Food and Agriculture Organization
of the United Nations

25 years of FAO Technical Assistance in Developing the Afghanistan Seed Sector

A record of commitment, tenacity and hard work

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Contents

Foreword

Seed is a farmer's most essential input, no more so than in times of crisis. In recent years, the incidence of emergency situations has increased, as a result of prolonged civil war and severe weather conditions, such as drought. The Food and Agriculture Organization of the United Nations (FAO) began to develop the seed system of Afghanistan using its own funds to implement two Technical Cooperation Programme (TCP) projects in 1977–1980. During this period, the Asian Development Bank (AsDB) funded the development of the first functional Afghan Seed Company (ASC) – the forerunner of today's Improved Seed Enterprise (ISE) – with a comprehensive seed programme costing USD 14 million. However, the development was short-lived as the long-running war destroyed the established infrastructure. Afghanistan's agriculture suffered, and the country became food insecure. It was under these hard conditions that FAO, working with other United Nations (UN) agencies (notably the United Nations Development Programme [UNDP] and the World Food Programme [WFP]) and international development assistance agencies (including the United States Agency for International Development [USAID] and the International Centre for Agricultural Research in the Dry Areas [ICARDA]), led the process of seed industry development.

The seed initiative intensified when the European Union (EU) funded three seed projects in succession. The results were: a comprehensive seed industry, a functional varietal development institution – Agricultural Research Institute of Afghanistan (ARIA) – and an efficient seed quality assurance capacity to carry out all necessary seed certification. Furthermore, the required policy and regulatory frameworks were established to ensure the successful implementation of seed activities and participation in the international seed trade.

The project proved successful: crop yields increased (especially of wheat); certified seed became available to all farmers in different agroecologies of Afghanistan; more than 100 seed enterprises were established; and, most importantly, the lives of farmily famers in rural areas were transformed. FAO's role as implementing agency was key to this success; the expertise it provided and transparency with which it operated allowed Afghanistan to play an integral part in global seed trade and exchange. In addition, the bulk of Afghanistan's germplasm lost to years

of war was retrieved through the collaboration of FAO and ICARDA during this 25-year period. This publication aims to create a written record of these activities and their results.

In conclusion, gratitude is expressed to Afghanistan's donors, including the EU, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Sweden and the United States of America, who have all contributed to rebuilding the seed security of Afghanistan. Particular thanks are extended to the EU for its determined efforts to see the seed project through to its conclusion.

This publication comes at a time when the Afghan authorities are taking over the running of the seed industry through the Ministry of Agriculture, Irrigation and Livestock (MAIL). The involvement of all experts (national and international) is recognized and gratitude is expressed for their dedication to helping Afghanistan achieve independence in seed production. As the saying goes, "Whoever controls your seed controls your destiny". Afghanistan is pleased to be in control of its seed security.

Mohammad Asef Rahimi
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Ousmane Guindo
FAO Representative
Kabul, Afghanistan

Abbreviations and Acronyms

AAIP	Afghanistan Agricultural Inputs Project
ACIAR	Australian Centre for International Agricultural Research
ANNGO	Afghanistan National Nursery Growers Association
ANSOR	Afghanistan National Seed Organization
APSA	Asia and Pacific Seed Association
ARIA	Agricultural Research Institute of Afghanistan
ASC	Afghan Seed Company
AsDB	Asian Development Bank
ASTA	American Seed Trade Association
BS	Breeder seed
CDAP	Comprehensive Disabled Afghans Programme
CIMMYT	International Maize and Wheat Improvement Center
CIP	International Potato Center
CS	Certified Seed
CSG	Contract seed grower
DAIL	Directorate of Agriculture, Irrigation and Livestock
DFID	UK Department for International Development
DUS	Distinctness, Uniformity and Stability
EC	European Commission
ECOSA	Economic Cooperation Organizataion Seed Association
EU	European Union
EUR	Euro (currency unit)
FAO	Food and Agriculture Organization of the United Nations
FFL	Food for Life
FHCRAA	Future Harvest Consortium to Rebuild Agriculture in Afghanistan
FS	Foundation seed
GDP	Gross Domestic Product
GoA	Government of Afghanistan
GPA	Global Plan of Action
IAIDS	Improving Agricultural Inputs Delivery System Project
ICARDA	International Centre for Agricultural Research in the Dry Areas
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics

IDP	Internally displaced person
IP	Implementing partner
IRC	International Rescue Committee
IRRI	International Rice Research Institute
ISE	Improved Seed Enterprise
ISF	International Seed Federation
ISRA	Islamic Relief Agency
ISTA	International Seed Testing Association
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
JICA	Japan International Cooperation Agency
LoA	Letter of agreement
MAAH	Ministry of Agriculture and Animal Husbandry
MAIL	Ministry of Agriculture, Irrigation and Livestock
MCI	Mercy Corps International
MFI	Microfinancing Institution
MRRD	Ministry of Rural Reconstruction and Development
NADF	National Agricultural Development Framework
NDP	National Development Plan
NGO	Non Governmental Organization
NPP	National Priority Programme
NPPP	National Professional Project Personnel
NSB	National Seed Board
NVDA	Nangarhar Valley Develoment Authority
NVRC	National Variety Release Committee
OECD	Organisation for Economic Co-operation and Development
PEACE	Poverty Eradication and Community Empowerment
PSE	Private Seed Enterprise
QDS	Quality Declared Seed
RS	Registered Seed
SAWIB	Seed Alliance without Boundaries
SCA	Seed Certification Agency
SCA	Swedish Committee for Afghanistan
SDC	Swiss Development Cooperation
SIDA	Swedish International Development Cooperation Agency
SME	Small and Medium Enterprise
SPU	Seed Processing Unit
SRG	Seed Review Group

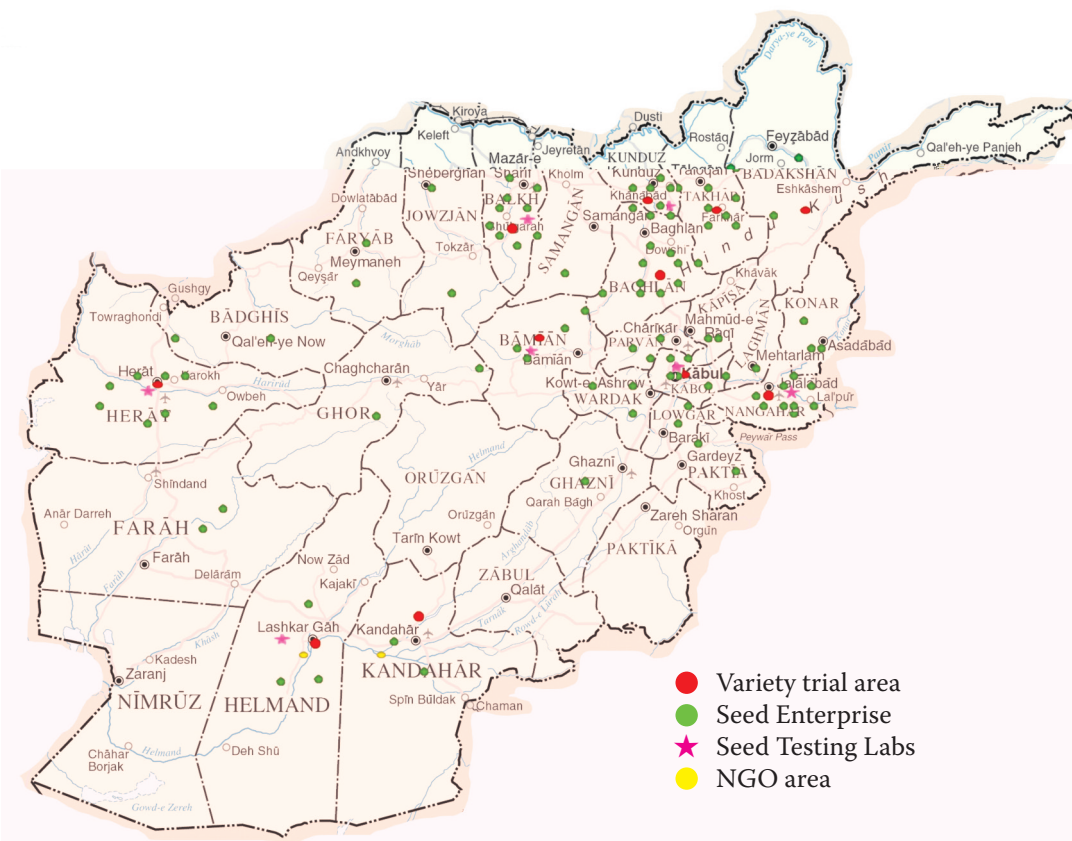
TA	Technical assistance
TCP	Technical Cooperation Programme
ToR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Programme
UN-Habitat	United Nations Human Settlements Programme
UNHCR	Office of the United Nations High Commissioner for Refugees
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UPOV	International Union for the Protection of New Varieties of Plants
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VARA	Voluntary Association for Rehabilitation of Afghanistan
VCU	Value for Cultivation and Use
WB	World Bank
WFP	World Food Programme

Fiscal Year
1 January – 31 December

Currency Equivalents
Monetary Unit = Afghan (AFN)
AFN 1.00 = USD 0.018 (June 2013)
USD 1.00 = AFN 56

Weights and Measures
Metric system
1 jerib = 0.2 ha
1 seer = 7.0 kg
1 000 kg = 1 tonne

MAP OF PROJECT AREA
Geographic coverage by direct project outputs



Executive Summary

This publication tells the extraordinary story of the development of the seed industry in Afghanistan during decades of violent conflict, and describes FAO's central role throughout the process. Agriculture is the mainstay of rural population who have mastered crop and livestock production in difficult conditions: harsh terrain, limited cultivable land, poor soils, a climate characterized by seasonal extremes and intermittent rain failure – all compounded by the adverse effects of climate change. Conflict brings further challenges: the displacement of people, the destruction of productive assets, the breakdown of markets and institutions, and the consequent erosion of skills and farming as a way of life.

Despite extensive and repeated periods of conflict, non-combatant farmers have continued to grow crops and raise livestock. Although some areas have known relative stability, most have endured 25 to 35 years of instability and economic decline, with a series of negative consequences: intractable rural poverty, emigration to the cities and abroad, technological reverses to low-input/low-output agriculture and a form of subsistence production that is neither environmentally nor financially viable.

Farmers have received emergency and developmental assistance under these war conditions, initially to restart the production of wheat, potatoes and other field crops, and later to transform the sector into a modern, viable industry founded on private enterprise and capable of feeding the nation.

Seed has a crucial role to play in achieving food security. Seed is the basis of successful agriculture and determines the level of crop productivity more than any other agricultural input. Numerous agencies acted and provided seed of high-yielding varieties adapted to the prevailing conditions and available locally, creating in Afghanistan an established and regulated seed industry.

A range of approaches have been adopted by the various seed projects over the years, but there has been a common goal: to increase productivity in the field, and thus raise the incomes and food security of farm households. Interventions have sought to: provide farmers with access to seed of high-yielding varieties adapted to local conditions; transfer skills in improved technologies; and establish the production capacity of the private sector so that it can meet the domestic needs for certified seed.

Until 1978, Afghanistan had its own centrally controlled and well-run organizations – essential for a successful seed programme. The country's long history of seed sector development was then interrupted by a series of destabilizing events, resulting in a situation of war which prevailed for some 23 years. International support was provided, but it focused on the import and distribution of replacement seed to deal with the emergency situation. Developmental activities proved unsuccessful because of theft, the destruction of assets, insecurity and disruption to the seasonal pattern of cultivation; this was the case at national level and also on the smallest farms. Progress was challenging and the situation even regressed.

The ousting of the Taliban regime in 2001 marked a turning point in the history of the seed sector, although the massive influx of aid that followed initially concentrated on emergency and recovery measures. Security was still of paramount importance, and a large multinational military and humanitarian presence remains to the present day. Public services had diminished during the period of instability, experienced professionals left the country. However, in 2003, the situation improved with a number of developmental interventions in the seed sector, particularly within the scope of the landmark EU seed project, and ten years later, in 2013, all sectoral responsibilities and resources were transferred to national institutions and management.

FAO has been a leading player in the development of the seed industry of Afghanistan for 25–35 years, providing technical support to major projects funded by the EU and other development partners. The technical advice and expertise provided has often been in collaboration with other international scientific institutions. The main developmental activities undertaken have been: introduction of quality seed; regulatory reform in the seed sector; institutional development in the public sector; seed marketing; and capacity strengthening.

Given the challenging conditions and the degeneration of Afghanistan's public services, FAO has implemented projects directly on behalf of the Government and donors, hiring managerial, administrative and financial staff, as well as providing technical assistance. Locally based staff have always received support and backstopping from headquarters (also during the period of "exile", when international staff operated from Pakistan).

FAO staff have shown dedication to the farmers of Afghanistan in what have at times been appalling conditions. This publication includes

personal testimonies from various actors in the development of the seed industry, which convey something of the extreme conditions ("Local Seed Production Targeting Food Security – Hazarajat" is a case in point). The national officers carried out their duties beyond all reasonable expectation.

Special recognition is given to the national team of the 2003–13 EU sponsored seed project, many of whom also worked on earlier FAO-implemented projects. They consolidated the foundations laid by previous emergency and sectoral rehabilitation interventions:

- New varieties and broader ecological coverage:
  - improved productivity of crops;
  - new varieties introduced on a regular basis into seed production;
  - crop ecologies (once abandoned because of weather phenomena) planted with adapted varieties;
  - new seed supply enterprises (over 100) in different regions; and
  - in-country provision of seed for food security crops (e.g. wheat, rice and barley).
- Increased seed production and handling capacity, with ARIA, ISEs and PSEs (private seed enterprises) equipped for various seed crop production activities.
- System for varietal development, release and certification established and backed up by government policy and appropriate legislation.
- Development of the seed industry and private sector participation in the seed business, removing the public sector monopoly on publicly bred varieties and production of early generation seed.
- Regional and global linkage of the national seed sector through creation of the Afghanistan National Seed Organization (ANSOR) and its membership of regional seed associations.

This review highlights the importance of quality controls and rigorous science by giving farmers access to the right seed at the right time for the right price. To further develop Afghanistan's seed sector, the EU provides project support to internalize the Seed Certification Directorate in the Ministry of Agriculture, Irrigation and Livestock, with government employees responsible for the activities. The World Bank (WB) and its Afghanistan Agricultural Inputs Project (AAIP) provides support for seed production through assistance to ARIA (varietal development

and breeder seed production), ISE (seed production facilities) and PSEs (production and seed entrepreneurial capability).

While FAO is not directly implementing projects at present, it continues to provide the technical and professional advice and support for Afghanistan's emergent seed industry.

These past successes are combined with cautious optimism for the future. There are challenges ahead for the seed industry, with ongoing security issues and uncertainties about the financial stability of the private–public partnership approach; a balance is needed between functioning markets driven by efficiency and incentives, and targeted welfare transfers to alleviate the poverty of those remaining in marginal subsistence production.

I. Historical Background

a. Seed sector development in the face of disasters

Seed is a basic element of successful agriculture and determines crop productivity more than any other agricultural production input. Unlike other inputs (fertilizer, water, pesticide), seed is a renewable resource and is not consumed during crop production. To achieve food security and agro-industrial development, agriculture must be progressive: farmers require modern crop production packages, including seed of appropriate varieties, in order to produce – in a sustainable and profitable manner – sufficient food for the population and enough raw materials for agro-industry. The scope of the seed sector's organization is therefore an indication of a country's agricultural progress.

The typical backdrop to a successful seed programme is peace and stability, enhanced by the availability of the necessary infrastructural, human and financial resources: functional agricultural research stations, competent lead farmers familiar with best practices in crop production, sophisticated seed conditioning equipment and an administrative and regulatory framework capable of ensuring the orderly functioning of the seed programme.

The development of Afghanistan's seed programme and industry is far from typical: it is a tale of unrelenting support from donors responding to the sayings "a hungry man is an angry man" and "when there is food security other problems can be solved". FAO's ingenious and dedicated staff (both international and national) persevered under at times extreme conditions, for example, when a seed production expert worked from an underground bunker to evade periodic rocket fire. The story of seed development in Afghanistan includes paradoxes and contradictions and takes place in a once agriculturally prosperous country – a leading supplier of dry nuts (pistachio, almond, walnut and raisins) to the Western world – which became food insecure. Progress has alternated with setbacks as successful interventions have been beset by human-induced and natural disasters. The numerous achievements must now be consolidated through carefully planned disengagement strategies by donors and conscientious fiduciary actions by the Government.

This is the story of seed development efforts in Afghanistan – a classic story of successful multi-donor interventions.

b. Seed sector development until 1978

Afghanistan is a centre of genetic diversity for wheat, barley, chickpea and lentil. The country lies within a centre of crop diversity identified by Vavilov in 1924[1]. The collection of germplasm of crops and their wild relatives had ended by about 1970. In the United States Department of Agriculture's (USDA) National Small Grains Germplasm Research Facility, Afghan accessions account for 14 percent of all accessions of bread wheat varieties (landraces) and 31 percent of crop wild relatives. FAO and ICARDA made additional collections of these valuable plant genetic resources in the 1970s. The country includes rugged and diverse mountains, valleys and plains, and has no large agro-ecological zones. It is classified according to four geographic regions and seven agro-ecological zones. A significant proportion of Afghanistan's plant genetic diversity obtained during pre-war expeditions is maintained in the genebanks of international agricultural research centres under the trusteeship of FAO. These resources would be repatriated to an in country genebank in Afghanistan.

According to Engineer Mir Dad Panjsheri, Special Adviser to MAIL, prior to 1978, Afghanistan had its own centrally controlled organizations essential for a successful seed programme[2]: the operational components (e.g. plant breeding, variety assessment, variety maintenance, seed production, processing, testing and distribution) were functioning smoothly; and the facilities and equipment required for seed production and supply operations (e.g. land, equipment, transport, buildings, chemicals, packaging materials and finance) were available.

The Afghan Seed Company (ASC) was established with headquarters in Kabul and satellite stations in Marja Helmund, Turnak Kandahar, Surda-e-Gazni, Larkhabi Pulikhumri and Urtabulaqi Kunduz at a cost of USD 14 million. The stations were well built, properly furnished and adequately equipped, and staffed with professional and technical operators who had received proper training and were well paid. The ASC – administered by the Supreme Council and the Executive Board – had two modes of operation: direct (using its own labour); and indirect (through contract seed growers, trained and adequately supplied with essential inputs). Contract farmers had the option of selling their produce directly to the market at profitable prices or selling seed back to the ASC who

[1] Mitrofanova *et al.* 2013. Russian J. of Genetics: Applied Res., Vol. 3(1).

[2] Personal communication to Michael Larinde at the Extension Department of the Ministry of Agriculture, Kabul, 26 June 2013.

paid 15–20 percent above grain market prices. During this period, the AsDB gave loans to farmers while MAIL provided production inputs in kind.

c. 1978–2001: the years of conflict

The development of Afghanistan's seed sector was interrupted by a series of destabilizing events, including the Russian invasion, Mujahidin conflicts and the period of the Taliban regime, resulting in a situation of war lasting 23 years and accompanied by intermittent severe droughts[3].

The Russian presence resulted in changes to the seed sector. The ASC was renamed the Improved Seed Enterprise (ISE) and it reverted to centralization, with 21 farms dedicated to seed production of various crops. The farms had a total land area of 11 768.27 ha, of which 5 504.87 ha were under cultivation. However, there were no technical and administrative systems in place to ensure coordination between research and production. The facilities and equipment of the new ISE were inadequate, and there were not enough trained professional and technical supporting staff. By the end of the 1980s, the seed production system – starting with good breeder seed stock to produce subsequent generations of certified seed classes – had fallen apart.

The situation deteriorated rapidly after 1992 and the sector's organizations and facilities collapsed and required complete rehabilitation. During this period, more than half the population were forced to migrate and a large proportion of the rural communities had become internally displaced persons (IDPs). Despite the efforts of humanitarian agencies, those who did return were unable to resume normal farming life, because of the loss of personal and community capital. Farmers who returned after one or two seasons had hardly any seed of well-adapted, improved varieties. Many rural populations moved to encampments with a reliable water source or to camps on the edge of cities in Afghanistan, while others moved to refugee camps in Pakistan and the Islamic Republic of Iran.

