Review of the Wheat Seed Sector in Afghanistan

Implications for seed programming and regulatory frameworks

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Pictures Front and Back Cover Pages

“Improved/modern” wheat varieties arriving at maturity in Panjshir valley. Parwan Province, 20th June 2003

TABLE OF CONTENT

Figures

Tables

Graph

Pictures

1. Introduction

With the emergence of a new government in Afghanistan since the end of 2001 and with the implementation of large scale emergency seed program in 2002 and 2003, interest in understanding seed systems and regulating seed activities in Afghanistan have increased. In May 2002, ICARDA, financed by USAID, organized a Code of Conduct workshop for the production, distribution and importation of seed in Afghanistan. During the same year, ICARDA prepared a draft National Seed Law and Seed Policy. More recently, FAO appointed an international Legal Consultant, who visited Afghanistan in October 2003 to draft a Seed Law.

This report is the product of several years of field observations on the wheat seed sector and addresses key programmatic and regulatory issues which may assist stakeholders involved in designing the future of the seed multiplication system in Afghanistan. The paper analyses the current agricultural context from recently produced baseline data as well as field observations and explore the implications for the seed sector (section 3). The seed needs estimation made by various agencies to plan the “seed” response to the drought in Afghanistan is discussed in detail (section 4). The absence of consensus on methodologies and best practices to estimate seed needs after a shock leads to sub-optimal program designs. The quality of the seed currently produced in Afghanistan is also analyzed (section 5) and this reveals some shortages which will require particular attention in the coming years if wheat production level in Afghanistan is to be maintained. A discussion on the issues of seed adaptability in Afghanistan is presented (section 6) and in particular in relation to the general use of traditional land tillage practices that still prevail even in combination with the use of tractors. Finally, the paper reviews the challenges that lay ahead in transforming the current seed multiplication system in a post-war context. A possible approach to undertake these changes in the seed multiplication sector are briefly presented. A brief history of the seed multiplication programs is also presented (section 2) while the bibliography will provide interested readers with additional references.

2. History of Seed Multiplication Program in Afghanistan

Forty five years ago, the UN declared the year 1961 as World Seed Year. The United States Agency for International Development (USAID) also celebrated that year with a publication titled, *Seed, the Yearbook of Agriculture-1961 (U.S. Department of Agriculture, 1961).* In the same decade many activities were initiated to establish formal seed production systems in most developing countries. The main emphasis was on spreading the 'miracle seed' of the Green Revolution as quickly as possible. Between, 1958 and 1978, the United States Agency for International Development (USAID) supported seed sectors in 57 countries. However, technical progresses in the seed sector that helped so significantly humanity were made by private foundations; Rockfeller and Ford.

In 1966, an important agriculture program was initiated by both the government of Afghanistan and USAID. The emphasis was on the promotion of newly selected improved wheat varieties as food security was a serious concern since the food deficit in Asian countries was worryingly increasing.

Few years, later, in 1972 the Department of Agro-Business was established in the Extension Department of the Ministry of Agriculture. It was responsible for multiplication and distribution of seed of improved wheat varieties.

In 1976, the Afghan Seed Company (ASC) was established with support of the Asian Development Bank, as a semi-autonomous agency under the Ministry of Agriculture aiming to produce, process, test, certify, distribute and sell seed. In 1978, FAO helped the government of Afghanistan to draft a Seed Law that was never enacted. The ASC name was changed to Improved Seed Enterprises (ISE) in 1985. 21 farms were transferred to ISE, with more than 10,000 hectares. ISEs headquarter was in Kabul, with several sub-offices in different provinces[1].

However, in the subsequent years, war in Afghanistan intensified, the central government lost its links and control over the provinces and the ISE were run independently with supports from FAO regular seed program. ICARDA notes that "ISE was established in 1976, when it was fashionable for government agencies to produce and supply seed. ISE was production-oriented, not market-oriented; had no structure to develop farmer use of seed; was led by government bureaucrats (who are notoriously focused on government targets rather than real market potential)"[2].

