Sharma	Afghanistan	CIMMYT	Afghanistan consultation and monitoring
Iran Coordinator	Saber Golkari	Iran	DARI	Iran technical implementation
Iran Int. Expert	Jalal Kamali	Iran	CIMMYT	Iran consultation and monitoring

* - Full time project staff based at CIMMYT-Turkey.

The Country Teams are composed of the Country Project Coordinator from the lead partner research institutes, a representative from CIMMYT, Leaders of On-Station Research and Leaders of Provincial

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Teams. These Leaders are normally researchers from the partner institutes part-time supported by the project during the season (6 months April-September). The provincial level teams comprise of the Province Leaders and extension agents and/or local administration from the target provinces. They work directly with the farmers on all aspects of project implementation including on-farms trial, seed production, field days, and training and promotion campaigns. KIBR-Japan Consultant (Tomohiro Ban) is responsible for consulting on genotyping and application of genomic tools. UC-Davis Consultant (Calvin Qualset) visits the project annually and provides essential technical input. Overall the management structure works well and very efficient.

4.2. Co-financing

Total project co-funding committed by the partners is US\$100,000. This co-funding includes the following expenses:

- CIMMYT-Turkey staff time, use of office equipment and cars: US\$15,000 per year. So far contributed to the project.
- Bahri Dagdas International Agric. Research Institute (Turkey): staff time, field machinery and seed processing facility use: US\$5,000. So far contributed to the project.
- Dryland Agric. Research Institute (Iran): staff time, field machinery and seed processing facility use: US\$2,500 per year. So far contributed to the project.
- Agricultural Research Institute of Afghanistan: staff time, field machinery and seed processing facility use: US\$2,500 per year. So far contributed to the project.

The co-funding by the partners demonstrated the commitment and reduced the costs of the operations, this, making possible to deliver more from the funds provided by the Treaty.

5. BENEFITS AND IMPACT

5.1. General perceived benefits and impact

The main benefits arising from the project implementation for different stakeholders are the following:

- Farmers and farming communities benefit from utilization of improved wheat landraces through maintaining their on-farm wheat diversity making production more resilient to climate fluctuation leading to improved food security and good traditional wheat products.
- Researchers' main benefit is their improved capacity to apply new research/breeding technologies, utilization of participatory methods in selections, direct work and contact with the extension and farming communities.
- Policy makers will acquire the knowledge on the importance of biodiversity in general and on-farm wheat diversity including the traditional wheat landraces. This will help them in making balanced decisions and recommendations promoting the Treaty implementation.
- Extension agents improve their capacity and knowledge on on-farm diversity and will be better connected to farmers and researchers/universities.
- Industry/private sector has the possibility of sourcing the grain needed for special wheat products and establish a value chain to production as well as offer its products and services to the other stakeholders involved.
- NGOs benefit by expanding their knowledge and partnerships to the stakeholders interested in similar agenda: support to subsistence farmers, ecological approaches, healthy food consideration, etc.
- Universities teachers gain from improved capacity to work on wheat diversity, connection to researchers, extension agents and farmers which will lead to transfer of this knowledge and capacity to their students.

5.2. Scientific impact (selection, characterization, evaluation, breeding, crossing, technology development and transfer etc.)

The project scientific impact is very substantial across all three countries and can be summarized as following:

- Phenotypic and genotypic characterization of the exchange set of wheat landraces from three countries (87 entries). This data will be extremely useful for their utilization by the project and by MLS.
- Identification of superior wheat landraces for specific traits: high grain yield under drought, resistance to diseases, grain quality, straw traits, etc.
- Relative performance of wheat landraces under irrigated and rainfed conditions – unique data since normally the landraces are not studied under irrigation.
- Genetic diversity of wheat landraces based on neutral KASP markers.
- Effect of functional KASP markers on expression of agronomic traits in wheat landraces.
- Utilization of NDVI and other physiological tools in wheat germplasm evaluation and selection.
- On-station and on-farm wheat landraces performance.
- Farmers' preferences in selection of wheat landraces in on-farm trials.
- Role of rural women in maintaining on-farm wheat diversity.
- Development of new germplasm through crosses between the landraces and between the landraces and modern varieties.
- Application of markers assisted selection into wheat breeding programs.

Several scientific papers will be prepared based on the project results.

5.3. Economic impact

The short-term economic impact of farmers communities is difficult to estimate due to two reasons: a) Most of the farmers are subsistence farmers with limited involvement in marketing their products, this, economic impact is largely on-farm and difficult to measure. b) The project timeframe of four years does not allow confident estimates of the economic impact which normally happens within 5-10 years after the activities started.

The long-term economic impact will be based on expansion of wheat landraces distributed by the project and generally making wheat landraces cultivation a mainstream for production in some provinces and regions. Cultivation of Einkorn in Kastamonu province is one example. Other long-term impact will come from utilization of wheat landraces in development of new wheat varieties. They will acquire better drought and heat tolerance and will result in higher productivity on national levels. However, this impact will be happening 12-17 years from the project activities.

5.4. Food security and nutrition impact

The food security and nutritional impact is difficult to access without a special study. The project does not plan such study as it requires substantial resources. However, even undocumented, the farmers and farming communities will improve their food security as they benefit from superior wheat landraces and their on-farm diversity. There is growing evidence that wheat products from the landraces have significantly better effect of human health. From this perspective, the farmers involved in the project will certainly benefit.