By 2001, the situation was serious, characterized by:

- lack of a functional high quality seed production system and the necessary facilities to ensure sustainable crop production;

[3] Annex 1 presents a Historical perspective of Afghanistan's seed industry development, with the principal sectoral support projects arranged in chronological order from 1977 to date.

- non-existence of a formal seed programme for important food crops;
- absence of seed quality control facilities to cater for a comprehensive seed programme;
- shortage of trained manpower to service a seed programme;
- loss of genetic resources for food and agriculture;
- deficiency of knowledge-based modern crop production technologies; and
- near absence of infrastructure to support seed development in the public and private sectors.

d. Sectoral recovery since 2001

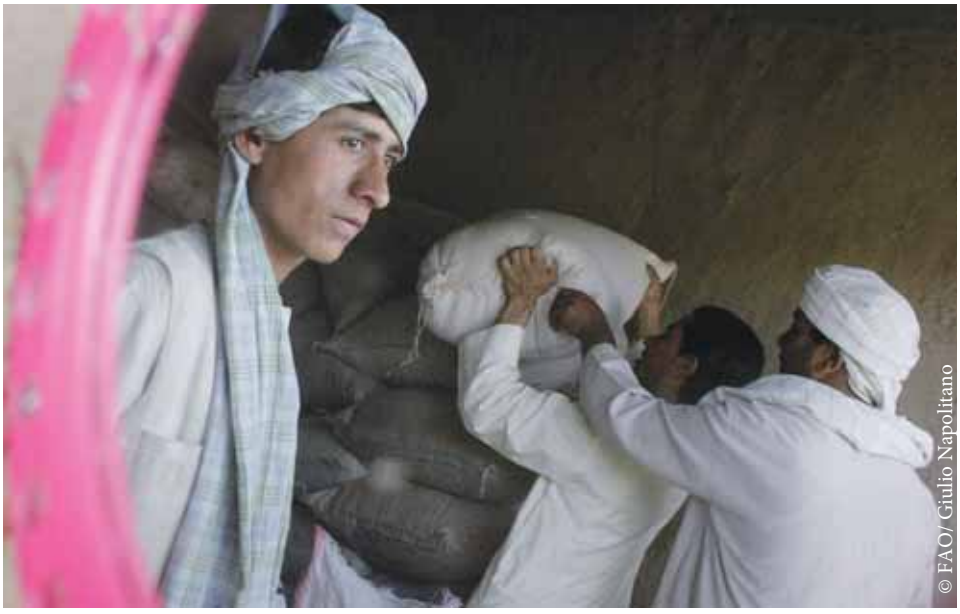
Since the collapse of the Taliban regime in November 2001, the Governnment has sought to rebuild and modernize the seed industry, reorienting it towards private enterprise within a public regulatory framework. The initial concern was to feed the returning population and resume rural economic activity. Development of the seed sector was not a priority at first, as can be seen from the projects listed in Annex 2.

Nevertheless, despite the continuing problem of security and thanks to the substantial assistance from development partners, Afghanistan has managed to relay the foundations of a viable seed industry characterized by a clear policy and direction, emerging market structures and the genuine prospect of national self-sufficiency in the planting materials of key crops.

Team with accompanying security detail required to visit locations of Private Seed Enterprises in Herat

This document outlines the technical and material contributions made by FAO and other development partners to develop Afghanistan's seed industry in the past 25–35 years. What began as an emergency response and recovery operation, is now a focused investment. The two most recent projects (EU and WB – with 24 professional and technical staff members covering various activities in the seed industry and involving 117 seed enterprises and distributors countrywide) consolidate the technical and institutional achievements of FAO and many other stakeholders, including MAIL, CGIAR centres, NGOs and farmers. The Government will continue to request technical support from FAO to complement the interventions of the major donors, while MAIL takes over the administrative and operational aspects of the sector.

II. Seed Projects, their Contributions and Impact



a. The first seed projects

A sustainable seed industry requires:

- a vibrant varietal development programme to develop and produce breeder seed;
- an efficient seed multiplication system to increase the quantity of breeder seed without loss of quality in terms of genetic, physical, physiological and sanitary attributes;
- a quality assurance system to guarantee the quality of seed used for cultivation and ensure delivery of the expected dividends; and
- a dynamic marketing system to generate economic gains for both the seed trader and the buyer.

The early projects in Afghanistan focused on skill acquisition, as is the case with any operation. The first seed projects (see Annex 1) aimed to:

- create awareness about seed technology;
- identify national talents in this new area;

- initiate national activities in seed testing and seed production in line with national emergency needs; and
- establish a framework for a national seed programme.

Training was provided, and seed and planting materials and crop production inputs were supplied. Specialist knowledge of seed crop production was extended to stakeholders, including would-be contract seed growers.

The development of the sector in Afghanistan has been characterized from the beginning by the donors collaborating to revitalize the collapsed seed industry. The roles played by the various donors at the different stages of the sector's development are outlined in the following sections.

It should be noted that, unless otherwise specified, FAO provided the necessary technical capacity to donors and development partners during project implementation.

b. UNDP-funded seed projects

From 1982 to 1992, in country seed multiplication programmes supported by FAO/UNDP included vegetable seed production and were conducted in collaboration with the Ministry of Agriculture and Animal Husbandry (MAAH) and ISE. This cooperation led to the establishment of seed laboratories, vegetable seed processing facilities, five small seed production and training farms and a training centre. Projects covered by UNDP funding:

- UNO/AFG/010/UNA "High quality improved seeds 1991/92"
- UNO/AFG/018/UNO "Procurement of wheat seed through local production and supply of fertilizer in Western Afghanistan"
- UNO/AFG/025/UNA "Rehabilitation programme to support seeds."

In 1992, the Government collapsed and all facilities were looted, and in 1993 FAO shifted its operational base to Pakistan, from where it implemented two seed projects through NGOs in Afghanistan or in direct collaboration with local communities:

- a cross-border project based on seed from Pakistan; and
- a seed multiplication project in Afghanistan involving vegetables, wheat, maize and other crops.

From 1997 to 2002, the Poverty Eradication and Community Empowerment (PEACE) programme served as the umbrella for FAO and other donors' inputs. From 1995 to 2002, the World Food Programme (WFP) collaborated with FAO in a food-for-seed scheme, organizing a revolving fund which could be accessed by implementing partners (IPs). In 2002, FAO's operational base returned to Afghanistan. With financial support from the Swedish International Development Cooperation Agency (SIDA), FAO's activities have included crop improvement trials and the release of new varieties. FAO continues to collaborate with MAIL, CIMMYT (International Maize and Wheat Improvement Center) and ICARDA in these areas.

c. EU-funded seed projects

The European Union (EU) has invested over USD 37 million in the Afghan seed industry, beginning in 1993 with a two-year emergency seed supply project to provide seed for staple food crops and achieve food security for IDPs and those returning from war. To ensure sustained production in the target area and extend the benefits nationally, a second developmental project was funded in 1995, investing USD 4 525 783 to initiate in country seed production and supply. To consolidate the results, the EU followed up with four other projects (described below) with two objectives:

1. Extend seed production to the Central Highlands of Afghanistan.
2. Embark on comprehensive seed industry development.

GCP/AFG/016/EEC "Seed supply and in-country seed production programme in Afghanistan" (1995–98)

The objective was to establish basic household food security in accessible areas of Afghanistan and to develop an in-country sustainable capacity for seed multiplication of internationally accepted standards, as part of Afghanistan's agricultural rehabilitation and development process.
Contract seed growers (CSGs) were developed to encourage participation of the private sector in seed production. In contrast to the previous centralized approach, the large number of small seed-producing pockets ensured that farmers from all regions and sections of society could benefit from the programme. More than 8 576tonnes of seed were produced by 7 791 CSGs in more than 97 districts of four regions. Thanks also to collaboration with WFP, seed imports were reduced by 89 percent and in-

country seed production increased by 286 percent, thus achieving the project's objective.

A food-for-seed scheme was introduced in collaboration with WFP. The traditional system based on seed buy-back against cash did not manage to convince farmers to part with their seed because of the risks associated with food shortages, fluctuations in food prices and hyperinflation. The new scheme guaranteed the retrieval of seed from farmers, with wheat seed exchanged at a rate of 1:1.25 for wheat grain supplied by WFP, ensuring, on the one hand, that seed growers had enough food to feed their own families and, on the other, that a large proportion of the seed crop would go outside the production areas to other farmers. Initially, only wheat seed was included in the scheme, but later maize, rice and pulse seeds were added. The scheme ensured food security on a sustainable basis and demonstrated the advantages of integrating two separate UN agency programmes. It also helped to make considerable savings of funds that had been earmarked for the purchase of 1 500 tonnes of seed from outside Afghanistan. WFP allocated over 13 482 tonnes of food wheat in 1996–97, sufficient to procure more than 8 576 tonnes of seed of various crops.

Operational seed production units were established. Prior to 1995, there were only two seed production units in the country – in Mazar and Herat. The project established new units in Kandahar, Grishk, Dilaram, Pulekhumri and Kabul. Five staging units, in Khost, Kunar, Jalalabad, Barkibark and Saidabad, were transformed into production and processing units. It is estimated that more than 112 926 ha were planted under foundation and quality declared seed produced and distributed by the units, while more than 78 000 farmers received improved seed for higher yields.

Fertilizer was distributed together with seed to help farmers produce more food per unit of area. A minimum yield of 2–3 tonnes/ha was achieved following the shift from traditional seed (low technology) farming to improved seed (high technology) farming – a major increase from the previous average productivity of 0.8–1.0 tonnes/ha.

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Training was carried out and twelve officers from the department of agriculture and ten IP staff members were instructed in improved seed production, while six project staff members in Pakistan received training in seed production and quality control.

GCP/AFG/018/EC "Strengthening national seed production capacity in Afghanistan" (2003–06)

The objective was to improve food security in Afghanistan by raising the capacity of the national seed sector, in particular of ARIA, by strengthening its varietal development procedures.

Seed production was improved. A total of 76.4 tonnes of breeder seed and 1 631 tonnes of quality declared seed were generated thanks to the intervention of the following IPs: the public sector (ISE and Nangahar Valley Development Association); NGOs, including Mercy Corps International (MCI), the Islamic Relief Agency (ISRA) and the Voluntary Association for Rehabilitation of Afghanistan (VARA); and the private sector (Afghan Seed Project and eight pilot small seed enterprises).

Quality assurance of seed production had a success rate of about 90 percent. Comprehensive laboratory testing of seed lots was undertaken for the first time in 2004 for the harvest of the 2003/04 season, when eight technicians from Kabul, Herat, Mazar and Jalalabad were trained in India and two counterparts participated in a regional plant variety protection workshop organized by the International Union for the Protection of New Varieties of Plants (UPOV) in the Islamic Republic of Iran. The number of samples submitted for testing increased each year, from 723 in 2003/04 to 1 569 in 2006. Private sector participation in the seed industry was virtually absent before 2004. Until the 2003/04 season, ISE and the three NGOs (MCI, ISRA and VARA) were the main producers of quality seed in the country.

GCP/AFG/045/EC Variety and seed industry development (2007–2012)

The project focused on introduction of certified wheat seed to Afghan farmers, rapid evolution of the private seed industry throughout the country, enactment of the seed law and seed policy, establishment of the National Seed Board (NSB) and of a national seed association, and extensive capacity-building in terms of physical facilities and human resources.

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In general, a strong foundation for seed production and certification was laid and the legal basis for a sustainable seed industry established. Action is being taken by the Government on fundamental issues concerning the sustainability of institutional arrangements for the effective implementation of the seed law, including the establishment of key affiliated bodies of the NSB, particularly an independent Seed Certification Agency (SCA) within the framework of MAIL responsible for the seed certification process. The necessary documentation for the Afghanistan SCA is ready and the seed regulations are being updated in preparation for the MAIL takeover.

Highlights of the project's direct impact on seed industry development in Afghanistan:

- Certified seed was responsible for 28 percent of wheat yield increases in irrigated areas using recommended fertilizer rates (according to nationwide market research).
- The total financial value of the wheat seed classes produced by the project was estimated at USD 53 162 924 – nearly five times the total cost of the project.
- Assuming that improved seed alone accounted for 30 percent of the wheat yield increase, the additional value of output minus the initial seed and distribution costs provided a net financial return amounting to USD 139 015 344 - about ten times the total cost of the project.
- The multiplier effect of injecting quality seed into the system enables farmers to retain improved seed for about 4 years of further multiplication and diffusion before considering replacement. These retention and diffusion effects lead to greater area coverage with improved seed.
- The creation of 114 PSEs across the country (with 6 873 trained contract seed growers) and the associated benefits in rural areas (such as the spread of contract farming in surrounding villages and increased employment opportunities for both men and women) will make a lasting contribution to rural economies.

- The production of certified seed in the country has had a significant import substitution effect, reducing the need to apply foreign exchange to the importation of seed for emergency and other purposes.
- The implementation of the seed policy, law and regulator framework engendered by the project will have a lasting positive impact on institutional reforms within the sector.
- Capacity enhancement activities – short-/long-term training, study tours and on the job routine training primarily targeted at counterpart govenment staff – will ensure that MAIL staff are qualified and capable of taking over the ownership and responsibilities of essential functions once the technical assistance ends.

GCP/AFG/059/EC Expanding certified seed production and utilization in Afghanistan (2009–2012)

The overall objective of the project was to contribute to improved and sustainable food security in Afghanistan by accelerating seed production and thereby increase yields of wheat and other major food crops. The project aimed to

i. improve capacity of existing enterprises for processing and storing certified seed;
ii. establish and strengthen new enterprises for certified seed production, processing and storage;
iii. strengthen capacity of enterprises for producing seed of other crops or undertaking other profitable seed-related ventures;
iv. enhance technical and business management capacity of entrepreneurs for efficient and effective certified seed production and marketing; and
v. provide support including institutional and policy assistance to the Agricultural Research Institute of Afghanistan (ARIA) for breeder seed production, the Improved Seed Enterprises (ISEs) for foundation seed production and the seed quality control and certification service.

The establishment of new ventures and the strengthening of pre-project PSEs resulted in increased availability of certified seeds across Afghanistan – even in some remote and insecure locations. The rise in national improved seed production – from 12 948 tonnes in 2009 to 24 136 tonnes in 2011 and 17 800 in 2012 – corresponds to meeting nearly 10 percent of the country's annual seed demand.

In an effort to enhance farmers' access to improved seeds, 20 new seed enterprises were established in 17 provinces, thereby extending the PSE network to 28 provinces (out of 34 provinces in Afghanistan). Farmers who used certified wheat seed produced by this project reported average yields of 3.5 tonnes/ha under irrigated conditions – 30 percent higher than the national average, thereby increasing agriculture-based incomes and household food security.

d. Other donor-funded seed projects

The Asian Development Bank (AsDB) funded the first comprehensive national seed programme run by the first public seed company – Afghan Seed Company – in 1978 and the basic facilities and manpower for certified seed production were developed. However, the prolonged situation of war and unrest led to the loss of all the benefits of the project: total decline of the structures, loss of trained staff and disengagement of the various elements constituting the seed programme.

Between 1998 and 2004, several emergency relief projects were funded by donors to alleviate immediate food-deficiency problems while the means were sought to re-establish the agricultural sector. Most of these relief interventions included seed distribution, so that production could resume, and – singly and collectively – they contributed to the subsequent process of sectoral development. For example:

- FAO/WFP food-for-seed programme (1994–2002) resulted in the development of food-based revolving funds involving community seed growers and other IPs, paving the way for the design of FAO's revolving fund scheme with growers[4]. IPs included ISEs (Pul-i-Khumri, Herat, Kabul, Mazar and Kandahar) and NGOs (IRC [International Rescue Committee], SCA [Swedish Committee for Afghanistan], ISRA, MCI, SOLIDARITÉS INTERNATIONAL, VARA and NVDA [Nangarhar Valely Agriculture Development Authority, Jalalabad])
- OSRO/AFG/101/GER (2001–02) and AFG/01/U04/JA/12 (2001–02) introduced varieties (germplasm) of wheat and chickpea that are tolerant to drought and thus enhanced the production of staple food crops.

[4]The communities contracted to grow seed included Bamyan and Yakawlang, Mazar, Farah, Kunduz, Takhar, Badghais, Ghor, Bakwa, Khak-e-Safid, Farah Centre, Balabuluk, Pusht-e-Rud, Punjwai, Arghandab, Dand and Shega.III.

• GCP/AFG/018/NET (2001) transferred seed production skills to farmers in remote northern villages of Afghanistan.
• OSRO/AFG/104/IRE (2001–02) distributed essential inputs (seed, fertilizer and equipment) for the multiplication of wheat and fodder seed in Central Afghanistan (Bamyan Province).
• OSRO/AFG/103/USA (2001–03) built up seed-producing infrastructure to rehabilitate drought- and war-affected farmers in Afghanistan. The project produced 600 tonnes of seed of wheat, 60 tonnes of rice, 100 tonnes of maize, 27 tonnes of chickpea and 19 tonnes of fodder.
• OSRO/AFG/208/NOR (2002–03) targeted seed supply and the training of farmers in seed production.
• AFG/01/U03/JA/12 (2001) aimed to stabilize the rural food supply through national crop sector input supply capacity by procuring and processing quality declared wheat seed from contracted seed producers in Afghanistan for redistribution to needy farmers in southern, northern and central Afghanistan for autumn 2002.
• OSRO/AFG/211/SWI (2002–03) provided good quality wheat seed to families in southern, western and northern rainfed areas of Afghanistan and built up the critical mass of contract seed growers.
• MAAH/MRRD/FAO/WFP carried out a winter agriculture survey (Dec. 2002 – Jan. 2003) in 104 districts in 30 provinces, revealing that productivity had increased from 1.7 tonnes/ha to 3 tonnes/ha.
• OSRO/AFG/210/NET (2002–03) carried out an emergency intervention to replace the equipment and inputs looted from the previous programmes during the Taliban retreat.
• USAID/ICARDA (2002–04) made a strategic intervention under the Future Harvest Consortium to Rebuild Agriculture in Afghanistan (FHCRAA).
• OSRO/AFG/206/GER (2002–03) funded the procurement and processing of quality declared wheat seed from contracted seed producers in Afghanistan for redistribution to needy farmers in northern and (2003–05) central Afghanistan.
• GCP/AFG/025/GER developed sustainable seed production in southern Afghanistan.

From recovery to development: planning for success

III. FAO Technical Assistance

a. Emergency, rehabilitation and developmental phase

FAO began providing assistance in earnest following the prolonged war and a three year drought which had terrible repercussions for the agricultural system of Afghanistan. Interventions aimed to help the Government re-establish sustainable agricultural productive capacity without having a negative impact on the environment. FAO's role in the early stages was both technical and regulatory, in particular ensuring that no harm was done to the country's genetic resources through the importation of seed of inappropriate varieties or because of neglect of phytosanitary rules.

Messrs Mirshafiuddin Mirzad and Assadullah Habibi outlining the history of Afghanistan's seed industry to Mr Geoffrey Rockliffe-King

It was clear that in order to restore food security and the livelihoods of the rural population, it was necessary to restore Afghanistan's agricultural production capacity. The major food security crops were self-fertilizing and this was a major advantage. Given the urgent need to feed the population and the high seed multiplication ratio of the crops concerned (wheat, rice and maize), FAO adopted a three-phase approach: from emergency action through rehabilitation to developmental interventions.

Emergency (early 1980s – 1994). This phase was characterized by cross-border seed supply from CGIAR centres and commercial sources. The primary aim was to import varieties familiar to Afghan farmers, in order that they could cultivate their land for food production and, by adopting good management practices, also save seed for use in the next cropping season.

Rehabilitation (mid-1990s – early 2000s). This phase concentrated on infrastructure development and capacity-building for a viable in-country seed industry. The Government was the dominant player in seed

production, and skills were passed on to farmers to enhance their ability to produce seed for their own use, while excess was sold back to ISE under contractual agreements. A Code of Conduct was introduced to regulate the flow of seeds into Afghanistan, respecting phytosanitary regulations and taking into consideration the appropriateness of the variety/germplasm. As there was no existing functional variety release system, a Seed Review Group (SRG) was introduced to facilitate the screening of materials.

Development (2002 – present). This phase aims for rapid seed industry development, enabling independent seed companies to take over full responsibility for production activities while the Government has a policy and regulatory role. This phase began from the end of the Taliban regime and donor's renewed interest in assisting Afghanistan to overcome its problems of food insecurity and rural poverty. Donor funding commensurate with the scale of the task has since been mobilized, and the EU leads the drive towards commercialization in a public-private partnership supported by the Government, which encourages investment so that the private sector can scale up domestic seed production.

b. Introduction of quality seed

Seed quality

Throughout the world, farmers and growers are clear about what they require from seeds. First, the seed should be of the specific species and variety desired. Second, the seed must produce a uniform and well established, weed-free crop that develops without seed-borne diseases. These requirements can be met by following quality assurance procedures, including both field inspections of seed crops and laboratory tests carried out on harvested seed prior to storage or sale. The international seed trade adopts seed certification procedures in order to guarantee quality, but some nations lack the facilities and expertise to carry out

Mr Hashmatullah of the Seed Certification Unit, Mazar, demonstrating the procedures for seed quality control from sample division to recording of seed purity analysis

seed certification. FAO has therefore developed the Quality Declared Seed (QDS) System, which – although less demanding than full seed quality control systems – guarantees a satisfactory level of seed quality. The system was elaborated by FAO in 1993 for agricultural crops; it was revised in 2006 and has been widely used and consulted. The QDS guidelines and protocols aim to assist small farmers, seed producers, field agronomists and agricultural extension personnel in the production of quality seed. The QDS system is not a substitute for seed certification, but an interim step towards that goal. It is often adopted for national use; however, for international seed trade, a full certification procedure must be employed.

Quality Declared Seed

Quality Declared Seed has been used as an entry point to raise awareness among Afghan farmers about the importance of seed quality. It was introduced with in-country seed production and is produced under the supervision of IPs as specified in letters of agreement (LoAs) signed by the IP and FAO. In addition to financial and administrative responsibilities, the LoA specifies the technical requirements for producing seed to specific standards, for example, the growing conditions must ensure genetic identity and genetic purity. QDS generally meets all the requirements of good seed. CSGs have become specialized and produce seed of consistently high quality.

Although the QDS project was not without problems, it resulted in the production of more than 41 515 tonnes of QDS of important food crops (mainly wheat) between 1995 and 2002 (see Annex 3) – a huge achievement considering the conditions. The implementation strategy was devised on the basis of past experience and according to the situation prevailing in the project areas. A calendar of operations for all stages was drawn up in advance and vigorously implemented, and the experience gained by the project staff and IPs in the emergency phase proved very useful.

Wheat is the most important staple food crop of Afghanistan and in 2002 occupied 1.74 million ha out of a total of 2.21 million ha under the four main cereal crops (wheat, barley, maize and rice)[5]. That year, the combined efforts of the various agencies led to the procurement of more than 23 000 tonnes of wheat seed for distribution, i.e. 11 percent of the total requirement of 217 750 tonnes.

[5] FAO-WFP Crop and Food Assessment Mission Report, 2002.

Afghanistan therefore had an 11 percent seed replacement rate, comparable to most of the other wheat-producing countries in the region, where there are established seed programmes and stable administrations. It is not actually necessary to cover the entire area every year with QDS, and a seed replacement rate of 20–25 percent could be considered ideal – any more would be impossible (even under conditions of peace) unless made available free of cost, which would be both unaffordable and undesirable.

The national capacity to produce quality seed of improved wheat varieties adapted to Afghanistan's various agro-ecological zones has been steadily developed over the years to meet the demands of the Government, NGOs and, increasingly, domestic markets. Table 1 presents the MAIL/FAO seed production plans for the 2012/13 season.

Table 1. Plans for production of wheat seed for 2012/13 (FAO, October 2012)

Region	Seed category				Total (tonnes)
	Breeder	Foundation	Registered	Certified	
North	1.7	34	300	5 300	5 636
Northeast	5.7	80	550	13 800	14 436
West	3.3	30	350	6 200	6 583
South	1.3	26	200	1 200	1 427
East	2.8	0	50	2 200	2 253
Central	2.8	0	0	2 500	2 503
Total	**17.6**	**170**	**1 450**	**31 200**	**32 838**
Irrigated	14.2	122		20 834	22 099

QDS production was based on a somewhat unorthodox strategy of diversification and sustainability. Instead of adopting a compact area approach and depending on a single organization to produce seed, various existing institutions in different regions were revived, including:

- provincial units of the parastatal ISE, to multiply breeder seed (BS) and foundation seed (FS) under the direct supervision of the project, located in Herat, Pulekhumri, Mazar, Kandahar, Kunduz and Kabul since 1995 with subunits in Ghazni, Badghis and Ghor following the establishment of the interim administration in 2001; and
- state farms under the jurisdiction of the Department of Agriculture, to produce QDS and test new varieties.

The restoration of ARIA and ISE units and state farms was very successful and they continue to play an important role in the national seed supply system. In addition, well-established NGOs (five international and one national) were contracted to produce specified quantities of QDS and their widespread presence helped increase the area under seed production and distribution.

Community schemes were started under the UNDP's PEACE initiative and in collaboration with UNHCR (Office of the United Nations High Commissioner for Refugees), in order to generate and distribute good quality seed at community level. Communities were asked to form seed groups to produce and distribute seed directly with project supervision, and seed-producing communities were constituted in areas where reliable partners were not available. Through the seed groups, the principles of seed production were demonstrated to farmers, and the introduction of new varieties and seed stocks was promoted through farmer-to-farmer seed exchanges. Farmers were responsible for production and FAO provided management and technical support. Long-term functioning of the programme was difficult because certain problems arose between the scheme and the Taliban administration at the time. For example, community seed groups were ordered by the Taliban to distribute the proceeds of sale among the village populations after paying tax to the authorities; failure to comply would result in severe punishment of the seed group members. Initially, a lenient approach was adopted, but from 1999 the rules were strictly enforced. As a result, communities in the west and the north abandoned the programme, and the majority of the seed groups became non-functional.

Despite these difficulties, FAO's seed team was highly valued by both Government and the Taliban, with letters of appreciation sent by the leaders of both sides. Some seed groups even managed to get Taliban Mullahs to change their views against roguing as a means of removing unwanted plants to keep seed plots clean.

Certified seed

Seed certification efforts include the promotion of the concept of limited generations of seed multiplication with the gradual increase of nucleus seed of newly developed and released varieties:

Breeder seed → Foundation seed → Registered seed → Certified seed → Commercial seed

The necessary administrative arrangements must be made and a range of technical institutions (public and private) capacitated. The project focused on creating and enhancing the capacity of such institutions, and as a result the Government approved the national Seed Policy and the Seed Law.

"Certified Seed" refers to a seed of a known variety that has passed quality tests by an official certification agency for sale/distribution to farmers. Seed certification is a legally sanctioned system for the quality control of seed multiplication and production and it comprises the following control measures: field and bin inspection, pre and post control tests, and seed quality tests. The purpose of seed certification is to maintain and make available to the public high quality seeds and propagation materials of superior crop varieties, grown and distributed to ensure genetic identity and genetic purity.

Production of various classes of seed and maintenance of a generation chain began by introducing the concept of quality seed. The maintenance, production, supply and marketing of improved seed and planting material are part of a continuous process, entailing the development of a 5-year chain of activities. This is a costly, time-consuming, and technically demanding activity, and any interruptions could set the process back several years. In a country where uncertainty is the only certainty and interruptions are frequent, maintaining an unbroken chain is almost impossible.

FAO deployed the services of various experts covering all the elements of seed industry development in Afghanistan. Seed certification officers were trained in field inspection, seed sampling and seed testing according to the rules and methods of the International Seed Testing Association (ISTA), and followed the necessary practical steps to carry out their functions effectively as part of a seed and plant health certification inspectorate. To facilitate record-keeping and information exchange, computerization of the certification system was introduced and staff trained in its use. A hands-on manual or guide for seed quality control was also prepared.

For commercialization of the seed industry, experts provided guidance (a total of 53 person-months) to ensure the orderly development of the sector, with attention to all those crops subject to seed and planting material legislation and regulation, and reinforcement of the training conducted by FAO, especially in seed production technology. Technical advice and training covered: human resource development; finance and accounts; farm and seed machinery; seed legislation; utilization of VCU

(Value for Cultivation and Use) and DUS (Distinctness, Uniformity and Stability) tests; seed quality assurance; plant disease testing, plant pests; plant breeding/statistics; and privatization legislation.

c. Regulatory reform in the seed sector

Seed quality assurance

Seed quality assurance is a mechanism designed to guarantee the quality of seed from production, harvesting and post-harvest handling through to sales. It is a systematic procedure for ensuring the genetic, physical and physiological integrity of seed delivered to farmers. The term "seed quality assurance" implies that agencies responsible for seed quality cooperate with and support stakeholders in other areas of the seed industry to guarantee quality products. The objectives of quality assurance include the prevention and diagnosis of chronic troubles, and the development of appropriate remedies for their resolution. The process of seed quality assurance covers variety release, proper land selection, field crop inspection, seed testing and seed control (pre- and post-control). There are four important seed quality parameters: genetic purity, physical purity, physiological condition and seed health status.

Seed quality assurance implies the need to:

- ensure that the best quality seeds are produced and sold to farmers;
- prevent the spread of weeds, pests and diseases, in particular invasive types;
- meet consumer demand for specified qualities;
- cater for the needs of specialized farming;
- conform to the mechanization of agriculture; and
- stimulate healthy competition among seed traders.

National seed policy

National seed policy can be defined as statements of principle which guide government action and explain the roles of relevant stakeholders in the coordination, structure, function and development of the seed sector. Although not legally binding, seed policy provides a framework within which regulatory instruments, such as seed law and related legislation, are contained. Seed policy ensures that a government's vision is adequately reflected in day-to-day operations in the seed sector. This link is important because well prepared seed policies can allow stakeholders to understand

their roles, responsibilities and contributions within defined boundaries, thus facilitating the smooth operation of the seed sector.

The National Seed Policy for Afghanistan was developed through a bottom-up approach during a national seed forum that brought together stakeholders in the sector. As a result, in 2005, the Afghanistan National Seed Policy was officially published, translated into Dari and English, and widely circulated. To reflect recent changes in the country – particularly in the agricultural sector – the policy was reviewed between October 2011 and February 2012 and a revised version produced. The 13-member National Seed Board was formed to oversee the development of the national seed industry. The Seed Policy clearly outlines the responsibilities and roles of all stakeholders in the industry.

Seed law

Seed laws are designed primarily to improve the overall quality of seed in the marketplace, protect farmers from seed of low quality and provide a facilitating environment for the development of local seed enterprises. While legislation has an important role, there are many aspects of seed sector operations that are best managed through voluntary procedures. Such aspects are covered in policy documents, and seed law and policy are thus complementary: policy provides objectives and a framework within which the law operates in certain key issues (notably, those relating to seed quality and the legal mandate of the authority in charge of implementation). Seed laws may need updating to reflect policy priorities and to meet the needs of farmers, the seed industry and other stakeholders.

"Two heads are better than one" – representatives from numerous sectors worked together to develop the National Seed Policy: Minister of Agriculture (centre) flanked by the FAO Representative and ANSOR Chairman.

The Seed Law of Afghanistan was passed in 2009 to provide a legal basis for the seed industry and to define the framework and essential principles that govern seed production and marketing. It identifies the competent authorities, sets up prohibitions and obligations, and stipulates registration, seed production systems and other quality requirements. The need for such a law reflects a fundamental problem: that the quality and the identity (variety) of seed cannot be assessed reliably by farmers at the time of purchase. Seed laws protect the farmer by establishing a legal obligation for the seller to guarantee the quality of seed by means of standardized inspection and testing procedures (e.g. certification, accreditation and authorization). The procedures in turn protect and promote enterprises that engage in quality seed production.

Seed rules, regulations and procedures

Seed regulations and procedures are essential for providing the meaning of the technical terminology used in the seed law and for elaborating the technical procedures to be adopted for implementing each specific objective or provision of the law.

d. Institutional development in the public sector and impact on the seed system

Variety development and breeder seed production by ARIA

In order to achieve rapid results with limited resources, advanced breeding lines were obtained from international research centres, including CIMMYT, ICARDA, CIP (International Potato Center), IRRI (International Rice Research Institute) and ICRISAT (International Crops Research Institute for the Semi-Arid Tropics), for testing in the main agro-ecological zones. This made it possible for ARIA, in collaboration with the project and other partners, to release 17 new varieties (including 11 wheat varieties) (see Table 2).

Table 2: Wheat varieties released in Afghanistan (1992–2013)

SN	Variety	Type	Year of release	Source	Pedigree
1	Bakhtawar-92	Spring	1992	CIMMYT/ICARDA	JUP/BJYURES
2	Inqilab-91	Spring	1992	Pakistan	PB19545-9A-0A-OPAK
3	Pamir-94	Winter	1994	CIMMYT/ICARDA	YMH?TOB/3/LIRA SWM16#
4	Gul-96	Winter	1996	CIMMYT/ICARDA	ID800994.W/VEE
5	Ghori-96	Spring	1996	CIMMYT/ICARDA	PRL'S'PEW
6	Takhar-96	Spring	1996	CIMMYT	VEE#7/OPAT
7	Dayma-96	Spring	1996	CIMMYT	HD2206/HORK//BUC/BUL
8	Rana-96	Facultative	1996	CIMMYT/ICARDA	CA8055/6/PATOR/CAL/3/76/BB/CN015/CAL//CNOSN64/4/CNO/NAD/CH
9	Roshan-96	Facultative	1996	CIMMYT/ICARDA	BLOUNDAN/3/Bb//7C/*2//Y50E/KAL*3
10	Ghazana-97	Winter	1997	CIMMYT/ICARDA	AGRI/NAC
11	MH-97	Alternative	1997	CIMMYT	Attila
12	Miwand-97	Facultative	1997	CIMMYT	F134
13	Amu-99	Facultative	1999	CIMMYT/ICARDA	Bloyka
14	Mazar-99	Facultative	1999	CIMMYT/ICARDA	PASTURE
15	Herat -99	Facultative	1999	CIMMYT/ICARDA	MYNA/VUL/PRL
16	Lalmi-1	Facultative	2000	CIMMYT/ICARDA	FOW-1
17	Lalmi-3	Facultative	2000	CIMMYT/ICARDA	FLRKWA-3
18	Lalmi-2	Facultative	2002	CIMMYT/ICARDA	BOBWHITE/MN 72131/PVN
19	Parva-02	Facultative	2002	CIMMYT	CHTO/ARDEA//SRN_2
20	Solh-02	Facultative	2002	CIMMYT	OK82282//BOW/NKT
21	PBW-154	Spring		India	HD2177/HD/2160
22	Darulaman-07	Facultative	2007	CIMMYT	WEAVER/4/NAC/TH.AC//3*PVN/3/MIRLO/BUC
23	Ariana-07	Facultative	2007	CIMMYT	PASTOR/3/KAUZ*2/OPATA/KAUZ
24	Darukhshan-08	Facultative	2008	CIMMYT	CDNO/R143//ENTE/MEXI-2
25	Shishambagh-08	Facultative	2008	CIMMYT	SW89.5181/KAUZ
26	Muqawim-09	Facultative	2009	CIMMYT	OASIS/SKAUZ//*4BCN/3/*2PASTOR
27	Koshan-09	Facultative	2009	CIMMYT	BABAX/LR42//BABAX*2/3/VIVITSI
28	Baghlan-09	Facultative	2009	CIMMYT	KIRTATI//SERI//RAYON (PICAFLOR #1)
29	Chont #1	Facultative	2010	CIMMYT	SERI.1B*2/3KAUZ*2/BOW//KAUZ/4/PBW343*2KUKUNA
30	Darul Aman-13	Facultative	2013	CIMMYT	WAXWING*2/TUKURU
31	Lalmi-4	Facultative	2013	CIMMYT	SLVS*2/PASTOR

The capacity of ARIA staff has been strengthened as a result of:

- the experience acquired in day-to-day variety testing and screening;
- on-the-job training in trial design, management and data analysis; and
- other forms of technical training, including external MSc courses.

The technical efficiency of ARIA stations has been enhanced by:

- the provision of essential equipment and supplies (including plot tractors, seed drills and planters, plot threshers, and spike and bundle threshers); and
- training and guidance in handling, repairs and maintenance of all new equipment.

The above improvements resulted in:

- a stepwise increase in breeder seed production (from 40 tonnes in 2007 to 104 tonnes in 2010); and
- enhanced productivity or multiplication factor of the seed (from 15 in 2007 to 36 in 2010).

Given the need to diversify beyond cereals, the project obtained advanced lines of wheat, potato, rice, chickpea, lentil, mung bean, tomato and eggplant from international and regional research centres for replicated variety trials in the relevant agro-ecological zones. These materials will be the building blocks of new varieties in Afghanistan for years to come.

Visiting team members comparing the fruits of newly bred tomato varieties earmarked for release to farmers at ARIA field in Mazar

ISE and early generation seed production

ISE's seed production was enhanced through:

- adoption of best agronomic practices and technical recommendations;
- vigorous field inspection;
- close monitoring of harvesting and post-harvest operations;
- facility improvements; and
- effective staff training.

Following a stepwise approach, breeder seed (BS) was gradually multiplied into foundation seed (FS) and registered seed (RS); nevertheless, ISE did not achieve its FS objectives in the last 5 years of the project. Although production of FS totalled 344 tonnes in 2007, 488 tonnes in 2008, 1 420 tonnes in 2009, 873 tonnes in 2010 and 601 tonnes in 2011, each year actual production fell significantly short of the set targets, making ISE a relatively weak link in the seed production chain. The problem came to a head in 2010 when, of the FS target of 2 000 tonnes and a field inspection estimate of 1 454 tonnes, ISE ultimately produced only 873 tonnes, at a time when the demand for FS by private enterprises was rising rapidly.

Although ISE's weakness appears to be largely structural, a change to its current parastatal status is unlikely in the foreseeable future, given the lack of political support for privatization measures advocated by the project. On the contrary, ISE is being considered for more central and crucial roles in the national seed industry, despite the fact that the success of such a strategy is by no means guaranteed.

Visit to the seed conditioning hall of ISE Herat (photo on left). Newly aquired equipment for vegetable crop seed production in Mazar (photo on right)

ISE's performance improved greatly thanks to technical backstopping which led to progress in crop management and an increase in the cultivated area of FS and RS. Although the FS cultivated area increased from 101 ha in 2007 to 463 ha in 2011, the injection of RS into the production chain limited the expansion of FS cultivation. The increase in area was accompanied by a significant rise in field quality standards, as shown by the drop in rejected area from 19 percent in 2007 to 1.2 percent in 2012. However, each year, the actual production of FS and RS fell short of the planned targets. There were significant differences in performance between stations, with Herat – and to a certain extent Mazar – maintaining higher standards. Overall, the multiplication ratios of seed of different classes indicate proficiency of the seed production system (Table 3).

Table 3: Multiplication ratios of various classes of wheat seed at ARIA, MAIL, 2013

Class of seed used	Seed rate kg/ha	Seed yield kg/ha	Multiplication ratio
Breeder	125	3 750	30
Foundation	125	2 500	20
Registered	125	1 875–2 500	15–20

National Seed Board and seed sector coordination

The Seed Law was finally enacted and published in the Official Gazette in December 2009. The National Seed Board (NSB) then became operative, although the key affiliated bodies – the Seed Certification Agency, the Variety Release Committee and the Seed and Plant Health Inspectorate – were yet to be officially proclaimed. The NSB meets under the Chairmanship of the Technical Deputy Minister of MAIL to discuss critical matters, including seed pricing and the annual seed distribution campaign. The National Seed Secretariat building is the focal point for seed industry coordination. Affiliated bodies of the NSB have been proclaimed and seed rules, regulations and procedures drafted.