5.5. Capacity building and empowerment

The project training/capacity building activities were integrated in all project meetings, formal and informal discussions as well as formal training courses. They can be summarized as following:

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- Workshops targeting all the stakeholders on national, regional and provincial levels. Total attendees: 821 including 113 ladies.
- Field days primarily targeting the farmers: Total attendees 1820 including 169 ladies.
- Formal and informal group meetings, training and discussions primarily targeting the farmers: Total attendees 1012 including 525 ladies.

Overall training was provided to 3,653 including 807 women. All the events provided essential information, knowledge and skills to enable the stakeholders improve relevant capacities.

5.6. Adaptation to climate change and environmental sustainability

The project activities contributed to protection and rehabilitation of wheat landraces and their sustainable use in the target provinces in three countries. By provision of wheat landraces seeds and their wide promotion the project contributes to establishment of more sustainable cropping practices due to the fact that wheat landraces much more tolerant to abiotic stresses including drought and heat. Wide cultivation of diverse wheat landraces sometimes in combination with modern varieties represent an important mitigation and adaptation strategy in the face of climate change. Stable production of wheat grain with good quality through cultivation of diverse landraces allows the target communities better cope with the climate change challenges.

5.7. Gender equality

The project undertook special efforts and measures to ensure that the needs and interests of women are incorporated in the project both at planning and implementation stage:

- The women were specially invited to participate in the stakeholders workshops, formal and informal discussions.
- The country and provincial teams have been trained in gender diversity and gender sensitive attitude in project activities planning and implementation.
- The Gender Group has been established under the leadership of Dr. Elif Aksoy, Anthropologist from Hacettepe University in Ankara, Turkey. The group main objective is survey and interviews with farmers wives in the project target villages. In 2018 more than 100 rural women were involved in this survey in Turkey only. Similar activities are being conducted by designated and trained women in Iran and Afghanistan. The survey targeted two main objectives: understand the role women play in the on-farm wheat diversity; secondly, promote and encourage the project ideas. All women surveyed received special promotional useful items like bags. This group will continue working in 2019. The special knowledge and suggestions gained during these interviews are incorporated in the project plan and activities.
- The share of women among direct beneficiaries varies depending on the group as reflected in the table in section 3.2. Overall, 109 ladies are among the beneficiaries with the highest share among the extension agents – approaching 20%.
- Overall more than 1000 women attended different project activities.
- Due to very active project Group and substantial amount of work conducted already, the project plans a workshop in 2019 to address the role of women in crop diversity.

6. SUSTAINABILITY

6.1. Project sustainability

The key issue contributing to sustainability of the project activities is the benefit the target groups and usefulness of the project activities coupled with the capacities to continue the work. In this respect, there are differences depending on the activities and the outputs summarized in the table below.

Project activities/outputs	Sustainability estimate	Financial capacity	Human capacity	Institutional capacity	Justification
Development of new wheat germplasm utilizing wheat landraces	Very high	+	+	+	Wheat breeding is an essential on-going activity supported by the countries and/or done by private companies.
Technology transfer to breeding and research programs	High	+ -	+	+	Some technologies like genotyping require funds which can be generated by national and international projects
Wheat PGRFA GLIS documentation	Very high	+	+	+	With the training this activity requires very little funding if any.
Seeds provision of wheat landraces added to MLS	Very high	+	+	+	The seeds will be multiplied and be available for requests by the contracting parties. The shipments costs are low.
Farmers utilization of wheat landraces	Very high	+	+	+	Once the farmers learn the benefits of the landraces – they will continue using them.
Linkages researchers-extension-farmers	High	+ -	+	+	Once established, these linkages are beneficial for all, but funds are needed for travel to be provided by local sources.
Community conservation systems	Very high	+	+	+	The communities are stable entities and once the on-farm diversity concept is accepted – it will stay.
Gender Group activities	High	+ -	+	+	People are trained in each country and willing to work. The funds are needed through national projects.
Out-scaling the activities to other regions and crops	High	+ -	+	+	Turkey already discusses the follow up project to address a wide area through government funding. Other countries may follow.

Overall most of the project activities have high or very high sustainability perspective.

6.2. Country ownership/synergies

Afghanistan, Iran and Turkey are all parties to Convention on Biological Diversity. All three countries are contracting parties of International Treaty on PGRFA, thus, committing to the Multilateral System. The Near East and North Africa Strategy on Conservation and Sustainable Use of PGR has specific reference to in-situ conservation of landraces for the benefit of poor and climate change mitigation (Anonymous, 2011). Afghanistan and Turkey published Country Reports on the State of PGRFA which make linkages between PGRFA and food security. All three target countries developed strategies for reaching the Millennium Development Goals and have made good progress towards its implementation. The current project contributed to all the national action plans related to poverty alleviation, food security, biodiversity and PGRFA. The project works in collaboration with the International Treaty Focal Points in each country and relevant state agencies to assure that planning and implementation is well coordinated with other efforts in this area. All three countries really own this project because the responsible people in the government are aware and are part of the Steering Committee. The other important project ownership comes from the researchers and the farming

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community who are highly interested in the results and continuation. Their view is expressed through visibility activities including the social media. They also lobby through relevant channels.

The project contributes to the following MDG:

1. Higher and stable wheat grain yields with good quality contribute to elimination of poverty.
3. Gender focused project planning and implementation, activities of the Gender Group contribute to equality and empowerment.
7. On-farm diversity promoted by the project contributes environmental sustainability.