Variety Release Committee

The project carried out testing and screening in agro-ecological zones around the country, in close collaboration with ARIA field stations, and identified two outstanding varieties, presented at a special session of the Variety Release Committee at MAIL in 2008. Two varieties – Dorokhshan-08 and Shesham Bagh-08 – were approved for release because of their characteristics: high yield potential, tolerance to diseases and sui-

tability for bread-making. As spring wheat varieties, they are particularly useful for farmers at cool, high altitudes, who cannot plant their wheat crop in autumn due to time and water constraints.

Farmers in such locations had previously used traditional varieties and needed new improved materials following a break-out of rust disease caused by a new pathogen, Ug99. In collaboration with ICARDA, CIMMYT and ARIA, the project tested materials for tolerance to Ug99, and in 2009, three new varieties were released. Table 4 lists the varieties released.

Table 4: Seed varieties released in Afghanistan 2007-10

Year of release	Crop	Variety	Collaborating institutions
2007	Wheat	Darulaman-07 Ariana-07	ARIA, CIMMYT, FAO
2008	Wheat	Dorukhshan-08 Sheshambagh-08	ARIA, FAO
2008	Mung bean	Mash-08 Mai-08	ARIA, ICARDA, FAO
2008	Maize	Shamal-08 Sharq-08	ARIA, CIMMYT, FAO
2009	Wheat (Ug99-tolerant)	Moqawim-09 Kushan-09 Baghlan-09	ARIA, CIMMYT, FAO
2009	Winter wheat	Autan Exotic Sosan	ARIA, French Cooperation, FAO
2010	Wheat (Ug99-tolerant)	Chonte-10	ARIA, CIMMYT, FAO
2010	Maize	Zoodrus-10	ARIA, CIMMYT, FAO

e. Seed marketing

Promotional and educational campaigns

Activities were planned to create awareness of improved varieties and quality seed. Seed enterprises organized field days to showcase the yield and other quality merits of the improved varieties distributed to farmers. Such events took place as on-farm demonstrations on contract growers' fields and at venues for field-level practical training and extension. Thanks to wide publicity in surrounding villages, large numbers of farmers came to see the performance of new varieties and were able to hold discussions with technical officers and enterprise members.

A record number of 32 field days were organized by the project during 2012, involving 54 enterprises and attracting over 4 560 farmers

(see Table 5). This is expected to translate into increased direct sales of certified seed in farming communities as awareness about quality seed spreads.

Table 5: Number of seed campaign field days organized (2007–12)

Region	Number of seed campaign field days						Number of participants
	2007	2008	2009	2010	2011	2012	
North	2	3	6	4	6	7	4 200
Northeast	2	2	3	4	9	9	5 770
East	2	3	4	2	4	7	2 612
Centre	1	1	1	3	4	1	1 630
West	3	6	6	4	5	6	3 364
South	0	1	1	2	0	2	770
TOTAL	**10**	**16**	**21**	**19**	**28**	**32**	**14 050**

Field day in Kunduz, May 2012

Field day in Jalalabad, April 2012

f. Role of farmers

A study was undertaken in 2007–08 to determine the productivity of improved and local varieties of wheat and other crops in irrigated and rainfed areas, with and without fertilizer. Farmers produce seeds (see Table A3.3, Annex 3) which are certified (Tables A3.4 and A3.5) and distributed for planting (Tables A3.6 and A3.7). Questionnaires were used to interview 29 small-scale private seed enterprises in 11 provinces, and 4 598 farmers of 16 provinces in 82 districts and 978 villages, and it was revealed that 12 000 tonnes of seed were produced and sold by seed enterprises (with an average margin of 20 percent), accounting for 95 percent of the total certified seed produced in the country. Use of improved varieties produced a yield increase of 33 percent in irrigated conditions, while use of quality seed enhanced yield by 28 percent[6].

[6]Sam Kugbei, 2010.

g. Capacity strengthening

An international human resource development consultant was hired by the project in 2008 and 2009 to assess the training needs of certified seed-producing enterprises and to develop a training plan. The plan focused on financial management and accounting training; it organized overseas study tours and workshops on seed enterprise management to enable Afghan entrepreneurs to engage in in-depth discussions with a number of smaller external seed companies comparable to those now operating in the country. Crop husbandry, care and post-harvest handling are also covered, both in the seed enterprise management manual and in on-the-job informal training at all seed production locations across the country. Project and MAIL extension staff, extension agents of seed enterprises and contract growers, are all involved in the training activities. Topics include: starting new seed enterprises; selection of varieties and growing crops for seed purposes; costs and benefits of seed production; business and production planning; processing and packaging; storage; quality control; promotion and marketing; and routine enterprise management. Seed enterprise training was organized for new seed enterprises in Kabul in February 2011.

IV. A Case Study: Local Seed Production Targeting Food Security

a. The problem: cumulative food insecurity

In the 1990s, the central and northern regions of Afghanistan underwent frequent food shortages, resulting from natural calamities and internal conflict. Indeed, the central region faces frequent food deficits due to man-made disasters and its geographical location. Increased internal displacement – especially of farmers at crucial times in the cropping season – and climatic aberrations forced aid agencies to divert their already limited resources and procure food from outside to respond to emergency situations. This placed additional strain on an already shattered economy, leading to major social and economic setbacks with national and international ramifications.

Over time, lack of food and high prices reduced the nutrition level of the population to a minimum and the occurrence of tuberculosis and other diseases rose sharply. The psychological and emotional disorder of the population was an enormous problem for aid agencies working in the area. FAO managed to remain operational, and this study illustrates the role played by FAO, specifically in the most challenging period from 1997 to 2000.

Food security in Hazarajat was gradually eroded by civil war, and by autumn 1997 the poorest groups were in a critical situation. Crops are grown at 2 000–3 000 m and the frost-free period is short, hence varieties must be early-maturing and short-season. Also in times of peace, the food security of the region is characterized by an annual wheat deficit made up by imports from outside the region and paid for by selling livestock and cash crops, mainly potatoes.

b. The response: the case of Hazarajat

A small-scale emergency seed programme began in Hazarajat in 1997 to reduce food shortages by guaranteeing sustainable access to new and high-yielding technologies for rural communities. FAO concentrated on the use of locally produced seed of improved wheat varieties to enhance food security.

Seed production was initially promoted in the more accessible districts of Bamyan, Yakawlang and Panjab in Bamyan Province, with gradual expansion to more remote areas planned for when security and logistical support were adequate. Seed production activities in Bamyan District were carried out by an NGO contracted as FAO's IP. This case study describes the direct implementation of a parallel seed production programme carried out by a local NPPP (National Professional Project Personnel) resident in the area.

In August 1997, the FAO suboffice in Mazar transported a small quantity of wheat seed and fertilizer to Yakawlang District in Bamyan Province. There, 1.4 tonnes of seed of two improved winter wheat varieties plus fertilizer were distributed on credit to 28 farmers nominated by 10 community groups representing 72 villages (see Table 6). The 1998 season was particularly bad for rust disease all over Afghanistan, as many varieties had lost resistance. One of the improved varieties introduced, Pamir-94, was both rust-resistant and high-yielding. Farmers witnessed these advantages in field demonstrations held throughout the district.

At harvest, in August 1998, despite military activity in the region, a total of 15.8 tonnes of Pamir-94 wheat seed were procured from farmers in Yakawlang, in exchange for WFP food wheat. The seed was cleaned using local methods, redistributed on credit to 322 farmers (with an appropriate amount of fertilizer) and sown in autumn 1998.

Table 6: Distribution of seed and fertilizer inputs in Yakawlang, 1997 and 1998

District	Farmer seed producers (number)	Inputs distributed 1997 (tonnes)		Wheat procured (tonnes)	Inputs distributed 1998 (tonnes)		Wheat procured (tonnes)	Value @ USD 300/tonne
		Seed	Fertilizer (DAP+Urea)	1998 actual	Seed	Fertilizer (DAP+Urea)	1999 actual	1999 estimate
Yakawlang	516	1.4	40.0	15.8	10.0	15.0	163.4	49 020

In October 1998, under an emergency proposal funded by the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the FAO programme purchased and successfully transported by truck (from Jalalabad and Kabul to Bamyan and Yakawlang) 19 tonnes of seed of facultative spring wheat varieties (HD-2285 and Bakhtawar-92) and 38 tonnes of fertilizer for spring planting and harvest in 1999. Of this quantity, 2.5 tonnes of seed and 10 tonnes of fertilizer were taken from Yakawlang to Panjab District and distributed among farmers for spring sowing. However, in 1999, spring-planted wheat was completely lost due to drought.

In September 1999, WFP transported 200 tonnes of food grain and 150 tonnes of fertilizer to the region to enable procurement of the harvest and autumn planting of the 2000 crop. The 1999 harvest of winter wheat in Yakawlang resulted in 163 tonnes being procured with the aid of 200 tonnes of WFP food grain. A further 55 tonnes of seed was redistributed farmer-to-farmer. The seed was cleaned using local methods (given the absence of appropriate machinery) and redistributed to farmers in Yakawlang (114 tonnes) and Panjab (19 tonnes) districts for further multiplication in 2000. In addition, in order to begin production of the improved varieties in more remote and food-insecure districts, seed and appropriate amounts of fertilizer were transported in time for planting to Daikundi (Uruzgan) (5 tonnes), Sharistan (Uruzgan) (5 tonnes), Lal (Ghor) (5 tonnes) and Waras (Bamyan) (15 tonnes).

A significant start to alleviating the problem of local food shortages was made. The value of the 1999 procurement was around USD 49 000. With a multiplication factor of 20, the potential yield of this seed (163 tonnes planted by 3 136 contracted farmers) in year 2000 was over 3 200 tonnes (see Table 7). If 50 percent of this yield was redistributed as seed and planted, there would be sufficient seed produced in the 2001 harvest to plant over 250 000 ha. Effectively, the food security needs of the central region would be met within 5 years of the initial intervention.

Table 7: Distribution, planting and target production in 2000 harvest of seed procured at 1999 harvest.

District	Contracted farmers (no.)	Seed (tonnes)	DAP (tonnes)	Urea (tonnes)	Target production (tonnes)	Target 50% redistribution (tonnes)
Yakawlang	2 167	113.942	47.800	47.700	2 278.84	1 139.42
Panjab	330	19.161	15.600	15.600	383.22	191.61
Waras	264	15.238	5.500	5.400	304.76	152.38
Lal	102	5.070	2.175	2.175	101.40	50.70
Dai Kundi	118	5.000	2.150	0.992	100.00	50.00
Sharistan	155	5.000	2.500	2.500	100.00	50.00
Totals	**3 136**	**163.411**	**75.725**	**74.367**	**3 268.22**	**1 634.11**

The potential impact on food security in the region was demonstrated by the intense demand for the seed. Farmers were well aware of the high yields these varieties could achieve: as much as 5 tonnes/ha, i.e. 3–4 times the yields of local varieties.

c. Developmental impact of seed programme

The result of this activity – begun in 1997 and carried out under sometimes extremely hazardous conditions – was that a mixture of winter and facultative spring wheat was introduced to the region (Bamyan, Ghor and Uruzgan provinces). In highland areas, it thus became possible to cultivate autumn-planted, instead of spring-planted, varieties and avoid crop losses caused by spring droughts.

The case of Hazarajat (1997–2000) shows that the drive to ensure food security in the region in as short a time as possible depends on the introduction of other new improved wheat varieties and the strengthening of training (extension) to enable farmers to realize the full benefits of the new technology. With limited initial input, well-planned programmes implemented by well-trained and determined local staff, are able to achieve their goals (provided there is no external interference); this was the case of the Hazarajat programme, which reached its targets and shows that food security is a realistic goal, even in the most inaccessible and poorest areas.

V. Personal Testimonies of FAO Representatives and Staff

This section outlines the key role of FAO and its representatives in the successful implementation of the "Seed Project" and includes personal accounts by people directly involved in the project, based on their own experience and with specific attention to their views on:

- achievements and the extent to which the objectives were met;
- security and how the ongoing civil unrest affected, if at all, project implementation; and
- future prospects, highlighting any particular concerns.

a. FAO Representatives in Afghanistan

For sustainable increased crop productivity, it is necessary to:

- develop, release and catalogue appropriate varieties;
- develop seed production planning;
- implement a systematic seed production system to ensure controlled seed increase – from a limited quantity produced by the plant breeder to a sufficient quantity for farmers – using a limited generation system of seed multiplication (certification process);
- establish an efficient decentralized seed production system involving public-private partnership; and
- put into effect appropriate seed legislation and regulatory processes and procedures to protect both seed producers and buyers.

These objectives could not have been achieved in Afghanistan without the support of MAIL senior management and donor representatives, combined with the full collaboration of FAO to oversee the technical support. Three FAO Representatives, namely Mr Serge Verniau, Dr Tekeste G. Tekie and Dr Ousmane Guindo, successfully steered the seed project in Afghanistan during the emergency/rehabilitation phase, through to the consolidation of in-country seed production and seed industry development.

Selected press releases from the FAO Representative in Afghanistan between 2007 and 2010 highlight the tremendous impact of the seed project on Afghan agriculture:

- In 2007, two events are announced, both firsts for Afghanistan:

"the introduction of seed and plant health to facilitate increased productivity through a reduction in the spread of pest and diseases, including invasive types" and "the availability of internally produced certified seed in Afghanistan".

- In 2008, four major breakthroughs are reported: "successful cataloguing of wheat varieties of Afghanistan in collaboration with MAIL and ICARDA; …developing of an umbrella organization for seed producers of Afghanistan called Afghanistan National Seed Organization (ANSOR) to, amongst many things, serve as lobby body for actions to facilitate seed sector goals and objectives; … release of two new varieties as part of the strategy to mitigate some of the consequences of climate change; … and coordinated meeting of seed enterprises to plan for seed production for the following season".
- In 2010, the legal seal for seed industry activities is finally achieved, providing "legal backing for all activities of the seed sector".

The two most recent FAO Representatives in Afghanistan provide their insights below:

Dr Tekeste G. Tekie, FAO Representative, April 2007 to October 2011

The seed project delivered tangible results to both Afghan farmers and the Government of Afghanistan, with positive effects also for the donor (EU) and the executor (FAO):

- The project exposed Afghan farmers to a range of certified seeds, in particular of wheat. They had access to high-yielding crop varieties which enhanced their income and allowed them to set up seed companies that delivered world class quality certified seeds to the wider farming community. Nearly 100 seed companies were set up between 2007 and 2011, resulting in 300 000 tonnes of wheat seed by 2010. The farmers benefited from visits to neighbouring countries, where they could observe the benefits of seed production; indeed, the Deputy Chairman of Shir Abad Seed Enterprise, Mr Shad Mohammad, reported that the top yield in 2009 was 5 tonnes/ha, but his goal was to reach an average yield of 5 tonnes/ha "as we have seen in India". Furthermore, the project created a national umbrella seed producers' association, ANSOR (Afghanistan National Seed Organization), in order to ensure long-term gains.

- MAIL benefited from the project, given the significant increase in seed production: the 2011 certified wheat seed production of 30 000 tonnes accounted for 10 percent of the annual seed requirement for the entire country – a significant achieve ment by any standard. Subsequent higher yields narrowed the gap towards food self-sufficiency in Afghanistan. The project also enabled the Government to enact seed law and seed policy to preserve and safeguard the country's seed sector. The office buildings and research stations established by the project can continue to function with government commitment. Finally, the country's professional capacity is now much greater, since although FAO employed a limited number of international and national staff, it was mainly MAIL staff who actually executed the project.
- The EU is associated with a huge success story having made a relatively modest financial contribution. It provided support to the Afghan farmers and MAIL through the expertise of FAO. There would be hardly any other EU funded project that has achieved so much in comparison with the financial donation.
- The seed project provided an opportunity for FAO to clearly demonstrate what it is capable of with its expertise and leadership. Without exception, the project's objectives were reached.

During Tekie's period of leadership, the dedicated team was headed by Dr Samuel Kugbei who deserves credit for the achievements: it was FAO who provided the support, but it was the team who delivered the goods. As FAO Representative, Tekie made frequent field visits, giving encouragement to field staff and meeting farmers all over the country, and during his period in office, links were created with other projects such as Irrigation and Plant Protection (Farmer Field School, IPM). All the FAO staff were made welcome, and this was stressed by a farmer in northern Afghanistan who affirmed that "here FAO is welcome, no one will touch FAO".

Dr Ousmane Guindo, from 21 December 2011 to 21 June 2014

The impressive achievements of FAO's 25-year involvement in the Afghan seed sector and, in particular, the 10-year EU-funded seed project compelled Guindo to bring them together in this reference document for use by policy-makers, seed professionals, donors and all other stakeholders.

The achievements include the following:

- Seed workshops in autumn, winter and summer. They provide an excellent opportunity to assess the availability, quality and mar-keting opportunities of improved wheat seed in the country. The fact that the workshops are opened by H.E. the Minister of Agriculture, Irrigation and Livestock is testimony of their importance to MAIL.
- Production, marketing and distribution of improved wheat seed through over 120 PSEs., with the support of FAO.
- Development of the MAIL-approved seed policy and regulatory framework, and of the seed law and regulations, with the assistance of FAO.
- Establishment of the basis for a national Seed Certification Agency, with the assistance of FAO.

The above accomplishments would not have been possible without the involvement of farmers, national MAIL staff and PSEs, together with the dedicated support of FAO staff (national and international) and the financial assistance from donors over a long period. The seed projects were embedded within the national seed secretariat, which facilitated the transfer of knowledge among and the capacity-building of staff and institutions.

Looking to the future, FAO will continue to have an important role in private seed certification, distribution of planting material and diversification of crop seeds. In addition, attention must be given to capacity–building, in particular to the professionalization of ANSOR and its members' seed companies.

b. FAO international staff

The FAO Representatives steered the activities of FAO in Afghanistan during the difficult start-up phase of the project. They were backed up by two outstanding international experts, without whose innovation, dedication and vision, the seed project activities would not have succeeded in turning field problems into opportunities.

Narendra Singh Tunwar, Chief Technical Adviser, Afghanistan Seed Project (1992–2004)

Mr Tunwar, an Indian national, served as the Senior Technical Adviser (Seed) from January 1992 to February 2004. In a period of extreme unrest,

he had a bunker beneath his office in the seed complex of Herat and it was he who inspired community IPs and food-for-seed. He was the trusted go-between of the Government and the rebels, as both parties relied on his agricultural expertise. His team of dedicated local officers ensured that, despite the hostilities and very real dangers, farmers in troubled areas still obtained seed supplies for planting. Tunwar received written commendation from both the Government and the rebels, as well as the FAO Sen Award for the excellent performance of duties.

Despite the seed project's low profile during his tenure of office, its results were prolific, and Tunwar commented: "a sea turtle lays many eggs, buries them in the beach sand and walks away quietly, while a hen lays fewer eggs and makes a lot of noise". Despite his personal knowledge and vast experience, he was reluctant to express an opinion on the project's achievements, but he did stress that the experience of working without an implementing partner, a government, was unique: "It was a memorable experience because nobody thought that a national programme, especially a seed programme, could be implemented without a proper government."

Although the civil unrest and serious security risks created obvious problems, the fact that the production base was constantly changing actually had its advantages and made it possible to "maintain a generational seed multiplication chain".

In the future, the private sector should be allowed to take over the role of production and distribution of seed on a commercial basis.

There has been some dispute about whether the seed project produced financial gain for contract seed farmers. However, Tunwar argues that "seed security precedes food security" – as is demonstrated by the Hazarajat case study above. Crucially, "no farmer ever lacked food".

Dr Samuel Kugbei, Chief Technical Adviser, Afghanistan Seed Project (2003–2011)

Dr Samuel Kugbei worked on the FAO-implemented project as Senior Technical Adviser/Privatization Expert from October 2003 to December 2006 and then as Chief Technical Adviser/Team Leader from January 2007 to August 2011. He is currently based at FAO headquarters in Rome and his duties include technical backstopping for Afghanistan. He expanded

the scope of the project and turned the centralized seed programme into an emergent industry with more than 100 private seed enterprises. He established the administrative and regulatory framework required to transform the seed programme into an industry with public-private partnerships. While the project phase guided by Tunwar had concentrated on QDS seed and food-for-seed innovation, the phase under Kugbei focused on the foundation of PSEs in the country, made certified seed available in Afghanistan and promoted seed diversification in order to achieve sustainability in the industry.

In November 2003, the idea of seed enterprises was born in Baghe Shamar next to a drying floor, as part of a scheme to "help a dynamic farmer, Mr Sultan Daud, establish a small-scale seed enterprise in his local community". In May 2005, "the first field of wheat seed crop was established". In September 2006, the Sultan Daud Seed Enterprise was under construction and business could begin. The project was not without danger and, unknown to Kugbei, a suicide bomber was attending a training course with a mission to blow up the meeting where two foreigners (including Kugbei himself) were teaching farmers. In an extraordinary turn of events, the would-be bomber found the course "highly useful" and changed his mind.

This is where it all began, next to a drying floor in 2003

The first field of wheat seed crop established by Sultan Daud Seed Enterprise in 2005

In 2006, a small-scale seed enterprise under construction

Sultan Daud sitting at his enterprise desk discussing business in 2009

In June 2009, the Sultan Seed Enterprise Compound

Training course in 2008 attended by a suicide bomber, who changed his mind after attending the course

The Seed Enterprise Training Programme in 2008

The project's major achievement was "*getting farmers to produce and sell certified seed and to do so as sustainable businesses. It shows that dreams can indeed come true if you put your heart to it and give it your all.*"

The security risks did not ultimately hinder the project's success. "*Security risks have not deterred farmers or dampened their spirits. Rather they have become more resolved in their approach.*" Meetings were "*full to capacity and the enterprises continued to grow in number, as "project staff, government counterparts and farmers supported each other".*

By the end of his period of office, the contract seed farmers had become very successful, but it was important to keep looking forward. In particular, future success would depend on "public–private partnership". Dr Kugbei concluded that "it is important not to take achievements for granted but to build on little successes made over time".

Dr Michael Larinde, Backstopping Officer, Afghanistan Seed Project (1999–2009)

The development of the Afghanistan seed industry was undertaken against all odds. Nevertheless, thanks to the determination of FAO's national and international experts, the unrelenting financial support of

donors and FAO's technical support, a comprehensive seed industry was created, despite the absence of an administrative and legislative framework and the lack of support.


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The development of the seed industry during year of instability was characterized by its nomadic nature, as the production base shifted repeatedly to cope with the security situation and to maintain an unbroken chain of generational seed production. The absence of a government IP was an additional feature, but one colleague is cited as saying "things work better without a government". The successful development of the seed sector was due to three main players:

- The team, who had knowledge, dedication, creativity and ingenuity. The team's successes included: introduction of the food-for-seed scheme; development of IPs among NGOs; use of trailed mobile seed cleaners, towed between communities to do contract seed cleaning; and application of a code of conduct to consolidate a competent seed inspectorate.
- The staff, who displayed honesty at all times. Given the confusion which characterized the development phase of the project, they could easily have chosen to opt for personal gain. On the contrary, "I recall an incident when local staff, in the absence of international staff at the time evacuated from Afghanistan to a neighbouring country, responded to the advance of plundering forces by cleverly digging holes in walls to bury money that had been made from seed sales and motorcycles used for seed inspections."
- The donors, particularly the EU, who showed trust and unwavering support. Their commitment to a project which could have been considered doomed from the start, permitted the replacement, at a cost of over USD 4 million, of seed equipment that was either looted or destroyed.

By the end of Larinde's period in office, the Afghan seed project was at an advanced stage, and with continued technical support and additional funding from donors in the area of production diversification, seed marketing and crop transformation activities, the seed industry was on the way to becoming sustainable and the country food secure.

c. FAO national staff

Ahmad Zia Aria, Regional Seed Coordinating Officer and Regional Coordination Officer, FAO projects in North Region, Mazar-e Sharif

Mr Aria joined FAO in February 1995 and was involved in the seed project from 1996 to 2004 as the National Professional in Crop Improvement, focusing on variety development, and seed procurement, distribution and multiplication.

Mr Ahmad Zia Aria, Regional Coordinator for Mazar-e-Sharif

"Part of the 2003 'bumper harvest' can be attributed to FAO. The regular programme made available a range of rust-resistant varieties which were then distributed by the emergency programme, and more land was cultivated as a result."

Similarly, the FAO/WFP Crop and Food Supply Assessment Mission to Afghanistan 2003 report describes how:

> "in most cases, the farmers identify the seeds they prefer and select those samples that are suited to their situation and with which they are familiar. Seeds of wheat varieties released in the last decade or so are known to the farmers by name or by origin and include, among others, Kauz, Pamir 94 and Roshan 96. Such seeds have become established and were noted to be used in all provinces visited. They are recognized as being responsive to fertilizer applications provided water is available."

The End of Assignment report by Mr Fitzherbert, former FAO Programme Coordinator and Agricultural Adviser, confirmed the project's success:

> "Few countries in a similar political state to Afghanistan can boast having 18 or 19 up-to-date and well-proven wheat lines in their programme and the capacity to multiply up to 20 000 tonnes of Quality Declared Seed and more with additional funds."

Mr Aria with the team during a visit to Shir Abad Seed Enterprise, Mazar; Alhaji Shah Mohammad Khan

Mr Aria with the team during a visit to Shir Abad Seed Enterprise, Mazar; Haji Abdul Ghani Sharaf, Head of Baba-i-Dehqan

The seed project's achievements included:

- release of 45 new high-yielding varieties of different crops;
- establishment of the National Seed Committee;
- drafting of the Seed Policy in September 2005 and its revision in November 2012;
- enactment of the Seed Law and drafting of the Seed Regulation;
- establishment of ANSOR, which gained membership of APSA (Asia and Pacific Seed Association) , ECOSA (Economic Cooperation Organization Seed Association) and ASTA (American Seed Trade Association);
- increase in the production of certified seed from 2 500 tonnes in 1995 to 30 000 tonnes in 2012;
- improvement of seed quality since the beginning of in-country seed production from 1995, with the establishment of seed laboratories in six regions and staff trained locally and abroad in seed quality assurance;
- upgrading of MAIL staff capacity, with scholarships (ten MSc degrees), fellowships and study tours abroad;
- establishment of the National Seed Board and affiliated bodies (Variety Release Committee, Seed Certification Agency and Seed and Plant Health Inspectorate);
- publication of the National Wheat Catalogue;
- establishment of new private seed companies (eight in 2004 reaching 114 PSEs), with storage and office facilities and, to boost productivity, seed drills, tractors, seed processing, vegetable seed processing and packaging machines supplied to private and public seed enterprises; and
- organization of market promotion activities, such as field days, travelling workshops, seed fairs, study tours, APSA congress, meetings, workshops, conferences and symposia.

Despite immense difficulty and high security risks, commitment to the project did not wane. For example, when the PEACE office (FAO, UNOPS, Comprehensive Disabled Afghans Programme [CDAP] and United Nations Centre for Human Settlements [UN-Habitat) was located in Bakwa District, Farah Province, "I had to make the daily 130-km journey to Dilaram District in Nimroz Province to buy bread for the labourers who had come from Herat for practical experience in variety identification . If the bread supply was refused by the District Governor,

then I would drive a further 200 km to and from Farah."

Thanks to this level of commitment, the QDS production objectives were achieved with only 20 farmers, and in 1999 1.5 tonnes of Myna/Vulture were released. The Variety Release Committee rewarded their tenacity by naming the variety 'Herat-99'.

Even September 2001 did not bring an end to the project, and when UN agencies paid three months advance salary to their staff and allowed them to leave, the FAO staff stayed in Herat, reporting regularly to work in the face of danger. Aria describes how in this period he "went to Murghab and spent one week distributing 30 tonnes of DAP fertilizer along with 60 tonnes of seed to 600 farmers, and then returned to Herat," maintaining that "if the seed had not been distributed, it would definitely have been stolen".

Contract seed farmers benefited enormously from the project and the 5 000 contract seed growers at the beginning of the programme grew to 6 783 farmers under the PSE contract seed growers' scheme. The seed growers were rewarded for their hard work and involvement and during variety trials in Khowja Malal village in Kushk Rabat Sang District, Hirat Province, they stayed even in very cold weather and observed the organization and planting of the wheat trials. For example, Haji Mohammad Arif accompanied the team from field to field and "assisted the FAO teams in all aspects of seed production" and eventually established the Dorokhshan Seed Company.

A strong foundation has been laid for the seed industry of Afghanistan, and any future players must follow on from FAO's work. Seed certification needs to be strengthened and managed with maximum transparency. To guarantee the quality of seed produced in the private and public sectors, additional equipment and further capacity-building is necessary.

Ghalam Nabi, Driver, Mazar-e Sharif

Mr Ghalam Nabi joined the seed project as a driver in 1988, and is now also responsible for maintenance, ensuring proper functioning of field and seed equipment. FAO's contribution has been "invaluable", matched by the commitment of local workers: "the value of our service to the farmers is more important than temporary riches" – with reference to an incident in 1999 when Nabi risked his life to com-

Mr Ghalam Nabi, Driver/Mechanic of the seed project, Mazar.

plete a seed transaction when it would have been simpler and safer to take the cash for himself. On that occasion, the international staff had been evacuated just as the seed had been harvested, processed and was ready for delivery. With no official pick-up available, Nabi reached the farmers by taxi. Having collected the money for the seed, he found himself in a life-threatening situation that broke out in the streets, just as he was on his way to process a bank transaction for the project. It would have been simpler and safer to take the cash for himself, but he chose to complete the transaction. Service to the farmers was more important than personal gain. Given the success to date of the project, Nabi is keen for FAO to carry the seed industry through to completion.

Nabi Gul, Regional Coordinator, FAO seed project, Herat

Mr Gul joined the project in May 2004 as National Seed Coordination Officer. He organized and managed the First National Seed Fair with the theme "Diversity and Knowledge for Seed Security", held in Herat in September 2007. The fair attracted an estimated 35 000 visitors from Herat and other parts of the country over three days and provided a platform for interaction between input dealers and producers. It had 141 stalls displaying seeds and varieties of a diverse range of crops, showing that Afghanistan is an origin and custodian of rich plant genetic diversity.

Visiting farmers and seed growers, NGO representatives and government officials were able to view 89 kinds of seeds of different crops and agricultural products displayed by farmers and seed traders. There were more than 600 varieties of wheat, rice, barley, chickpea, maize, millet, sorghum, mung bean, bean, broad bean, baquli, moshing, alfalfa, clover, lentil and other crops on display, and they were eventually collected by FAO and submitted to MAIL for storage in the germplasm bank.

The seed programme's achievements include:

- increased yields of wheat, maize, rice, mung bean and other crops, as a result of the production and distribution of improved seed to farmers, with 6 323 000 tonnes of cereals produced in Afghanistan in 2012 according to the Agriculture Prospect Report.
- supply of improved seed to over 34 provinces in Afghanistan;
- preparation of the Seed Law;
- drafting and revision of the Seed Policy;
- development of seed sector regulations in Afghanistan (ongoing);
- realization of travelling workshops, National Field Day and seed fair;

- provision of technical training; and
- release of new varieties of wheat, mung bean, maize, rice, chick-pea and other crops.

Wheat is a high volume/low profit self-pollinating seed crop, and its production has increased thanks to government subsidies, which may now cease with privatization and liberalization. The private sector may choose to concentrate on low volume/high profit crops with real market demand in preference to wheat seed, because the nature of the wheat crop makes seed saving easy and farmers, therefore, do not replace their seed often.

Mr Nabil Gul explains the procedures at the Herat Seed Testing Laboratory as the result of a purity test is calculated

To improve its prospects for the future, the seed industry in Afghanistan should consider:

- provision of long-and short-term credit;
- establishment of an agricultural development bank;
- enhancement of breeders' technical skills; and
- increasing the technical capacity of MAIL personnel to produce hybrid seed.

A visit to Hambastagi Seed Enterprise: (right to left) Mr Enayatullah Seed Laboratory Assistant (FAO), Mr Gul Ahmad, Community Seed Assistant (FAO), Mr Arif Khan, Head of Dorokhshan Seed Enterprise and Mullah Abdullah, Contract Seed Grower.

Hambastagi Seed Enterprise, Mr Mullah Abdullah, the longest-serving contract seed farmer, addresses the team.

Khaja Mohd Musafar Seed Enterprise: Mr Abdul Satar (non-certified seed grower), Mr Wali Mohd (newly contracted grower), Mr Enayatullah (laboratory assistant, FAO), Mr Nematullah (member of enterprise), Mr Nabi Gul (RNSCO/RCO) and Mr Farid Aziz (head of enterprise)

Abdullah Hakimi, Senior Administration/Finance Assistant, FAO, Herat
Mr Hakimi joined the FAO seed project in 1998 as a clerk and rose to Administrative Assistant in Herat. He was involved in the establishment of private seed enterprises and was particularly influenced in his work by the tale of a farmer in Yakawlang District, Bamyan Province. The farmer gave him a glimpse of the importance of FAO's work and seed for Afghan farmers:

"If it were not for the efforts of FAO, my family and I would not be drinking this tea. We used to cultivate local varieties of wheat in spring and harvest in October. In some years, there was heavy snow in October and the crops were badly damaged. There were years when we lost our entire product. We learned that winter cultivation is possible in Bamyan and we received varieties of wheat resistant to cold weather and with a high yield. Thanks to FAO, I can buy food, tea, clothes and many other things for myself and my family."

His experience in the field was positive as, in spite of the ongoing conflict, FAO staff received reassurance that they would not be harmed. The seed project's achievements are wide-ranging:

- bringing food to farm households;
- changing the lifestyle of more than 80 percent of farmers;
- enabling around 80 percent to use certified seed in Afghanistan; and
- avoiding huge shortages in wheat supplies.

However, in the future, further urgent action is needed:

- solution of the corruption problem;
- development of the seed sector, for which MAIL employees need to be motivated and committed;
- support from MAIL to PSEs through short- and long-term loans and subsidies for chemical fertilizers;
- production of sufficient high quality wheat seed nationally and distribution to farmers (given that wheat is the main staple and strategic crop in Afghanistan, and every man, woman and child is dependent on it);
- establishment of a seed certification agency;
- implementation of the Seed Law;
- strengthening of ARIA and ISE; and
- provision of subsidies for the wheat crop.

Nazila Jamshidi, Laboratory Assistant, Herat[7]

Ms Jamshidi worked at the Herat Seed Test Laboratory, and was responsible for recording the seed samples and testing their purity under a microscope. She takes pride in "contributing to find better seeds for farmers." Not only does she consider her work important, the USD 500 wage also allows her to support her family and care for her sick mother, as well as save a small amount for the future.

Fariha Azimi, Laboratory Assistant, Herat[8]

Purity analysis at the Seed Testing Laboratory in Herat

Ms Azimi also worked at the Herat Seed Test Laboratory, planting, watering and collecting seeds. While she began as a cleaner and laboratory assistant, she recalls how "my colleagues helped me so that my work could become more specialized". As for her colleague mentioned above, the wages she earns make a big difference to her family. It can be difficult in this country for a woman to work, although the situation is improving.

Mr Mohammad Musa Athar, National Quality Control Officer, Bamyan

Mr Athar joined the seed project in February 2008 as a National Seeds Officer. He organized a travelling workshop in July 2009, during which all the Afghan seed enterprises came to observe farming in Bamyan.

The project's major achievements were the:

- release of new top varieties; and
- establishment of a seed industry in Afghanistan.

He was adamant that the project had not been weakened by security problems, emphasizing that seed enterprises had been created "in 24 provinces of Afghanistan, including Helmand, Farah, Logar, Qandahar and some other locations where the cultivation of opium was the norm", citing the example of the deputy of a seed enterprise in Bamyan, who had opened a motorcycle shop in the bazar with the money he earned from the seed business.

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[7]From FAO News, 6 August 2007.
[8]From FAO News, 6 August 2007.

Future development "should focus on crop diversification, taking into consideration regional climatic conditions".

Mr Shabbuddin Shahab, Information Officer, Seed Project


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A civil engineering graduate, Mr Shahab began work with FAO in 2005. He is head of the seed project database and responsible for all the vital statistics of the seed industry.

He attributes the immense progress made by the project to the hard work of all the staff members – national and international. He boasts about the accomplishment of the project and takes pride in his work, listing the project's achievements:

- increased productivity;
- rapid spread throughout the country of improved varieties through the sale of certified seeds;and
- the vast network created by the EU/FAO seed project.

In the future, he expects the seed industry to act as a catalyst for agricultural development in Afghanistan, with the private sector playing a pivotal role. However, he emphasized that efforts were necessary to not interrupt the chain of activities during the transition to the private sector and Government. Good coordination between the EU project staff and the functionaries of MAIL and the PSEs is essential.

d. Ministry of Agriculture, Irrigation and Livestock staff

Mir Dad Panjsheri, Senior Special Advisor to the Minister of Agriculture


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During the early 1970s, Engineer Mir Dad Panjsheri, having graduated in the United States of America, returned with a passion for seed development and has played a critical role in the development of the Afghanistan Seed Corporation, past and present. He regards FAO's role as crucial and is optimistic that the sector will continue to grow, expressing hope for greater achievements in the sector.

Picture from left to right Ms Nazila Jamshidi, Seed Assistant (FAO), Mr Mohd Esmayel Hyderzada, Head of DAIL, MAIL Consultant and HE Asif Rahimi, Minister of Agriculture, Irrigation and Livestock

Mr Tahir Ataye, Director of Agriculture,Bamian (right), with staff at Bande-E-Amir, Afghanistan's First National Park

e. Non-governmental Organization staff

Najmuddin Mujadedi, Head, Voluntary Association for Rehabilitation of Afghanistan (VARA)

VARA began its collaboration with FAO in July 1990 and the first project was "Distribution of Wheat Seed to Farmers in Bakwa and Jowain Districts of Farah Province". Presently, VARA is producing improved wheat seed, but not as much as was produced during FAO's direct financial support to NGOs in seed production and multiplications. FAO had a huge impact, bringing VARA's wheat seed yield from an initial 1.2 tonnes/ha in 2000 to over 3 tonnes/ha in 2013. In addition, 600 tonnes of maize seed, 350 tonnes of mung bean seed and 10 tonnes of rice seed were distributed to 1 000 farmers for multiplication in Bakwa and Gulistan districts of Farah Province, and Khashrod and Dilaram districts of Nimroz Province, as well as Girishk, Nadali and Marja districts of Helmand Province. Mr Mujadedi describes the farmers as "busy with the cultivation, production and processing of improved seed", while VARA staff were occupied "day and night in seed cleaning, treatment, field visits and farmer training in seed production".

The seed project's greatest achievement was the improvement of the living conditions of vulnerable Afghan people, especially farmers, who previously did not manage to produce sufficient wheat seed, but now produce "a considerable amount of wheat seed for food use, seed reserves and selling to the markets". The Government played a vital role in supporting the industry in terms of seed production, loans, provision of agricultural machinery and buying improved seed, and in encouraging the seed industries "to increase the quantity and quality of the seeds in use all over Afghanistan".

VARA began its operations in the seed industry under very difficult conditions of civil unrest and instability and faced security problems with its Seed Processing Unit (SPU) located in Dilaram District, Nimroz

Province, on the Kandahar–Herat road:

> "VARA lost 14 professional staff (engineers, agronomists and agriculture extension workers and veterinarians) during agricultural project implementation in areas of Helmand, Nimroz and Farah. On three different occasions there were attacks on the VARA SPU in Dilaram; four people were killed, seed cleaning machines, vehicles, trucks, tractors and other machinery were destroyed and a thousand tonnes of wheat, maize and mungbean seed were burned."