6.3. Innovation, scaling up and replicability

Overall, the project concept of collecting wheat landraces from the farmers, improving them through evaluation and selection and returning back to farmers is highly innovative and not practiced much. This innovative approach assist the farmers with the food security and the climate change mitigation. It has already proved successful since the dominating majority of the farmers found superior landraces which they keep, multiply and utilize. This project can certainly play a catalytic role for other regions and crops. When the project makes presentations on international conferences and forums this concept interests people and they always come with many questions and comments. As the project results and outcomes are made wider known, there will be interest from the governments, donors and private sector to replicate it in other areas and crops.

The concept of wheat landraces cultivation in some specific areas and for some products is also innovative. When the project was formulated in 2015 – this concept was not common. Now the 1st International Wheat Landraces Conference in Italy in June, 2018 demonstrated that cultivation of wheal landraces or ancient varieties of different species is becoming very popular in Europe and USA. There is a great interest in this area especially coupled with organic agriculture. There is a boom of interest to wheat products from the landraces and Einkorn in Turkey. Partly, this project contributes to this huge interest. It will develop in the future and is driven by the value chain. There is a likelihood that Turkey and may be other countries will become major wheat landraces producers for their own consumption and for export to the growing markets in Europe and USA.

The crossing/breeding program to improve the landraces through incorporation of important genes related to disease resistance and other traits is also very innovative and so far has not been utilized in wheat. The results of this work are still to come in several years and once the success is demonstrated – it can be replicated elsewhere. At the same time, when this concept is presented at the workshops and conferences – many people start thinking and it has already made an impact for some researchers and breeders how to approach the alternative breeding scenarios.

6.4. Exit strategy and follow up activities

The current BSF project timeframe was sufficient to ensure sustainability. The institutional and human capacity has been improved to continue for the post-project period. There is also high motivation from the project staff and partners to continue beyond 2019 when the project finishes. The key elements of the exit strategy are: 1) Ensure that the positive results of the project are widely disseminated nationally and internationally; 2) For each country prepare the vision and roadmap document for the continuation of the important activities and adding new agenda in the view of developing a new project for the government or donors funding; 3) continue the operation of the web sites, formal and informal networks, communities and communications beyond the project.

7. METHODOLOGY OF THE FINAL REPORTING

7.1. Monitoring of project performance and data collection methods

The data collection and monitoring of different project activities was conducted in different manner depending on the nature of the activities.

- On-station research activities. The data collection was made using routine breeding system methodology and the data entered into Excel files. The monitoring was mostly conducted by the Country Coordinator and respective CIMMYT staff in the country. The project leader visited all research sites/activities in Turkey and Iran on a regular basis.
- On-farm activities. The data was collected following the uniform template for on-farm trials and demonstration. The Province Leaders were responsible for collecting all the information and submission the forms to the Monitoring Officer. He, in turn, had the task of visiting all the on-farm trials at least one time. Normally, he followed very closely all on-farm activities and reported the problems to the Country Coordinator or the Project Leader.
- Gender Group activities. The data was collected following the informal individual and group interviews and then later entered into the database. The Monitoring Officer was part of the group and provided logistics during all the surveys.
- All activities. Annually, during the wheat season the evaluation and monitoring group (Project Leader, countries representatives, SC members, consultants, invited scientists) visited selected sites in Iran and Turkey, listened to presentations and discussed the results and plans.
- All activities. In September either regional or country reporting and planning meetings take place with group leaders (province level, gender, research) making presentations/reports followed by discussion of the results and future activities.

So far the system has worked very well.

At CIMMYT the project is housed at Global Wheat Program (GWP) Therefore, the GWP has the responsibility for the technical content, activities and outputs. Project Leader (A. Morgunov) has been working with CIMMYT for the last 27 years and has the level of Principal Scientist. He reports directly to the GWP Director H.-J. Braun. The project was supported by GWP at the preparation stage and it is high priority for CIMMYT. The Project Leader informs the GWP Director and consults with him on the project implementation. All technical reports are first cleared by the GWP before submission to CIMMYT Project Management Unit (PMU). GWP Director visited field activities in Turkey in 2016 and 2018 and made evaluation of the work, which was very positive.

Head of CIMMYT Gene Bank (T.S. Payne) is a member of the project SC and visits Turkey annually for the meetings, evaluation and monitoring activities. He also provides valuable technical support. Normally, he informs the GWP Director about the progress after his visits to the project.

The financial monitoring is conducted in two stages: a) GWP Financial Officer monthly follows all the project expenditures and asks questions, makes suggestions and corrections to the project Financial Officer at CIMMYT Ankara office (Bahar Erdemel); b) CIMMYT Finance Department checks again all transactions and they are posted in the system after their clearance. CIMMYT PMU keeps track of all the necessary paperwork, project reporting schedule and communicates to the Treaty on behalf of CIMMYT.

7.2. Challenges and major issues identified in conducting project monitoring

The main constraint in the project monitoring is inability of CIMMYT staff to visit Afghanistan due to security issues and institutional restrictions. Therefore, the project relies on CIMMYT local staff in Kabul and other provinces to conduct the monitoring.

8. BEST PRACTICES AND SUCCESS STORIES

The success stories are presented in Annex 1.

9. LESSONS LEARNED AND CONCLUSIONS

The good practices and lessons learnt:

- Importance of clear communication of the project objectives, activities and all details. In a few cases people involved in the project were not well aware about the project vision and strategy. Very important.
- Clearly defined, written and signed sub-contracts with all organizations and individuals involved. The sub-contracts have to be complimented by realistic work plans and deliverables. This system makes implementation and monitoring very easy and efficient.
- As a Project Leader, do not hesitate to contact and visit all stakeholders. Listen and learn, make conclusions and adjustment to project activities.
- Fundamental importance of the SC and experienced outside consultants who can provide independent evaluation and valuable advises and suggestions.
- Encourage as much as possible cross-country visits on all levels: researchers, extension agents, policy-makers, farmers.
- Stay away from any political issues.

The impediments and constraints:

- The provincial leaders have full time job with research institutes or universities. Therefore, the time they can devote to project activities is limited. We communicate that that they can use the weekends and we write letters from the project if needed.
- Afghanistan security situation is a constant constraint. CIMMYT staff is not allowed to travel. Even the stakeholders workshop was conducted in India and the respective cost increased substantially.
- Iran sanctions from November 1, 2018 limit formal cooperation between Iran institutions and CIMMYT. There is no possibility to transfer funds. The project asks the Treaty that the funds allocated to Iran are transferred through FAO office in Tehran.
- The movement of seeds across the borders is becoming increasingly difficult. For this reason the project needed one extra year to make an exchange of the landraces between the three countries. Seed shipments require advanced preparation following all the formal seed movement requirements.
- The structure of the farming communities in all three countries is such that due to cultural rules and traditions there are very few if any women farmers. Especially in Iran and Afghanistan. The project tries to involve women farmers but they are simply not there in the farming communities. For this reason the project has Gender Group working directly with the farmers wives to compensate the lack of work with women farmers. In fact, the establishment of the gender Group was unintended activity but highly successful.

10. PLAN FOR INCLUSION OF MATERIAL IN MLS AND MAKING INFORMATION PUBLICLY AVAILABLE

10.1. The Governing Body of the International Treaty decided, at its Third Session, that plant genetic resources for food and agriculture listed in Annex 1 of the International Treaty resulting from projects funded by the Benefit-sharing Fund shall be made available according to the terms and conditions of the Multilateral System, and information generated by projects funded through the Benefit-sharing Fund shall be made publicly available within 1 year of the completion of the project. These requirements are reflected in the general provisions (m) and (n) of the Letter of Agreement signed with your institution

The project clearly realizes this important provision.

10.2. Provide details on the plan you will implement for the inclusion of plant genetic resources for food and agriculture listed in Annex 1 of the ITPGRFA that may result from the project into the Multilateral System. You could consider the following options:

- *Include the accessions in your institution's genebank*
- *Include the accessions in a national genebank*
- *Include the accessions in a genebank of the CGIAR centres*

There are 87 wheat landraces in the exchange set which are now available in all three countries. These landraces were registered with the GLIS and provided DOI. They will be deposited to the national Gene Banks in each country as well as to CIMMYT and ICARDA Gene banks. They will also be made publicly available through MLS.

10.3. Provide details on the plan you will implement to make information generated by the project publicly available.

The agronomic and genomic data for the exchange set is available through the project web site: www.wheatlandraces.org. This is an excel file which is being updated when new data/information becomes available.

11. COMMUNICATION AND VISIBILITY

The summary of selected visibility activities are presented in Annex 2.

12. SIGNATURE

Alexey Morgunov, Project Leader, CIMMYT-Turkey



.....

Contact person (Name, position)

.....

Author of this report (name and position).

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This report must be signed by: i) the contact person; and ii) the responsible designated for monitoring the project as per information provided in the Project Proposal Form.

Explicatory note: Please indicate the name and the position of the person who is signing. Any variation with the information provided in the Project Proposal Form should be reported to the Secretariat of the IT-PGRFA.

Annex 1: Logical Framework

Project title: Improving food security by enhancing wheat production and its resilience to climate change through maintaining the diversity of currently grown landraces				
	Intervention logic	Indicators/targets	Sources and means of verification	Assumptions
Impact	<p>To contribute to the achievement of Millennium Development Goals 1 and 7:</p> <ul style="list-style-type: none"> • <i>To eradicate extreme poverty and hunger</i> • <i>Ensure environmental sustainability</i> 			
Outcome	<p>To improve adaptation to climate change and enhance the food security of resource-poor farmers in selected developing countries, by strengthening the sustainable management of plant genetic resources for food and agriculture (PGRFA).</p>			
Output 1	<p>Drought and heat tolerant wheat landraces selected using on-station and on-farm trials and participatory approach.</p>	<p>In total at least 30 wheat landraces improved. Increase in grain yield of selected landraces under drought (10-20% compared to bulks or check varieties) and limited kernel weight reduction under high temperature (<5%).</p>	<p>On-station and on-farm data from the yield trials recorded and made available.</p>	<p>There is genetic variation amongst (and within) landraces for drought and heat tolerance that is amenable to selection. There is capacity for field experiments.</p>

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Output 2	Wheat germplasm combining drought and heat tolerance with disease resistance developed through crosses and selection.	At least 30 F2 segregating populations of simple crosses (landrace x landraces, landraces x modern varieties) and BC1F1 combining drought and heat tolerance with resistance to yellow rust, common bunt, leaf and stem rust delivered to breeding programs in the target countries.	The seed of F1 and back-cross or top-cross generations from the crosses of landraces with the resistance sources. Field observations and accounts of the breeding programs receiving the germplasm.	Most landraces are susceptible to diseases and resistance shall be incorporated by crosses. There is capacity for crossing program and selection.
Output 3	Improved drought and heat tolerant landraces adopted by resource poor farmers in the targeted project regions.	At least 30 improved wheat landraces identified through participatory approach multiplied in the farming communities and the seed delivered to at least 3000 farmers. Field days and training conducted on landrace maintenance, on-farm seed production and agronomy to assure adoption of new landraces and cropping practices and yield increase.	Area under new improved landraces. Amount of seed of improved landraces distributed to farmers. Farmer's wheat yield. Verification through project documentation survey and data collection.	Farmer's wheat productivity can be improved by introduction of improved landraces, better seeds and agronomy.
Output 4	Farmers, extension services and local administration, policy-makers, NGOs and researchers trained on sustainable cultivation of wheat landraces and biodiversity maintenance.	All the project participants take part in different formal training activities including workshop (at least 32), lectures (at least 100), field activities and field days (at least 300), conferences (at least 3). Informal communication and individual training will also take place and is important.	Number of different training activities and stakeholders trained during the project verified through the project documentation (e.g. lists of participants).	There is a scope for capacity development for sustainable use of PGRFA for food security and climate change mitigation. All resources for training available.