It was eventually decided to move the VARA SPU from Dilaram to Kandahar, where it operates today. He expressed concern about the future direction of the seed industry privatization programme, particularly the influence of corruption and the possible decline in seed quality.

Saidajan Attiq Abdiani, President, ANSOR, Kabul

Since 2008, all PSEs work under the umbrella of ANSOR, with the support of FAO. Prof. Abdiani highlighted the problems related to insecurity, low capacity and lack of financial resources and proposed the following interventions for the future:

- crop seed diversification
- increase in the introduction of varieties
- greater involvement in research programmes
- strengthening institutional capacities and loan facilities; and
- encouragement of foreign partnerships and support to ANSOR.

ANSOR President, Prof Saidajan Abdiani, and executives with a team member

ANSOR assembly in Kabul, 19 October 2008

f. Voices from the field

- Seed enterprises, farmers and NGOs

The direct beneficiaries of the seed industry are seed and crop farmers, whose productivity increases as a result of the use of good quality seed of appropriate crop varieties. They operate in all regions of Afghanistan

and all agree that the seed project has been "very beneficial in agricultural, environmental, economic, and cultural terms". Their views are outlined below.

Haji Abdul Qader, Hambastagi Seed Enterprise, Herat

Haji Qader started his family seed business with USD 11 000 in 2004. The Hambastagi Seed Enterprise is now worth over USD 50 000 and comprises 5 ha of land, irrigation facilities, offices and seed storage space. A modest production of 250 tonnes of wheat in 2004 rose to 550 tonnes in 2010/11. Nevertheless, the company has had to diversify its seed production to include vegetables, as the demand for wheat seed has decreased as a result of:

- fewer market opportunities as the principal customers – the Government and NGOs – wind down their free seed distribution activities;
- lack of farmer awareness with regard to the impact of quality seed on their productivity;
- the inherent problem of wheat as a high-volume/low-profit crop; and
- the proliferation of seed enterprises in Herat (increasing from three in 2005 to nine in 2013), as seed production is seen as "easy money" for people with the right contacts but no real interest in agriculture.

ANSOR has an important role, but changes should be made if it is to replace FAO in future operations:

- improved coordination with the Government;
- adherence by members to the ANSOR constitution; and
- registration under the appropriate ministry as an association rather than as an NGO.

Haji Arif Khan, Dorokhshan Seed Company, Herat

Haji Khan began as a contract seed grower in the rainfed areas of Herat between 2000 and 2005, producing 150 tonnes of wheat seed for ISE, and now has his own seed enterprise, with tractor, thresher; seed processing plant, offices and storage facilities. The Dorokhshan Seed Company's production increased from just 170 tonnes in 2004 to 1 150 tonnes in 2012, but dropped in 2013 to 490 tonnes because of low demand.

Haji Khan is also an executive member of ANSOR and reported that action was being taken to rectify the organization's shortcomings, emphasizing that the assistance of the new World Bank-supported project is aimed not at individual farmers but at ARIA and ANSOR as a group.

Mullah Abdullah, contract seed grower, Herat

One of the oldest contract growers in Herat, he described his position as a "*very happy*" one.

Ahmad Farid Azizi and Khawja Mohammad Mosafer, contract seed growers, Herat

They began producing certified wheat seed and vegetable seed in 2007 with assistance from MAIL and FAO. They used foundation and registered seed to grow wheat, onion, tomato, eggplant and okra. The production of wheat seed increased from 500 tonnes in 2007 to 1 900 tonnes in 2011, but decreased to 800 tonnes in 2012 following a fall in demand for seed from NGOs.

Wali Mohammad, contract seed grower, Herat

Mr Mohammad is a well-established seed grower who began his operation 20 years ago. He noted that when he used certified seed, his yields increased threefold.

Fatima and Shah Bibi, Seed Workers, Urdo Khan Variety Trial Site

The seed project has created employment opportunities for field workers on trial sites across the country[9]. Both Fatima and Shah Bibi support their families thanks to the work (the former is a widow, the latter's husband is disabled). Their principal tasks are weeding, cleaning and sorting and the income means that the younger children can go to school "*to learn as much as possible so they will have a chance when they grow up*".

Nazir Ahmad, Head, Sahrai Loy Kandahar, Improved Seeds Company

The company started producing wheat seed in collaboration with the seed project in 2011 and benefited from the improved seeds which gave good


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Members of Zakria Seed Enterprise, Bamian

[9]FAO News, 6 August 2007.

yields and were resistant to harsh conditions. However, the experience of crop failure with seeds obtained from DAIL (Directorate of Agriculture, Irrigation and Livestock) convinced him that the way forward is to free companies from government pressure so that they can "choose the breeder, foundation and registered seeds to release to farmers for the production of certified seeds".

He is therefore adamant that the solution for the future is privatization, and that to make it work, companies need their own trained agronomist for effective field inspection.

Bahar Seed Company and Husbandry Farm, Shulgar, Balkh

Mr Assadullah, Deputy Head of the seed enterprise, recalled that the Bahar Seed Company began its collaboration with the seed project in 2008, when its activities already covered seed production and distribution, field inspection, and seed procurement, processing and marketing. In 2009, a field day was held in the district with a high level of participation: the "clean and beautiful wheat fields" made a lasting impression and the contract seed growers received much praise.

The seed project's greatest achievements were:

- establishment of new seed companies;
- production of high quality seed;
- drafting of the Seed Law, Policy and Regulation; and
- distribution of early generation seed to contract seed growers.

Future prospects depend on continuity combined with crop diversification. The conditions of unrest and security problems led, above all, to a lack of predictability and permanency of the agricultural operations, but FAO's constant presence helped overcome the constraints.

The company and its contract growers have undoubtedly benefited from the seed business and the company intends to "stay in the business, reduce its production costs [to make seed more affordable] and include extension services to increase productivity and food security".

Shir Abad Seed Company, Dedadi, Balkh

Mr Shah Mohd, Deputy Head, reported that collaboration with FAO began in 2004, resulting in annual production of 1 000 tonnes of wheat seed, 10 tonnes of chickpea, 4 tonnes of mung bean, 5 tonnes of cotton seed and 10 kg of vegetable seed.

The company's success against all odds was made possible by the persistence, guidance, incentive and support of the FAO experts. Indeed, the project's main achievements were the establishment of 115 seed companies and the release of 32 wheat varieties and different vegetables.

The fact that the obvious security problems did not ultimately impede the project was, again, due to the commitment and support of FAO.

For the future, "FAO should continue to assist the PSEs in seed production", with a focus on crop diversification.

Ahmad Baryalai, President, Ahmad Baryalai Improved Seeds Company (ABISC)

ABISC became operational in 2011 with the help of the FAO seed project, and today produces wheat, okra and eggplant seeds. Baryalai, Company President, recognized that the project had increased awareness of the different varieties of seeds and their expected output under the conditions in Kandahar.

For the future success of the seed industry, it is important that the Government take a back seat and allow companies to operate freely and choose the breeder, foundation and register seeds to plant for their farmer clients. A successful future depends on privatization of the industry, so that other kinds of seed can be grown and the company "can directly communicate with farmers to advertise its products". Furthermore, privatization would result in job opportunities for graduates in agricultural agronomy with a consequent positive impact on society.

Shikhul Islami Harawi (SIH)

The SIH seed enterprise started business in 2008, since when wheat production has markedly increased and there has been crop diversification, with production of chickpea, lentil, tomato, mung bean, onion and eggplant seed. The CEO was originally encouraged by FAO to form his own company, and he has no regrets, citing the seed project's principal achievements as:

- establishment of seed enterprises;
- provision of high quality early generation seeds (breeder and foundation) for further multiplication; and
- increased cereal production throughout the country.

Looking towards the future, it is necessary to:

- increase government capacity to help the private seed sector

technically; and

- facilitate access of farmers to agricultural credit/loans and agricultural inputs.

Shikh Maruf Karukhi's Seed Enterprise

Shikh Maruf Karukhi's Seed Enterprise's association with the FAO seed project dates back to 2004; the Head of the Enterprise affirmed that the seed project's main achievements were:

- increasing productivity in Afghanistan; and
- creating opportunities for Afghan farmers to become seed entrepreneurs.

However, there is concern about the future, because the current seed market is weak, as farmers have become dependent on subsidized seed from NGOs, the Government and others. It is, therefore, important that:

- the sector diversify into other crop seeds; and
- the Government facilitate access of farmers to agricultural inputs (e.g. high quality chemical fertilizer, pesticide and insecticide) at a subsidized rate.

VI. Summary of the main achievements in seed sector development

The success of the seed industry can be measured in terms of a range of interrelated factors:

- increased crop productivity due to farmers' access to good quality seed that meets their agro-ecological conditions;
- frequency of varietal renewal in the national catalogue;
- creation of value-chain employment;
- establishment of a seed production and conditioning infrastructure to serve the industry;
- foundation of an enabling administrative and legal framework to create private sector participation; and
- relations with international players.

During 25 crisis-ridden years, the activities funded by donors – in particular the EU – have led to all the above achievements. The introduction of new varieties has led to broader ecological coverage, with positive consequences:

- Improved productivity, with wheat, barley and rice, for example, increasing in the order of 1:4 when certified varieties were chosen over grain or farmers' saved seed.
- ARIA's collaboration with CGIAR centres such as ICARDA and ICRISAT, resulting in regular introduction (over the last three years) of new varieties in the seed production chain.
- Crop ecologies previously abandoned because of weather phenomena now planted with varieties developed to fit these ecological niches.
- Over 100 seed supply enterprises in different regions with seed secured in-country for food security crops like wheat, rice and barley.

"Seeing is believing" – seed fairs allow farmers and technicians to familiarize themselves with new varieties

Seed production and handling capacity have increased as ARIA, ISE and PSEs have been equipped for seed crop production activities, including land preparation, planting, threshing, harvesting, seed conditioning, treating and bagging.

Wheat was not grown in Bamyan in winter because of the harsh weather condition. Since ARIA released two new cold-tolerant varieties in 2002, farmers have been able to produce a winter wheat crop and bolster the region's food security.

An elaborate system for varietal development, release and certification has been established and backed up by government policy and appropriate legislation, paving the way for orderly development of the seed industry and private sector participation in the seed business, thereby eventually removing the public-sector monopoly on publicly bred varieties and the production of early generation seed.

Regional and global linkage of the national seed sector has been achieved thanks to the creation of ANSOR and its membership of two regional seed associations: ECOSA and APSA. ANSOR members are also linked to the developed seed industry of India through the Seed Alliance Without Boundaries (SAWIB) network initiated by FAO in 2009.

Vital seed field equipment has been provided to facilitate varietal development and breeder and early generation seed crop production of ARIA and ISE.

The project provided key institutions with land preparation and crop production equipment vital to the development of a modern seed industry. FAO equipment specialist, Mr M.A. Mushira, with the Hon. Minister of Agriculture FAO Representative, Dr Tekeste Tekie, in 2009.

VII. FAO's Vision for the Future

a. Lessons learned

Challenges were faced during development of the seed sector:

- The initial stages of the project presented the challenge of achieving synergy to optimize the inputs and efforts of competing agencies and organizations, for example in the procurement of sufficient quantities of quality seed and planting materials to re-establish crops and plantation, and in making available appropriate varieties for the prevailing soil conditions. Indeed, competing and non-complementary actions by civil society organizations resulted in the inadvertent introduction into the country of unsuitable seeds, and of pests and diseases. FAO subsequently assisted the Government in the development of a code of conduct for the orderly testing and introduction of seeds into Afghanistan.
- A second challenge was the overwhelming interest of donors in emergency relief rather than long-term development interventions, to the detriment of the future sustainability of agriculture. This led to the development of an intermediary tool – rehabilitation – for the smooth transition from emergency to development actions, during which emergency assistance was transformed into building blocks for rehabilitation and eventual long-term development.
- Security was a major challenge for the transportation of relief supplies and the rehabilitation process. FAO's response was to adopt devolved rather than centralized modes of operation for both emergency and rehabilitation efforts. The combined synergy of the Emergency Unit of FAO and the technical divisions was unrivalled and gave FAO an edge over other agencies operating in the arena of food and agriculture.
- Hunger itself needed to be overcome in order to move forward and, therefore, cooperation was established with the World Food Programme (WFP), whose food relief was used for "food for agricultural crop" exchanges – a form of revolving fund.
- The scarcity of well-trained staff willing to accept the low salaries paid by the Ministry represented a further challenge in FAO's efforts to rebuild the destroyed agriculture sector. The chief technical advisers of FAO's long-term projects, therefore, set in place a

structured plan of training staff associated with projects, with a view to developing future leaders to ensure the sustainability of ongoing work and thereby secure a good exit strategy for FAO.

In facing these challenges, lessons were learned:

- Good quality seed of appropriate crop varieties ensures good yields and prevents disappointment among recipients of seed relief.
- Government coordination of the seed inflow into the country is required to ensure that materials meet all necessary phytosanitary and seed quality requirements.
- Given donor preference for short-term intervention, emergency assistance must be transformed into building blocks for the long term.
- Devolved delivery systems are an effective strategy for reducing transportation and security problems.
- Coordination of emergency operations and technical divisions results in greater impact of interventions.
- Food is a useful tool: for providing work or as barter for seed in rural communities.
- Structured long-term training supplemented with short term/on-the-job training is more effective than stand-alone short-term training courses.

Additional lessons were learned during field visits and in interviews with selected stakeholders in Kabul and Mazar Sharif, Herat and Bamyan. While the success of the seed programme was unquestionable, the majority of those interviewed expressed concern with regard to the smooth transition of seed industry development from ongoing project implementation modalities to the Government and private sector.

b. Long-term prospects

The seed project's achievements surpass – in both quantitative and qualitative terms – those of many projects operating under far more stable conditions. The achievements to date create the foundation of a successful seed industry in the future:

- Dynamic varietal development mechanisms, including germplasm introduction (FAO, ICARDA, JICA, CGIAR, France, Australia) and potential international seed/germplasm exchanges

through cooperative modalities of seed associations (global, regional and subregional) and SAWIB (FAO). The key beneficiary of this support is ARIA.

- **Sound seed production, conditioning and storage technologies** for breeder, foundation, registered and certified seed. The beneficiaries are ARIA, ISE, IPs, PSEs and CSGs.
- **Capacity and technical know-how for a seed quality assurance system** that meets the requirements of the national and international seed trades, including procedures for pre- and post-control field inspection, seed sampling, laboratory seed testing, basic studies, and mechanisms and activities geared towards seed marketing.
- **Administrative and regulatory instruments** necessary for successful public-private partnerships in the seed industry.

These include: government-approved Seed Policy; national seed legislation and regulations; the National Seed Board (with all the necessary committees) to guide the orderly implementation of the national Seed Policy; and an apex organization for seed producers and marketers.

- **International connections for seed/germplasm trade and exchange** through: membership of regional seed associations (APSA and ECOSA); linkages to global organizations (UPOV, Organisation for Economic Co-operation and Development [OECD], ISTA and International Seed Federation [ISF]); and seed investment initiatives, such as SAWIB, linking ANSOR members with other seed companies in Asia (e.g. India, Uzbekistan and Iraq).

The ultimate objective of seed programme development is to support the agricultural goals of the country and become a successful industry which needs the Government only with regard to crop research and policy, and provision of regulatory services. The revised National Seed Policy highlights some problems and challenges in the seed sector, including: sustainability of the market; flexibility and deregulation of the seed sector; funding of essential services; institutional arrangements; and market-distorting subsidies.

The seed sector today stands at a crossroads. It is expected to become a private sector industry via a transformation process involving the transfer of the services of seed project staff to the public and private sectors to support seed production (through parastatal and private seed enterprises with AAIP funding) and seed certification, as well as NSB activities under the auspices of MAIL, to be funded by the EU.

There is concern that the transition from project-driven to government-led activities may not be without problems. For this reason, the EU has decided to provide support to internalize the Seed Certification Directorate in MAIL, with government employees in charge of running the activities. Similarly, the World Bank has agreed to provide support for the seed production elements of the sector through support to ARIA (varietal development and breeder seed production), ISE (seed production facilities) and PSEs (production and seed entrepreneurial capability).

Mr Aria discusses future strategy with the team at Mazar

Some issues require further attention and several questions remain unanswered:

- How can the seed sector become a successful private industry and not a financial liability? While the Seed Policy highlights some problems and challenges in the sector, farmers still talk of N G O and government patronage. How are these problems to be addressed?
- A seed programme/industry is as robust and as good as the pool of knowledgeable professionals able and willing to run it.

The well-trained cadre of EU-FAO seed project staff constitute a great asset to the seed industry and their participation in EU and the WB follow-up projects is necessary. Nevertheless, how will the imminent redeployment of staff be carried out to avoid a break in the seed production chain?

- Effective communication among donors, Government and technical agencies is key for the management of the transition period. Are staff aware of their future role once the EU transition project ends at the end of September?
- Can farmers face the expense of seed or is it an input which the Government should provide free of charge?

The following serious gaps in the overall transition process were observed by the team:

- Some seed production stations were supposed to close at the end of July 2013 despite the fact that crops (foundation and registered) are standing in the field and no contingency plans have yet been made for post-maturation crop handling.
- There is not a complete overlap in the geographical areas covered by the present EU seed project and the WB plans for seed production support. Of the six locations earmarked for WB assistance, only four (Tarnak, Khasa-Paz, Falahat and Jalalabad) cover the current operational areas.
- Seed enterprises, including ISE, lack the necessary aggressive approach to seed marketing. Companies tend to wait for government, donor and NGO calls for tender for seed: rather than market-driven, the sector is production-driven.
- Effort is required to create a market pull for seed demand, for example, through value-chain activities.
- More emphasis on crop diversification – especially vegetable crops – is required.

In conclusion, regardless of how the seed industry continues to develop, the sustainability of the achievements of the project is unavoidably linked with:

- social responsibility (taking care of growers, communities and stakeholders);
- environmental responsibility, with particular emphasis on conservation of natural resources; and
- the generation of revenues for stakeholders.

Annex

Annex 1. Historical perspective of Afghanistan's seed industry development

Reference	Title of project and cost	Years	Contribution to industry development
TCP/AFG/6703	Practical Training in Seed Industry at Tarnak Seed Multiplication Farm	1977–1978	Develop skills for seed production.
TCP/AFG/8903	Supply of Foundation Wheat Seed	1979–1980	Build up seed stocks.
AsDB project	Afghanistan Seed Project (USD 14 million)	1978	Develop basic facility for certified seed production. Establish public sector seed industry ASC.
Russian invasion Dec. 1979 – Feb. 1989: ASC renamed Improved Seed Enterprise (ISE)			
AFG/82/004	Seed Production and Training (Phase I)	1983–1986	Develop skills for seed production.
AF/86/010/01/12	Seed Production and Training (Phase II)	1987–1992 (to Dec. 1993)	Develop skills for seed production.
AFG/85/015/01/12	Cereals Research	1988–1993	Revitalize varietal improvement.
Civil unrest and Mujahidin conflicts affected security in much of the country 1989–1996			
UNO/AFG/010/UNO	Provision of High Quality Improved Certified Seed for 91/92 Planting Season (USD 1 513 084)	1993–1994	Build up seed stock.
UNO/AFG/018/UNA	Procurement of Wheat Seed through Local Production and Supply of Fertilizer in Western Afghanistan (USD 442 477)		Build up seed stock.
OSRO/AFG/301/EEC	Provision of Staple Food Crop Seed (USD 879 696)	1993–1994	Enhance food security.
AFG/93/001	Seed Improvement in Northern and Western Afghanistan (USD 499 550)	Jan. 1994 – Apr. 1995	Revitalize varietal improvement.
UNO/AFG/025/UNA	Rehabilitation Programme to Support Seeds	1994–1995	Build up infrastructure for seed production.
FAO-WFP	Food for Seed Programme	1994–2002	Develop ingenious food-based revolving funds and start revolving funds with IPs.
AFG/94/002	Integrated Crop and Food Production	1995–1997	Accelerate food production.
GCP/AFG/016/EC	Seed Supply and In-Country Seed Production (USD 4 525 783)	1995–1998	Build up equipment needs.
Taliban regime 1996–2001			
UNDP (as lead agency)	Poverty Eradication and Community Empowerment Programme (PEACE)	1997–2002	Umbrella for FAO and other donors' inputs.
AFG/96/004	Food Security through Sustainable Crop Production	1997–2001	Accelerate food production (incorporated in PEACE programme).

Annex 1. Historical perspective of Afghanistan seed industry development

Reference	Title of project and cost
OSRO/AFG/003/EC	Emergency Procurement of Cereal Seeds in Central Highlands of Afghanistan (USD 310 000)
GCP/AFG/018/NET	Participatory Community Seed Production in Northern Afghanistan
AFG/01/U03/JA/12	Stabilizing Rural Food Supply through National Crop Sector Input Supply Capacity
OSRO/AFG/101/GER	Distribution of Wheat and Chickpea Seed and Fertilizer (USD 215 163)
AFG/01/U04/JA/12	Distribution of Seed of Dryland Varieties
OSRO/AFG/104/IRE	Distribution of Essential Inputs (Seed, Fertilizer and Equipment) for Seed Multiplication in Central Afghanistan (USD 214 000)
AFG/00/015	Food Security through Sustainable Crop Production and Livestock Development
OSRO/AFG/103/USA	Emergency provision of Essential Inputs to Support Drought and War Affected Farmers in Afghanistan (USD 500 000)
GCP/AFG/025/GER	To Increase Farmers' Incomes and Provide Viable Production Alternatives to Opium Poppy through the Provision of Quality Declared Seed of Improved Crop Varieties Suitable for Year-Round cropping (USD 1 752 383)
Removal of Taliban regime at the end of 2001; new donors' engagement from 2002	
OSRO/AFG/204/ITA	Procurement and Processing of Quality Declared Wheat Seed from Contracted Seed Producers in Afghanistan for Redistribution to Most-Needy Farmers in Southern, South-Western and Central Afghanistan for Autumn 2002 (USD 1 218 400)
OSRO/AFG/206/GER	Procurement and Processing of Quality Declared Wheat Seed from Contracted Seed Producers in Afghanistan for Redistribution to Most-Needy Farmers in Northern and Central Afghanistan (USD 1 231 570)

Annex 1. Historical perspective of Afghanistan seed industry development

Reference	Years	Contribution to industry development
OSRO/AFG/003/EC	2000–2001	Facilitate marketing of locally produced seed.
GCP/AFG/018/NET	Jan. – Dec. 2001	Develop seed business enterprise.
AFG/01/U03/JA/12	Jan. – Dec. 2001	
OSRO/AFG/101/GER	2001–2002	Mitigate adverse effects of drought on crops through planting drought-resistant varieties of wheat and chickpea to facilitate production of staple food.
AFG/01/U04/JA/12	2001–2002	Germplasm introduction.
OSRO/AFG/104/IRE	2001–2002	Produce and provide 2 000 tonnes of wheat and 10.5 tonnes of fodder seed for Bamyan Province, spreading seed production activities in Afghanistan.
AFG/00/015	2001–2002	Spread improved crop production technology.
OSRO/AFG/103/USA	2001–2003	Build up infrastructure for seed production, with aim of producing 600 tonnes of seed of wheat, 60 tonnes of rice, 100 tonnes of maize, 27 tonnes of chickpea and 19 tonnes of fodder.
GCP/AFG/025/GER	2001–2004	
Removal of Taliban regime at the end of 2001; new donors' engagement from 2002		
OSRO/AFG/204/ITA	2002–2003	
OSRO/AFG/206/GER	2002–2003	Procure and redistribute high-quality, disease-resistant wheat seed to 24 000 farm families.

Annex 1. Historical perspective of Afghanistan seed industry development

Reference	Title of project and cost	Years	Contribution to industry development
OSRO/AFG/208/NOR	Procurement and Processing of Quality Declared Wheat Seed from Contracted Seed Producers in Afghanistan for Redistribution to Most-Needy Farmers in Southern, Northern and Central Afghanistan for Autumn 2002 (USD 536 350)	2002–2003	Make available good quality wheat seed to 10 300 families and develop capacity of seed growers and seed production enterprises, facilitating the building up of a critical mass of CSGs.
OSRO/AFG/210/NET	To restore the Functional Capacity of FAO National Seed Project by Replacing Equipment and Inputs Looted from the Previous Programme (USD 4 717 000)	2002–2003	Build up critical mass of seed processing equipment for seed production.
OSRO/AFG/211/SWI	Procurement and Processing of Quality Declared Wheat Seed from Contracted Seed Producers in Afghanistan for Redistribution to Most-Needy Farmers in Southern, Western and Northern Rainfed Areas of Afghanistan for Autumn 2002 (USD 563 000)	2002–2003	Make available good quality wheat seed to 16 000 families and produce more than 5 000 tonnes of seed locally, contributing to the critical mass of CSGs.
[illegible] USAID/ICARDA	Afghan Seed Consortium for the Rehabilitation of Agriculture in [illegible] (FHCRAA)	2002–2004	
GCP/AFG/018/EC	Strengthening National Seed Production Capacity (EUR 6 million)	2003–2005 (with no cost extension to 2006)	
GCP/AFG/025/GER	Developing Sustainable Seed Production in Southern Afghanistan	2003–2005 (handled other crops not wheat)	
GCP/AFG/045/EC	Strengthening Variety and Seed Industry Development	2007–2011 (in progress)	
TCP/AFG/3101	Strengthening Seed and Plant Health Inspectorate Capacity (USD 420 000)	2007–2012.	
GCP/AFG/059/EC	Expanding certified seed production and utilization in Afghanistan (USD 18 000 000)	2009-2012	Contribute to improved and sustainable food security in Afghanistan by accelerating seed production and thereby increasing yields of wheat and other food crops.

Annex 2. Seed projects under implementation since 2000

Project Title and Code, End Date, Donor and Budget (USD)	Major Outputs Envisaged
1. Stabilizing Rural Food Supply through National Crop Sector Input Supply Capacity AFG/01/U03/JA/12 (31-12-2001) SIDA USD 404 531 (Trust Fund)	Production and distribution of 600 tonnes of seed in Northern Region.
	Strengthening of the two seed production units.
	Procurement of 300 tonnes of DAP and 300 tonnes of Urea fertilizers.
	Procurement of certification material (USD 35 725).
	Procurement of office equipment (USD 12 000).
	Procurement of one mobile processing unit.
	More than 200 technicians and farmers trained.
	Six regional variety testing stations equipped and operational throughout the project period.
	Fielding of one STA for six months and two NPPS.
2. Family Food Production Project: Trust Fund SDC USD 225 651	Production and distribution of 50 tonnes of wheat and rice seeds.
	Distribution of seasonal vegetable seeds.
	Establishment of fruit and fuel wood trees nurseries.
	Training of farmers.
	Purchase of 60 tonnes of DAP.
	Purchase of 60 tonnes of Urea.
	Procurement of one mobile seed processing plant.
	Purchase of certification material (USD 5 000).
	Fielding of a CST for two months (Aug.–Sept. 2001)
	Recruitment of two NPPs for 12 months.
3. Participatory Community Seed Production Programme of Northern Afghanistan GCP/AFG/018/NET (30-06-2001) The Netherlands USD 250 000	Production and distribution of 200 tonnes of rice and wheat seeds.
	200 tonnes of DAP and Urea fertilizer procured.
	One Mobile Seed cleaner procured
	Purchase of certification material (USD 5 000)
	Fielding of a CST for 2 months.
	Recruitment of three CLOs for 12 months.
	Training of farmers.
4. Spring Wheat Seed Distribution Plan to the IDPs in Badghis and Ghor Provinces. Trust Fund (31-12-01) SIDA USD 505 664	Procurement and distribution of 500 tonnes of spring wheat seed.
	Procurement and distribution of 300 tonnes of summer crop seed.
	Local production and distribution of 750 tonnes of wheat seed for autumn planting.
	Training.
	Purchase of certification material (USD 25 000).
	Recruitment of three CLOs for 12 months.
5. Procurement of Wheat and Chickpea Seeds of Drought Tolerant Varieties for Distribution along with Fertilizer to the Farmers Affected by Recent Drought in Samangan Province of Afghanistan. OSRO/AFG/101/GER. (31-03-2002) DM 500 000 (USD 215 163.13)	Local production and distribution of 200 tonnes of wheat seed for autumn planting.
	Production and distribution of 5 tonnes of chickpea seed for Mar. 2002 planting.
	Procurement of 69.8 tonnes of DAP fertilizer.
	Procurement of 67.0 tonnes of Urea fertilizer.
	Certification material (USD 28 750).
	Extension support (USD 3 000).

6. Emergency Provision of Essential Inputs to Support Drought and war Affected Farmers in Northern Afghanistan. OSRO/AFG/103/US (30-04-2002) USA USD 500 000 (Seed USD 447 524)	Procurement and distribution of 18.8 tonnes of BS (wheat 10 + maize 4 + rice 2 + chickpea 1 + fodder 1.8) (USD 21 950).
	Procurement of 100 tonnes of wheat seed in Herat and dispatched to Badakshan,
	Procurement of 100 tonnes of wheat seed in Herat and dispatched to Faryab.
	3 Honda CG 125 procured and sent to Faryab.
	3 Honda CG 125 procured and sent to Badakshan.
	Procurement of 130 tonnes of DAP fertilizer for Faryab.
	Procurement of 130 tonnes of Urea fertilizer for Faryab.
	Procurement of 130 tonnes of DAP fertilizer for Badakshan.
	Procurement of 130 tonnes of Urea fertilizer for Badakshan.
	1 mobile seed cleaner for Badakshan.
	4 portable seed cleaners for Faryab.
	Certification material (USD 4 470).
	Recruitment of one NPPP for 12 months at Faryab.
	Recruitment of one NPPP for 12 months at Badakshan.
	Recruitment of three CLOs for 12 months at Faryab.
	Recruitment of three CLOs for 12 months at Badakshan.
	International CST for 3 months.
	Training (USD 5 000)
7. Provision of Essential Inputs to Support Drought and war Affected Farmers in Northern Afghanistan. OSRO/AFG/102/EC (31-05-2002) ECHO USD 501 000(Seed 455 308)	Procurement and distribution of 150 tonnes of wheat seed in autumn 2001 in Jowjan
	Procurement/distribution of 1 tonne of chickpea seed in Apr. 2001 in Jowjan
	Procurement/distribution of 2 tonnes of maize seed in Apr. 2001 in Jowjan
	Procurement and distribution of 1 tonne of fodder seed in Jowjan
	3 Honda CG 125 to be procured and sent to Jowjan
	One Toyota Hi-Lux to be procured and sent to Badakshan
	One MF tractor 75 HP to be procured and sent to Badakshan
	One trailer to be procured and sent to Badakshan
	One wheat thresher to be procured and sent to Badakshan
	One portable seed cleaner
	Procurement of 130 tonnes of DAP fertilizer for Badakshan
	Procurement of 130 tonnes of Urea fertilizer for Badakshan
	Procurement of 160 tonnes of DAP fertilizer for Jowjan
	Procurement of 160 tonnes of Urea fertilizer for Jowjan
	1 mobile seed cleaner for Jowjan
	4 portable seed cleaner for Jowjan
	3 motorbikes for CLOs
	Certification material (USD 10 255 (Thiram))
	Recruitment of one NPPP for 12 months at Jowjan.
	Recruitment of three CLOs for 12 months at Jowjan

Annex 2. Status of seed projects under implementation since 2000

8. Distribution of Essential Inputs (Seed, Fertilizer and Equipment) to the Drought Affected Farmers in Central Afghanistan) OSRO/AFG/104/IR (30-06-2002) Ireland, USD 214 000	Procurement and distribution of 5 tonnes of BS (wheat 4 and fodder 1) (USD 8 200).
	Procurement of 100 tonnes of QDS of wheat for distribution in Sept.–Oct. 2001 in Panjao.
	Procurement of 5 tonnes of fodder seed.
	3 Honda CG 125 procured and sent to Panjao.
	One Toyota Hi-Lux procured and sent to Panjao.
	One MF tractor 75 HP procured and sent to Panjao.
	One generator procured and sent to Panjao.
	One wheat thresher procured and sent to Panjao.
	Five portable seed cleaners for Panjao.
	Procurement of 105 tonnes of Urea for Panjao.
	Procurement of 105 tonnes of DAP for Panjao.
	Procurement of certification material (USD 6 970).
9. Emergency Seed Procurement for Badakshan, Faryab and Jowzjan OSRO/AFG/105/SW1 (01-12-2002) SDC USD 100 000	Swiss Development Cooperation (SDC) USD 100 000

Annex 3. Key statistical indicators of achievements

Table A3.1: Wheat breeder and foundation seed produced by the FAO Seed Project (2003–10)

SN	Variety	Breeder Seed (tonnes)								
		2003	2004	2005	2006	2007	2008	2009	2010	Total
1	MH-96	0.100	2.440	0.341	0.404	--	--	--	--	**3.285**
2	Herat-99	0.775	3.409	1.500	1.775	3.525	6.607	8.301	9.000	**34.892**
3	Balkh-66	0.200	--	--	0.315	--	--	--	--	**0.515**
4	Mazar 99	1.850	--	0.748	1.200	1.514	3.492	7.278	9.134	**25.216**
5	Gul 96	1.825	0.118	0.783	0.590	0.430	6.452	5.395	6.172	**21.765**
6	Ghori-96	0.800	--	0.850	0.540	0.554	11.743	8.205	9.575	**32.267**
7	Lalmi-1	2.000	--	0.950	0.340	1.700	--	--	--	**4.990**
8	Lalmi-2	0.900	0.378	0.753	0.797	1.035	4.631	5.900	4.571	**18.965**
9	Lalmi-3	1.500	0.370	0.450	1.114	3.500	6.160	4.718	3.600	**21.412**
10	Diyma-96	0.200	2.193	0.318	0.646	1.958	0.350	0.890	--	**6.555**
11	Sn'b	--	--	0.308	0.348	0.730	1.405	1.521	1.665	**5.977**
12	Cham-6	--	0.050	0.371	0.221	0.880	0.485	--	--	**2.007**
13	Rona-96	--	--	0.200	0.857	2.721	0.536	--	--	**4.314**
14	Pamir-94	0.800	--	0.900	0.747	0.733	2.645	0.691	0.250	**6.766**
15	Roshan-96	1.950	1.832	0.600	0.389	0.260	3.340	3.109	--	**11.480**
16	Amu-99	1.350	1.413	0.428	0.848	0.587	3.635	3.764	--	**12.025**
17	Parva-2	0.400	--	0.200	0.950	2.782	1.618	2.240	2.283	**10.473**
18	Solh-2	0.600	0.315	0.983	0.569	0.202	2.915	4.961	6.529	**17.074**
19	PBW-154	0.800	0.180	0.988	1.692	11.470	10.000	8.657	11.288	**45.075**
20	HUW-234	--	--	0.368	0.348	--	--	--	--	**0.716**
21	HD-2285	--	--	0.130	0.320	4.500	0.648	1.579		**7.177**
22	Bakhtawar-92	0.550	3.002	1.263	1.799	0.790	3.940	4.424	2.355	**18.123**
23	Mayson	--	--	--	0.242	--	--	--	--	**0.242**
24	Kouz/AA/Kouz	--	--	--	0.350	--	--	--	--	**0.350**
25	FDLu/NG8695	--	--	--	0.225	--	--	--	--	**0.225**
26	Pastor	--	--	0.728	0.600	0.160	--	--	--	**1.488**
27	Ghazna-97	0.250	--	--	--	0.170	--	--	--	**0.420**
28	/4/Clif	--	--	--	0.150	--	--	--	--	**0.150**

Annex 3. Key statistical indicators of achievements

Table A3.1: Wheat breeder and foundation seed produced by the FAO Seed Project (2003–10)

SN	Variety	Foundation Seed (tonnes)								
		2003	2004	2005	2006	2007	2008	2009	2010	Total
1	MH-96	2.00	44.00	8.46	--	10.88	--	--	--	**65.34**
2	Herat-99	18.00	64.00	35.50	14.65	14.76	54.33	210.05	122.80	**534.09**
3	Balkh-66	4.50	--	--	2.40	9.07	--	--	--	**15.97**
4	Mazar 99	44.00	--	17.00	31.05	26.03	33.71	156.01	75.65	**383.45**
5	Gul 96	42.50	4.00	19.00	17.56	14.14	2.91	171.74	34.00	**305.85**
6	Ghori-96	18.50	--	18.99	39.06	6.59	9.02	122.35	79.00	**293.50**
7	Lalmi-1	4.50	--	20.00	6.40	2.68	10.43	--	--	**44.01**
8	Lalmi-2	47.00	11.00	18.50	48.64	21.20	23.39	111.79	21.25	**302.77**
9	Lalmi-3	20.00	11.00	8.40	20.25	33.67	40.62	100.15	35.70	**269.79**
10	Diyma-96	35.00	--	8.80	20.88	12.70	29.25	2.56	--	**109.19**
11	Sn'b	4.50	--	7.00	8.05	5.38	9.18	33.41	9.35	**76.86**
12	Cham-6	4.00	--	8.00	27.05	6.61	4.80	--	--	**50.45**
13	Rona-96	--	--	4.80	5.40	14.73	33.64	--	10.00	**68.57**
14	Pamir-94	18.50	--	18.20	7.05	19.31	11.45	31.76	1.50	**107.77**
15	Roshan-96	44.00	39.00	14.50	13.30	7.75	0.69	--	--	**119.24**
16	Amu-99	30.50	29.00	9.50	26.95	12.30	10.82	106.70	--	**225.77**
17	Parva-2	9.50	--	34.00	32.87	15.82	26.39	18.80	12.75	**150.13**
18	Solh-2	14.00	9.00	24.00	15.97	14.41	27.49	43.30	29.75	**177.92**
19	PBW-154	18.00	5.00	23.00	38.53	35.50	134.00	234.48	51.85	**540.36**
20	HUW-234	--	--	8.00	1.00	11.70	--	--	--	**20.70**
21	HD-2285	--	--	3.50	1.00	6.78	65.84	34.40		**111.52**
22	Bakhtawar-92	12.00	65.00	22.85	16.61	33.00	--	42.50	30.00	**221.96**
23	Mayson	--	--	--	--	--	--	--	--	**0.00**
24	Kouz/AA/Kouz	--	--	--	--	--	--	--	--	**0.00**
25	FDLu/NG8695	--	--	--	--	--	--	--	--	**0.00**
26	Pastor	--	--	--	--	6.00	--	--	--	**6.00**
27	Ghazna-97	--	--	--	5.33	--	3.10	--	--	**8.43**
28	/4/Clif	--	--	--	--	--	--	--	--	**0.00**

Annex 3. Key statistical indicators of achievements

SN	Variety	Breeder Seed (tonnes)								
		2003	2004	2005	2006	2007	2008	2009	2010	Total
29	UREs/PRC	--	--	0.130	0.224	--	--	--	--	**0.354**
30	IRENA/Weaver	--	--	0.230		--	--	1.900	2.480	**4.610**
31	WEBBLL-1	--	--	0.130	0.200	--	--	--	--	**0.330**
32	Takhar-96	0.150	--	--	--	--	--	--	--	**0.150**
33	Darullaman-07	--	--	--	--	--	--	--	0.806	**0.806**
34	Ariana-07	--	--	--	--	--	--	--	1.584	**1.584**
35	Dorkhshan-08	--	--	--	--	--	--	8.487	8.573	**17.060**
36	Shesham Bagh-8	--	--	--	--	--	--	4.980	5.819	**10.799**
37	Moqawem-09	--	--	--	--	--	--	--	11.820	**11.820**
38	Kushan-09	--	--	--	--	--	--	--	6.728	**6.728**
	Total	**17.000**	**15.700**	**14.650**	**18.800**	**40.201**	**70.602**	**87.000**	**104.232**	**368.185**

Source: FAO Seed Project (GCP/AFG/018/045/EC)