ANNEX 2: MONITORING QUESTIONNAIRE

Assessing performance in project implementation Monitoring Questionnaire

Section A: Project Overview

1. Letter of Agreement number: W2B-PR41-Turkey

2. Implementing institution (name): International Maize and Wheat Improvement Centre (CIMMYT)

3. Type of the implementing institution:

- | | |
|---|---|
| <input type="checkbox"/> Governmental organization | <input type="checkbox"/> National non-governmental organization (NGO) |
| <input type="checkbox"/> National research institute | <input checked="" type="checkbox"/> International non-governmental organization |
| <input type="checkbox"/> International research institute | <input type="checkbox"/> Gene bank |
| <input type="checkbox"/> University | <input type="checkbox"/> Other |

4. Target country/ies: Afghanistan, Iran, Turkey

Indicate the importance of the targeted countries for genetic diversity:

- Unknown Low Medium High

5. If applicable, indicate which of the below biotic and abiotic stresses the project is addressing?

- Drought Heat Pests/diseases (Rust, bunt) Floods Other (specify)

6. Target crop/s: Wheat

7. Indicate the importance of target crops for:

Income generation Unknown Low Medium High

Food security Unknown Low Medium High

Resilience Unknown Low Medium High

Adaptation Unknown Low Medium High

8. Indicate the districts/villages covered by the project activities and their extension in (km²): ~35,000

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9. Rank the level of vulnerability of the targeted areas / regions involved with respect to:

- | | | | |
|--------------------|------------------------------|---------------------------------|--|
| 1. Food insecurity | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input checked="" type="checkbox"/> High |
| 2. Poverty | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input checked="" type="checkbox"/> High |
| 3. Climate shocks | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input checked="" type="checkbox"/> High |
| 4. Genetic erosion | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input checked="" type="checkbox"/> High |

10. Indicate who are the partners involved in the implementation of this project and specify:

Name of the partnering institution	Type of the institution ¹	Areas of collaboration
Bahri Dagdas International Agricultural Research Inst.	National research institute	Project implementation in Turkey overall, Konya, Karaman, Tokat and Malatya provinces
ICARDA-Turkey	CGIAR center	Project implementation in Turkey and Iran: technical support and monitoring
Artuklu University	University	Project implementation in Mardin, Siirt and Sirnak provinces, Turkey
East Anatolia Agric. Res. Inst.	National research institute	Project implementation in Erzurum province, Turkey
Aegean Agric. Res. Inst.	National research institute	Project implementation in Manis province, Turkey
Aksaray University	University	Project implementation in Aksaray province, Turkey
Nigde Province Extension Service	Governmental organization	Project implementation in Nigde province, Turkey
Bilecik NGO	NGO	Project implementation in Bilecik province, Turkey
Dryland Agric. Research Inst.	National research institute	Project implementation in Iran
CIMMYT-Iran	CGIAR center	Project implementation in Iran
Afghanistan Research Institute of Agriculture	National research institute	Project implementation in Afghanistan
CIMMYT-Afghanistan	CGIAR center	Project implementation in Afghanistan
University of California, Davis, USA	University	Consultancy on project implementation and participatory approaches
Yokohama City University	University	Application of modern research tools
FAO-Turkey office	International Organization	Steering Committee participation
Norway Agricultural University	University	Steering Committee participation
General Directorate of Agric. Research, Turkey	National research organization	Steering Committee participation

¹ For example: Governmental organization, national research institute, international research institute, university, national non-governmental organization (NGO), international non-governmental organization, gene bank etc.

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Agriculture Research and Extension Organization, Iran	National research organization	Steering Committee participation
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11. Indicate the number and socio economic status of the direct² beneficiaries of this project by filling in the table below:

Number of direct beneficiaries reached	Status of direct beneficiaries ³	Share of women (%)	How did they benefit?
12	Policy makers	8.3	Understanding the importance of diversity
243	Researchers	10.7	Training, access to farmers, equipment
638	Farmers	2.4	Seeds of wheat landraces, inputs, training
224	Extension agents	19.2	Training, access to farmers, capacity
25	Industry/private sector	4.0	Knowledge, access to wheat grain/products
16	NGOs	12.5	Knowledge, access to farmers, seeds
62	Universities teachers	33.9	Knowledge, access to farmers, seeds
1220	Total	8.9	

12. Indicate which of the following criteria have been used in selecting project beneficiaries:

X Poverty level	X Knowledge in farming the targeted varieties	X Geographic distribution
X Vulnerability to climate change	X Potential multiplier effect	X Other(specify) Security in the area
X Vulnerability to food insecurity	X Gender balance	

13. Indicate the estimated number of the beneficiaries that will indirectly benefit from this project by filling in the table below:

² Direct beneficiaries can be defined as those who are participating directly in the project, and thus benefit from its activities (e.g. access to seeds, training, orientation sessions, workshops, field activities etc.).