Annex 3. Key statistical indicators of achievements

SN	Variety	Foundation Seed (tonnes)								
		2003	2004	2005	2006	2007	2008	2009	2010	Total
29	UREs/PRC	--	--	--	--	--	--	--	--	0.00
30	IRENA/Weaver	--	--	--	--	3.01	--	--	--	3.01
31	WEBBLL-1	--	--	--	--	--	--	--	--	0.00
32	Takhar-96	--	--	--	--	--	--	--	--	0.00
33	Darullaman-07	--	--	--	--	--	--	--	--	0.00
34	Ariana-07	--	--	--	--	--	--	--	--	0.00
35	Dorkhshan-08	--	--	--	--	--	--	--	120.50	120.50
36	Shesham Bagh-8	--	--	--	--	--	--	--	69.30	69.30
37	Moqawem-09	--	--	--	--	--	--	--	--	0.00
38	Kushan-09	--	--	--	--	--	--	--	--	0.00
	Total	391.00	281.00	332.00	400.00	344.00	531.05	1420.00	703.40	4,402.45

Source: FAO Seed Project (GCP/AFG/018/045/EC)

Table A3.2: Wheat registered and certified seed produced by the FAO Seed Project (2003–2010)

SN	Variety	Registered Seed (tonnes)		Certified Seed (tonnes)								
		2010	Total	2003	2004	2005	2006	2007	2008	2009	2010	Total
1	MH-96	--	**0.00**	35	800	328	--	--	173	80	--	**1 416**
2	Herat-99	336.24	**336.24**	322	1,175	978	450	358	445	570	3 582	**7 880**
3	Balkh-66	--	**0.00**	81	3	--	60	9	12	0	--	**165**
4	Mazar 99	210.22	**210.22**	790	5	533	942	815	1,321	984	1 261	**6 651**
5	Gul 96	206.82	**206.82**	782	83	575	1 150	193	348	300	2 455	**5 886**
6	Ghori-96	232.20	**232.20**	330	3	580	733	1,017	1,033	1,167	1 496	**6 359**
7	Lalmi-1	--	**0.00**	81	5	605	620	128	235	200	--	**1 874**
8	Lalmi-2	181.52	**181.52**	847	238	569	1 279	767	881	955	1 379	**6 915**
9	Lalmi-3	23.18	**23.18**	358	235	326	504	242	460	882	2 254	**5 261**
10	Diyma-96	--	**0.00**	629	8	336	521	236	154	100	13	**1 997**
11	Sn'b	22.78	**22.78**	81	--	293	503	13	42	160	505	**1 597**
12	Cham-6	--	**0.00**	119	--	317	--	210	99	123	--	**868**
13	Rona-96	--	**0.00**	--	--	240	--	85	423	453		**1 201**
14	Pamir-94	7.00	**7.00**	318	3	617	194	145	490	640	477	**2 884**
15	Roshan-96	--	**0.00**	736	880	473	178	309	1,505	881	--	**4 962**
16	Amu-99	--	**0.00**	514	666	357	689	1,474	1,429	402	11	**5 542**
17	Parva-2	--	**0.00**	159	3	245	851	289	311	376	422	**2 656**
18	Solh-2	67.30	**67.30**	236	200	701	--	285	584	470	571	**3 047**
19	PBW-154	388.15	**388.15**	303	100	677	--	534	1,017	2,734	3 490	**8 855**
20	HUW-234	--	**0.00**	--	--	317	--	16	105	--	--	**438**
21	HD-2285	--	**0.00**	--	--	119	27	42	411	1,432	--	**2 031**
22	Bakhtawar-92	--	**0.00**	200	1,428	668	426	339	455	19	165	**3 700**
23	Mayson	--	**0.00**	--	--	--	--	--	--	--	--	**0**
24	Kouz/AA/Kouz	--	**0.00**	--	--	--	--	--	--	--	--	**0**
25	FDLu/NG8695	--	**0.00**	--	--	--	--	--	--	--	--	**0**
26	Pastor	--	**0.00**	--	--	--	--	--	65	--	--	**65**
27	Ghazna-97	--	**0.00**	--	--	--	145	10	11	20	--	**186**
28	/4/Clif	--	**0.00**	--	--	--	--	--	--	--	--	**0**
29	UREs/PRC	--	**0.00**	--	--	--	--	--	--	--	--	**0**
30	IRENA/Weaver	13.00	**13.00**	--	--	--	--	--	25	--	--	**25**
31	WEBBLL-1	--	**0.00**	--	--	--	--	--	--	--	--	**0**
32	Takhar-96	--	**0.00**	4	--	--	111	--	--	--	--	**115**
33	Darullaman-07	--	**0.00**	--	--	--	--	--	--	--	--	**0**
34	Ariana-07	--	**0.00**	--	--	--	--	--	--	--	--	**0**
35	Dorkhshan-08	0.70	**0.70**	--	--	--	--	--	--	--	--	**0**
36	Shesham Bagh-08	0.40	**0.40**	4	--	--	111	--	--	--	--	**115**
37	Moqawem-09	13.80	**13.80**	--	--	--	--	--	--	--	--	**0**
38	Kushan-09	--	**0.00**	--	--	--	--	--	--	--	--	**0**
	Total	**1703.31**	**1703.31**	**6 929**	**5 835**	**9 854**	**9 494**	**7 516**	**12 034**	**12 948**	**18 081**	**82 691**

Source: FAO Seed Project (GCP/AFG/018/045/EC)

Table A3.3: Seed multiplication at regional farms as of July 2013

No.	Farm	Location	Total area (ha)	Area under seed production (ha)
1	Rishkhar	Kabul	65.0	48.0
2	Qargha	Kabul	6.4	6.0
3	Dehdana	Kabul	1.6	1.6
4	Waselabad	Kabul	2.0	2.0
5	Tarnak	Kandahar	960.0	100.0
6	Khasapaz *	Mazar	195.0	142.0
7	Pulekhumri	Pulekhumri	20.0	18.0
8	Falahat	Herat	1 414.0	100.0
9	Hazarjarib	Herat	16.0	12.0
10	Rawjabagh	Herat	8.0	7.0
11	Rabatsadar	Herat	6.0	5.0
12	Navabad	Herat	5.0	5.0
13	Zindajan	Zindazan	60.0	30.0
14	NADA	Jalalabad	500.0	100.0
	Total		**3 259.0**	**576.6**

* At present occupied by locals.

Table A3.4: Wheat seed (tonnes) certified by seed testing laboratories during 2011 and 2012 seasons

Seed producing region	2011			2012		
	Main Season			Main Season		
	F	R	C	F	R	C
	Passed	Failed	Passed	Failed	Failed	Passed
West	147	0	9 289	10	10	3 664
North	115	0	3 157	0	0	2 943
Central	0	0	862	0	0	1 196
Northeast	126	0	8 531	0	0	7 389
East	261	0	1 504	0	0	1 140
South	113	0	794	0	0	952
Total	**763**	**0**	**24 137**	**10**	**10**	**17 282**

Table A3.5: Other crop seed (barley, rice, maize, cotton, potato, legume and onion) certified by seed testing laboratories during 2011 and 2012 seasons (tonnes)

Seed producing region	2011			2012		
	Main Season			Main Season		
	F	R	C	F	R	C
	Passed	Failed	Failed	Failed	Failed	Passed
West	2	0	88	7.0	0	28
North	0	0	5	3.5	0	31
Central	0	0	13	0	0	0
Northeast	21	0	35	1.0	0	30
East	20	0	131	0	0	148
South	104	0	4	69.0	0	6.5
Total	**147**	**0**	**277**	**80.5**	**0**	**237**

Table A3.6: Wheat seed (tonnes) produced by seed centres in 2011 and 2012

Seed producing region	2011			2012		
	Main Season			Main Season		
	F	R	C	F	R	C
West	147	330	9 326	20	199	3 747
North	115	386	3 238	59	285	3 154
Central	0	0	973	0	0	1 242
Northeast	126	246	9 397	23	628	7 557
East	261	505	1 594	0	0	1 253
South	113	125	1 292	8	164	1 042
Total	**762**	**1 592**	**25 820**	**110**	**1 276**	**17 995**

Table A3.7: Other crops (barley, rice, maize, cotton, potato, legume and onion) produced (tonnes) at seed centres in 2011 & 2012

Seed Producing region	2011			2012		
	Main Season			Main Season		
	F	R	C	F	R	C
West	2	0	88	7	0	28
North	0	0	5	3.5	0	31
Central	0	0	13	0	0	0
Northeast	21	0	35	1	0	30
East	20	0	131	0	0	148
South	104	0	4	69	0	6.5
Total	**147**	**0**	**277**	**80.5**	**0**	**237**

Annex 4. Certified seed suppliers in Afghanistan – July 2013

	Agency	Location	Contact Person	Designation
1	Shirabad Seed Company	Dedadi, Balkh	Mr Shah Mohd	Deputy Head
2	Baba-e-Dehqan Seed Company	Chimtal, Balkh	Mr Abdul Ghani	Head
3	Sweda Agriculture Services	Mazar, Balkh	Mrs Sweda	Head
4	Bahar Seed Company	Shulgar, Balkh	Mr Assadullah	Deputy Head
5	Balkh Sabz Seed Company	Mazar, Balkh	Mr Khwaja Mohd Arif	Head
6	Brotharan Moshini Seed Company	Mazar, Balkh	Mr Muhsini	Head
7	Stankzai Seed Company	Chimtal, Balkh	Mr Haji Torab Khan	Head
8	Chushmaia Shifa Seed Company	Dehdad, Balklh	Mr Zahair	Head
9	Awfooq-e-Sabz Seed Company	Shulgara, Balkh	Mr Sayed Hussan	Head
10	Amiri Seed Company	Mazar, Balkh	Mr Atiqullah	Head
11	Teamor Sohrab Seed Company	Sari Pul	Mr Azizullah	Head
12	Khurasan Samangan Seed Company	Samangan	Mr Faizullah	Head
13	Insaf Jozjan Seed Company	Jozjan	Mr Rasool Khan	Head
14	Abobakr Sdeiq Seed Company	Faryab	Mr Haji Ahamd	Head
15	Brathran Hashemi	Faryab	Mr Mohammad Hasham	Head
16	Alogh Big Seed Company	Faryab	Mr Mohammad Aslam	Head
17	Zakaria Seed Company	Bamyan, Bamyan	Mr Assadullah Jafari	Head
18	Bamyan Bastan Seed Company	Bamyan, Bamyan	Mr Neisr Ali	Head
19	Qurghan Seed Company	Yakawlang, Bamyan	Mr S Mohammad Hassan	Head
20	Koh-e-Baba Seed Company	Panjab, Bamyan	Mr Ahmad	Head
21	Paiman Sabs Seed Company	Dekondy	Mr Ibrahim	Head
22	Shiekh Maruf Karokhi Seed Company	Karokh, Herat	Mr Sayed Abdul Qadar	Head
23	Dorkhshan Seed Company	Kushak, Herat	Mr Haji Mohd Arif	Head
24	Hambastagi Seed Company	Gozara, Herat	Mr Abdul Qadir	Head
25	Noor Brother Seed Company	Heart	Mr Abduld Wahed	Deputy Head
26	Khwaja Mohd Mousafer Seed Company	Injil, Herat	Mr Faiz Ahamad	Deputy Head
27	Shikhul Islam Herawi Seed Company	Injial, Herat	Mr Abdul Hamid	Head
28	Peshgam Herat Seed Company	Centre, Herat	Mr Mohammad Sohel	Head
29	Imam Fakhruddin Razi	Karokh, Herat	Mr Haji Sifyatullah	Head
30	Tila-e-Sourkh	Zindajan, Herat	Mr Barakatullah	Deputy Head
31	Sultan Doud Seed Company	Puli Khumri, Baghlan	Mr Sultan Doud	Head
32	Mustafa Chopan Seed Company	Puli Khumri, Baghlan	Mr Shawali Copan	Head
33	Zam Zam Seed Company	Puli Khumri, Baghlan	Mr Sardar Khan	Head
34	Zarai Afghan Seed Company	Puli Khumri, Baghlan	Mr Enaytullah	Head
35	Watanyar Seed Company	Puli Khumri, Baghlan	Mr Ahmad Farid	Head
36	Mazlom Yar Seed Company	Puli Khumri, Baghlan	Mr Sharafuddin	Head
37	Tamadoon Seed Company	Puli Khumri, Baghlan	Mr Latfurahman	Head
38	Hawad Seed Company	Baghalan Jaded, Baghlan	Mr Abdul Khalil	Head
39	Dushi Seed Company	Doshi, Baghlan	Mr Dust Mohammad	Head

	Agency	Location	Contact Person	Designation
40	Mashal Nawaweer Seed Company	Baghlan	Mr Mohammad Moneer	Head
41	Ikhlas Seed Company	Puli Khumri, Baghlan	Mr Khan Sheerin	Head
42	Sofi Zada Seed Company	Puli Khumri, Baghlan	Mr Qudaratullah	Head
43	Brothran Malak Zada	Baghlan	Mr Abdul Hamid	Head
44	Sara-e-Sang Seed Company	Taloqan, Takhar	Mr Ghulam Sarwar	Head
45	Nahri Sayed Seed Company	Taloqan, Takhar	Mr M Akram Kargar	Head
46	Sabzi Motmian Seed Company	Taloqan, Takhar	Mr Mohammod	Head
47	Khushkildy Seed Company	Taloqan, Takhar	Mr Waly Mohammad	Head
48	Taloqan Seed Company	Taloqan, Takhar	Mr Abdul Tahir	Head
49	Low-e-Bakhtar Afghan Seed Company	Taloqan, Takhar	Mr Hafizullah	Head
50	Khwaja Kafter Baba Seed Company	Char Dara, Kunduz	Mr Haji Lal Jan	Head
51	Puli Khushti Seed Company	Ali Abad, Kunduz	Mr Mullah Bashir	Head
52	Khalil Mohmand Seed Company	Archi, Kunduz	Mr Abdul Ghafar	Head
53	Abuza-i-Ghafari Seed Company	Khanabad, Kunduz	Mr Haji Mehman Dost	Head
54	Abdul Masawar Seed Company	Centre, Kunduz	Mr Hafizullah	Head
55	Zakhil Pamir Seed Company	Centre, Kunduz	Mr Noor Wali	Head
56	Hazrat Sultan Seed Company	Centre, Kunduz	Mr Mohammad Halem	Head
57	Kulab Kunduz Seed Company	Centre, Kunduz	Mr Abdul Ali Khirullah	Head
58	Zarghun Watan Seed Company	Char Dara, Kunduz	Mr Bashir Ahmad	Head
59	Hazrat-e-Belal Seed Company	Imam Sahib, Kunduz	Mr Mohammad Nabi	Head
60	Jahon Bahar Seed Company	Centre, Kunduz	Mr Hidatullah	Head
61	Abdul Ghani Sardarzai Seed Company	Panjwai, Kandahar	Mr Abdul Ghani	Head
62	Ahamad Baryaly Seed Company	Kandahar	Mr Shmadullah	Head
63	Sahrabi Loi Kandahar Seed company	Kandahar	Mr Nazir Ahmad	Head
64	Qadar Ahak Seed Company	Kandahar	Mr Zahir Shah	Head
65	Sadaqat Seed Company (MC)	Helmand, Kandahar	Mr Mohd Lal	Seed Manager
66	Voluntary Association for Rehabilitation of Afghanistan	Helmand, Kandahar	Mr Mohd Ismail	Seed Coordinator
67	Helmand Etehad Agriculture and Seed Company	Helmand	Mr Haji Hatam	Head
68	Noorzai Seed Company	Helmand	Mr Nabi Jan	Head
69	Bust Seed Company	Helmand	Mr Mohammad Aqa	Head
70	Helmand Zarghun SE	Helmand	Mr Ghazi Mohammad	Head
71	Mosmir Helmand SE	Helmand	Mr Noor Mohahammad	Head
72	Nasiri Brothers SE	Helmand	Mr Yar Mohammad	Head
73	Qudrat Sami SE	Helmand	Mr Abdul Ahad	Head
74	Miarwayes Seed Company	Mohd Agha, Logar	Mr Miarwayes	Head
75	Omar Seed Company	Logar	Mr Mohammad Omar	Head
76	Sadat Safi SE	Mohammad Agha, Logar	Mr Mohammad Naseem	Head
77	Berdaran Logar SE	Logar	Mr Mohammad Sha	Head
78	Parwan Bastan Seed Company	Bagram, Parwan	Mr Abdul Qaher	Head
79	Brathran Badar Seed Company	Bagram, Parwan	Mr Sheer Aqa	Head

	Agency	Location	Contact Person	Designation
80	Brothran-e-Karimi	Parwan	Mr Abdul Manan	Head
81	Kaynat-e-Sabaz Seed Company	Centre, Kapisa	Mr Khalid Lalazar	Head
82	Dehqan Aser Seed Company	Centre, Kapisa	Mr Mohammad Ibrahen	Head
83	Helal Seed Company	Kabul, Nangrahar	Mr Hazrat Wali	Head
84	Rana Seed Company	Kabul	Mr Abdul Ghafoor	Head
85	Mazreha-e-Sabaz Seed Company	Centre, Kabul	Mr Najeebullah	Head
86	Kabul Seed Company	Kabul	Mr Aziulrahman	Deputy Head
87	De Maka Seed Company	Kabul	Mr Wali Ahmad	Head
88	Wasi Kouchi Seed Company	Kabul, Kunduz	Mr Abdul Wais Kouchi	Head
89	Sharq Seed Company	Jalalabad, Nangrahar	Mr Saida Jan Abdiani	Head
90	Nangrahar Seed Company	Behsood, Nangrahar	Mr Ghulam Nabi	Head
91	Wadan Agricultural Company	Jalalabad, Nangrahar	Mr Mohammad Naiam	Head
92	Abid Alkozai Seed Company	Nangrahar	Mr Gul Mullah	Head
93	Poul-e-Behsood Seed Company	Behsood, Nangrahar	Mr Eisa Jan	Head
94	Hussain Zai Seed Company	Jalalabad, Nangrahar	Mr Haji Shawali	Head
95	Zarghun Seed Company	Behssod, Nangrahar	Mr Hanif	Head
96	Swatwal Seed Company	Jalalabad, Nangrahar	Mr Israr Ahmad	Head
97	Katal Seed Company	Laghman	Mr Sardar Mohd	Head
98	Eltaf Hasib Seed Company	Nangrahar	Mr Zamari	Head
99	Kunar Seed Company	Centre, Kunar	Mr Shazada	Deputy Head
100	Adeel Safi Seed Company	Kunar	Mr Gul Mohammad	Head
101	Nooristan Seed Company	Nooristan	Mr Elhamuddin	Head
102	Sayed Hamidullah Sadat Seed Company	Narkh, Wardak	Mr Meer Hamidullah	Head
103	Ferdous Seed Company	Madan Shar, Wardak	Mr Abdul Ghafoor	Head
104	Sofi Seed Company	Madan Shar, Wardak	Mr Fazalurhaman	Head
105	Sestan Seed Company	Farah	Mr Mohammad Esmil	Head
106	Sedeq Zada Seed Company	Farah	Mr Mohammad Tahir	Head
107	Faza-e-Sabz Seed Company	Farah	Mr Sheer Afgan	Head
108	Asim Salim Farhi SE	Farah	Mr Abdul Nasar	Head
109	Bahristan Seed Company	Baharak, Badakhshan	Mr Nizamuddin	Head
110	Sadat Bloch Seed Company	Kashim, Badakhshan	Mr Abdul Hadi	Head
111	Afghan Pamir Seed Company	Kashim, Badakhshan	Mr Noor Agha	Head
112	Bazer Afghan Haider Zadah SE	Badkghis	Mr Mohammad Ishaq	Head
113	Bazgar Seed Company	Khost	Mr Sayed Wali	Head
114	Haji Baba Mangal Seed Company	Gardez, Paktia	Mr Haji Mohammad Yaseen	Head
115	Sang-e-Zard Seed Company	Ghor	Mr Abdul Karim	Head
116	Barg Seed Company	Ghor	Mr Mohammad Ewaz	Head
117	Ghazni Seed Company	Ghazni	Mr Abdul Ahad	Head

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