³ Beneficiaries' status may include: farmers, plant breeders, national gene banks managers and their staff, community/grassroots organizations members, government officials (Ministry of Agriculture, Ministry of Environment) etc.

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Number of indirect beneficiaries	Status of beneficiaries	Share of women (%)	How will they benefit?
3,885	All stakeholders attending the project events.	28.9	Capacity building through training courses, workshops, formal and informal discussions.
17,030	Farmers in the villages where the project is active	5-10%	Potential access to seeds, information, knowledge, training, promotional items, connection to extension and researchers.
1,755	Researchers attending international conferences and workshop	31.7	Knowledge and information about the project, concept of on-farm wheat landraces and diversity.

14. Did your organization undertake any surveys/vulnerability assessments of the needs and challenges faced by the target population? Yes, in 2009-2014 and 2018 No

15. If yes to Q 14, please provide details by filling the table below:

Total number of people surveyed	Categories of surveyed people (farmers, students etc)	Share of women (%)	Problems identified	Coping strategies	Possible solutions
1000	Farmers	5	Wheat landraces erosion, negative effect of climate change, wheat production as key for food security	Develop more resilient diverse cropping systems.	The main activities of this project address the identified problems.
450	Rural women	100	Diminishing on-farm wheat diversity		Survey/training of farmers wives and promotion of on-farm diversity of wheat landraces through provision of seeds and technologies

16. If yes to Q 14, please explain how the results of the vulnerability and needs assessments have been incorporated in project design and implementation?

During the wheat landraces inventory in Turkey in 2009-2014 the survey and interviews were conducted with more than 1500 farmers in 60 provinces of Turkey covering very diverse sociological and environments landscape. The survey form had several questions of the farmers perception of what is needed to keep the wheat landraces diversity on-farm. More than 90% of the farmers were happy with the grain quality and more than 70% were satisfied with the drought and cold tolerance. It indicates the importance of these traits for landraces maintenance. Most of the respondents wanted to have new and clean seeds of the landraces. During the project implementation the farmers interest in wheat landraces was confirmed as all of them willingly took the seeds and started testing.

Section B: Targeted PGRFA and field activities

17. Has the project used/addressed local varieties? If yes, which ones?

The project used recently collected wheat landraces from the three countries.

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18. Did the project use any pre-breeding material? If yes, can you please indicate how you accessed and used it?

No.

19. Did your project contribute to safeguarding or managing any crop wild relatives? If so, of which species?

No.

20. Has your project addressed or reintroduced any underutilized crop? If yes, of which crops?

No.

21. Is the executing institution of the project undertaking any activity for crop improvement? X YES NO

22. If yes to Q 21, please specify below:

22.1. Traits/characteristics addressed:

Grain yield stability, drought and heat tolerance, disease resistance, end-use quality.

22.2. Number of new/improved varieties developed : 0

23. Have the new varieties been distributed to farmers YES x NO

24. If yes to Q 23, specify how many varieties and of which crop

25. Is the project re-introducing lost varieties? If yes, of which crops?

No.

26. If yes to Q 25, indicate the source for the reintroduction of lost varieties (e.g. community seed banks, national genebank, regional or international genebank etc).

27. Is the project establishing community seed banks?

No.

28. If yes to Q27, how many community seed banks have been established and which varieties are stored within?

29. Indicate any collection mission related to PGRFA conducted by your organization, providing details on:

29.1. Name of Crop/s collected:

29.2. Number of collected accessions

29.3. Indicate whether the collected accession have been stored in

Community/farmers genebank Local genebank National genebank International genebank International research center

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30. If evaluation and characterization activities occurred, please detail the importance of the following criteria in evaluating and characterizing crop germplasm (from 1=not important to 4=very important)					
Traits		Name of crops/material characterized/evaluated			
		Wheat			
30.1. Morphological	3				
30.2. Agronomic	1				
30.3. Socio-economic	4				
30.4. Total accessions characterized/evaluated	2				
Total number of identified accessions exhibiting novel/preferred traits	87				
30.5. What was the type of evaluated material					
<input type="checkbox"/> crop wild relatives	<input checked="" type="checkbox"/> traditional cultivar/landrace	<input type="checkbox"/> genebank material			
30.6. What was the origin of the evaluated material					
<input checked="" type="checkbox"/> material obtained through project collection missions		<input type="checkbox"/> national gene bank			
<input checked="" type="checkbox"/> farmers/field genebanks		<input type="checkbox"/> international gene bank			
<input type="checkbox"/> local gene bank		<input type="checkbox"/> private sector/commercial agencies			
31. Has the data obtained from the evaluation process been incorporated into an information system?					
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
32. If yes to Q31, please detail the type of information system					
GLIS					
33. What was the role of farmers in the characterization/evaluation and selection activity?					
<input checked="" type="checkbox"/> selection of pilot sites	<input type="checkbox"/> setting selection and evaluation priorities	<input checked="" type="checkbox"/> implementing the activity			
<input checked="" type="checkbox"/> choice of germplasm	<input checked="" type="checkbox"/> definition of preferable traits				

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34. If genotyping and/or phenotyping activities occurred, please detail the importance of the following criteria in genotyping and phenotyping crop germplasm (from 1=not important to 4=very important)

Traits	Name of crops/material evaluated					
	Wheat					
34.1. Morphological	3					
34.2. Agronomic	1					
34.3. Gastronomic	2					
34.4. Socio-economic	4					
34.5. Total accessions phenotyped/genotyped	87					
34.6. Total number of genotypes with novel traits identified	30					

34.7. What was the type of genotyped/phenotyped material

crop wild relatives traditional cultivar/landrace genebank material

34.8 What was the origin of the genotyped/phenotyped material?

material obtained through project collection missions national gene bank
 farmers/field genebanks international gene bank
 local gene bank private sector/commercial agencies

35. Has the data obtained from the phenotyping and/or genotyping been incorporated into an information system?

Yes No

36. What was the role of farmers in the phenotyping and/or genotyping activity?

selection of pilot sites setting selection and evaluation priorities implementing the activity
 choice of germplasm definition of preferable traits

37. Indicate which of the following activities have been carried out to promote and facilitate the use of crop varieties:

seed days agricultural shows diversity fairs demonstrations
 field studies study tours field trials

38. If any breeding activity has been implemented during this project, please enter below the following information:

38.1. Name of crop/s: Wheat

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38.2.Trait (s)/characteristic(s) addressed: Yield stability, drought and heat tolerance, disease resistance, end-use quality.	
38.3.Estimated importance of the improvement in terms of food security and nutrition: <input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	
38.4.Estimated importance of the improvement in terms of adaptation and resilience: <input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	
38.5. Breeding involved farmers in :	
X setting breeding priorities X select from fixed lines (PVS)	<input checked="" type="checkbox"/> select from segregating populations <input type="checkbox"/> making crosses and/or determine parents
38.6.Specify the main output of the breeding activity Segregating populations F2-F3 with improved traits.	
39. If any genetic enhancement (including base-broadening) occurred during the implementation of this project, please enter below the following information:	
39.1.Type of activity:	
X genetic enhancement by introgression for specific traits X population improvement through incorporation or base broadening	
39.2.Rationale of the activity:	
X poor gain in breeding programmes X specific trait not available in current breeding materials X evidence of narrow genetic base	
39.3.Assessment of genetic diversity was made through:	
X molecular markers <input type="checkbox"/> pedigree studies	<input type="checkbox"/> other methods <input type="checkbox"/> N/A
39.4.Starting materials:	
X local varieties/landraces X improved varieties in your country	<input type="checkbox"/> wild varieties
39.5.Specify the main output of the enhancement/base-broadening activity Segregating populations F2-F3 with improved traits.	
40. Did this project enhance community conservation systems? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
41. If yes to Q40, please detail further/ The project targets establishment of community conservation systems by introducing the seeds of wheat landraces and the concept of on-farm diversity.	
42. Did this project enhance any linkages between local, national, regional and international genebanks? Yes.	
43. If yes to Q 42, specify how? The Gene Bank managers participated in the project meetings and their suggestions were incorporated in the project activities. The project provides the germplasm to the national and international gene banks.	

Section C: Information and technologies related to PGRFA

44. Did this project contribute to the development of new technologies related to PGRFA? YES NO

45. If yes to Q 44, provide more details on the number and type of new technologies developed

46. If yes to Q45, have these technologies been transferred? YES NO

47. If yes to Q 46, please provide more details on where and how technologies have been transferred

48. Has the executing institution of this project put the PGRFA material and related information resulted from the project in public domain? Yes.

49. Did the project establish any learning and knowledge sharing platforms? If yes, please detail further how many and what type of platforms. Project web site in Turkey in Turkish.

50. Has the project developed any strategy/plan for the diversification of local agricultural and food systems?
 YES NO

51. If yes to Q50, please provide more details

52. Has the project undertaken any study on climate change and adaptation strategies? YES NO

53. Has your project contributed to creating and enabling environment, and put in place any national legislation and incentives for the conservation of and use of PGRFA? YES NO

54. If yes to Q53, please specify how

The policy makers from all three countries participate in the project Steering Committee and learn the project outcomes which motivates them to enhance the legislation on conservation and use of PGRFA.

55. Specify if seeds of the target crops have been distributed /made available to local communities specifying :

Crop variety	Quantity (kg)	Number of beneficiaries		Status (e.g. farmers, breeders)	Purpose (plantation, multiplication, selection, improvement, conservation etc.)	Channel of distribution (formal/informal seed system)
		male	female			
300 wheat landraces	1-3 kg each	623	15	Farmers	plantation, multiplication, selection, conservation	Directly by the project to farmers.

Section D: Training and capacity building related to PGRFA

56. Indicate what subjects have been addressed through capacity building and training during the implementation of the project and provide details by filling in the table below:

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Subject of the training	Country/ region	Frequency	Durati on	Female	Male	Status (e.g. farmers, breeders)	Methodology (workshops, field days, demonstrations)
1. Training on participatory breeding and variety selection.	AFG. IRAN, TUR	1	1	2	14	Breeders	Workshop
2. Training on application of modern genomic technologies in landraces improvement.	AFG. IRAN, TUR	1	1	2	14	Breeders	Workshop
3. Training on conducting of on-farm wheat landrace trials.	AFG. IRAN, TUR	3	2	8	40	Farmers, Breeders, Extension	Workshop
4. Training of farmers on wheat landrace cultivation and use.	AFG. IRAN, TUR	300	1	60	480	Farmers	Working visits
5. Regional wheat landraces workshop.	TUR	1	3	10	43	All stakeholders	Workshop
6. Stakeholders consultations.	IRAN, AFG	2	3	5	70	All stakeholders	Workshop and field visit
7. Field days.	AFG. IRAN, TUR	50	1	>200	>1500	Farmers, Breeders, Extension	Demonstration
8. Rust monitoring.	AFG, IRAN, TUR	1	6	1	2	Scientists	Workshop
9. Phenotyping workshop	Central Asia	1	4	6	41	Scientists	Workshop
10. Gender role in on-farm diversity	TUR, AFG	8	2-3	450	0	Farmers wives	Informal discussions
11. Provincial workshops on on-farm wheat diversity and landraces	TUR; AFG	7	1	40	500	Farmers, Breeders, Extension	Workshop

Several more training activities conducted in all countries as presented in section 5.5 of this report.

Total	AFG, IRAN, TUR			807	3653		
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57. Did your project develop any awareness raising materials and information products about the Treaty? X YES NO

58. Indicate the type of products developed, media used and audience targeted by your organization in implementing the visibility plan to date. Please, make sure that those communication products are shared with the Treaty Secretariat, as per Communication and Visibility Manual provisions.

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58.1. Products developed:

<input type="checkbox"/> Audio-visual products (enter references/links)	X Booklets
X Display panels and posters	<input type="checkbox"/> Reports (enter references)
<input type="checkbox"/> Fact sheets (enter references/links)	X Websites
<input type="checkbox"/> Newsletters (enter references/links)	<input type="checkbox"/> Magazines (enter references)
	X Accessories (t-shirts, caps, bags, etc.) /gadgets

58.2. Media used

X Press	X Radio	X Diversity fairs	<input type="checkbox"/> Educational events
X Television	X Internet	X Conferences	

58.3. Audiences targeted

X Policy makers	X Plant Breeders	X Gene bank managers	X General public
X Scientists	X Farmers	X Students	<input type="checkbox"/> Other _____

59. Indicate the major benefits gained by the targeted country/ies through the activities sponsored under this project:

<p>X Expanding characterization, evaluation and number of core collections of germplasm</p> <p>X Increased availability of resistant to climate change seeds</p> <p>X Increased availability of high yielding/quality seeds</p> <p>X Exchange of germplasm</p> <p>X Backup safety duplication of germplasm</p>	<p>X Increased resilience of local communities to climate change</p> <p>X Increased food security of local communities</p> <p>X Increased capacities for sustainable agricultural practices</p> <p>X Exchange of technical expertise</p> <p>X Exchange of information</p> <p>X Establishment of networks for PGRFA</p> <p>X Increased stakeholder participation</p> <p><input type="checkbox"/> Development of new seed markets</p>	<p>X Transfer of technology</p> <p><input type="checkbox"/> Introduction of improved varieties</p> <p>X Improved knowledge</p> <p>X Improved access to markets for PGRFA products</p> <p><input type="checkbox"/> Development of information systems on PGRFA</p> <p>X Increased awareness on PGRFA</p> <p><input type="checkbox"/> Other (please specify)</p>
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60.1 Indicate the number of households that access increased diversity of crops

638

60.6. Indicate the % increase in crop diversity at household levels

Not evaluated at this time.

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<p>60.2. Indicate the number of households that report improved food security and nutrition Not evaluated at this time.</p>	<p>60.7. Indicate the number of adaptation strategies for food security that have been developed and tested - 1</p>
<p>60.3. Indicate the number of households practicing conservation agriculture Not evaluated at this time.</p>	<p>60.8. Indicate the number of climate smart varieties developed and introduced in farmers' fields None.</p>
<p>60.4. Indicate the number of households with increased access to markets Not evaluated at this time.</p>	<p>60.9. Indicate the number of policy dialogues involving smallholder farmers established Not evaluated at this time.</p>
<p>60.5. Indicate the % increase in yields and marketed products Not evaluated at this time.</p>	

Section E: Project efficiency

61. To what extent the outputs planned for the reporting period (with respect to the original workplan) have been achieved to date? If possible, indicate percentage of achievement (e.g. 70 % achieved)

- Highly satisfactory- 95%
 Moderately satisfactory - %
 Satisfactory - %
 Moderately unsatisfactory- %
 Unsatisfactory- %

62. List the main risks faced during the implementation of the project (e.g. political turbulence, economic crisis, climate shocks etc.)

- Security in Afghanistan limiting the project staff from visiting the country
- US sanctions on Iran effectively severing the financial relations with Iran

63. Has the project strengthened ties with the private sector, with private breeders and/or government extension services and seed banks? If yes, provide details. Yes, Explained in the report.

64. Has the project established any relevant linkages with other projects, plans and/or programmes related to biodiversity, food security, and poverty alleviation in the country/region? X YES NO

65. If Yes to Q64 please specify the projects and or programmes and the institutions responsible for their implementation:

Afghanistan: Climate Change Adaptation Project by GEF; Afghanistan Agricultural Extension Project by USDA.

Iran: Increase the productivity of wheat and wheat-based systems in Iran. Project supported by Agricultural Research, Education and Extension Service of Iran and implemented by CIMMYT.

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Turkey: Evaluation of the diversity of wheat landraces and identification of genes for agronomic traits. Project supported by TAGEM and implemented by Cukurova University in Adana. Evaluation and selection of wheat landraces with soft grain for bisquit production. Project supported by TUBITAK and implemented by Transitional Zone Agric. Research Inst. in Eskisehir.

66. Did the project receive co-financing from other funding sources? If yes, indicate:

Source:	CIMMYT, Bahri Dagdas Intern. Agric. Research Inst. (Turkey), Dryland Agric. Research Inst. (Iran) Afghanistan Agric. Research Inst.	
Amount USD	\$100,000	

67. Is there any additional co-financing envisaged after the end of the project implementation? X Yes No

68. If Yes to WQ64, indicate the approximate amount secured in co-funding. \$10,000 per year.