From 1982 onward, seed multiplication was supported by FAO inside Afghanistan with the cooperation of the Ministry of Agriculture (MAAH) and the ISE. In 1989-90, the Department of Seed Certification was established in the Extension Department of the MAAH to check and certify seed produced by ISE. However, with no certification law enacted and as the conflict continued

[1] ICARDA, "*Afghanistan Seed and Crop Improvement Situation Assessment. April-May 2002*", 2002. www.icarda.cgiar.org/Afghanistan/NA/content.htm.
[2] ICARDA, *Ibid.*, 2002.

the MAAH became inactive, and ISE certified its own seed internally.

On the ISE, ICARDA notes that "ISE has stagnated in growth, concepts, market orientation, and other essential areas during the conflict, when some ISE facilities were looted. Personnel received little training (other than some technical training as a better subsidiary of the FAO emergency intervention seed program). It is in poor condition, and has not kept pace with modern developments in seed supply, business management, market development, etc."[3]

In parallel to formal seed multiplication programs, aid was provided to agencies based mainly in Peshawar in Pakistan for "cross-border" operations in which seed became an important component in the effort to rehabilitate agriculture production, particularly in regions accessible from Pakistan (South and East). Indeed, after the signing of the Geneva Accord in 1988, various aid agencies, including FAO launched emergency seed program in Afghanistan. FAO placed its first order of "emergency" seed in Pakistan during 1988. FAO opened a second operational office in Pakistan for cross-border operations the same year.

During the mid-80s, a few NGOs (Madera, Swedish Committee for Afghanistan) started multiplying improved seed in Afghanistan for distribution to farmers. In 1993, 5 years after its first seed procurement in Pakistan, FAO "cross-border" seed operation started to multiply informally in Afghanistan the wheat varieties procured in Pakistan (for distribution to farmers). The seed multiplication was conducted through Implementing partners NGOs (IPs) or sometime community "*shura*".

In 1995, the FAO seed multiplication schemes - the emergency "cross-border" seed program and the existing more formal seed multiplication program (though ISE) in previously government controlled areas - were merged under the UNDP PEACE program. Yet, in the absence of a Seed Law and functioning government, FAO certified the seed produced under its own program in Afghanistan.

As classic formal seed sector has never existed in Afghanistan and no Seed Law has ever been enacted, any seed produced in Afghanistan have always been certified by the producer itself. In the absence of a formal seed sector, FAO supported a QDS (Quality Declared Seed) program in Afghanistan (see Annex III).

At present – after significantly reducing the number of NGO IPs engaged in seed multiplication since the emergency "cross-border" program – four ISE (Herat, Pul-i Khumri, Kandahar, and Kabul), one governmental farm (NADA), a few NGOs (IRC, ISRA, MCI, Solidarité, VARA, and FOCUS) and some community *shura* (Mazar, Farah, Kunduz, Takhar, Badghis, Ghor and Ghazni) work as implementing partners of the FAO QDS seed program. By 2001, 4,904 farmer-seed growers were under contract in 17 provinces.

Tunwar (2002) indicates that production of Quality Declared Seed (QDS) was ranging between 2,510 MT to 4,856 MT per year in the second half of the 1990s. In 2000, the production was doubled. In fall 2002, FAO seed multiplication program estimated a wheat seed supply of up to 5,000 MT of QDS (by paying contract growers with food grain 1.25 kg WFP food grain is exchanged for 1.0 kg of seed – food for seed) and another 5,000 MT that could be purchased from contract growers with cash (seed that

[3] ICARDA, *Ibid*., 2002.

would otherwise be used by seed growers for farmers to farmers seed exchange). The seed were sold to foreign agencies for emergency distribution at a price averaging $350/tons.

The FAO seed program is a remarkable "quantitative" success given the context in which the program was developed. Yet, a number of technical points are discussed in this paper to better understand the strength and limits of this program.

Beside FAO seed multiplication program, a number of NGOs, among which SCA and Afghanaid, have since 1995 pursued their own seed multiplication and distribution/sale activities, either in collaboration with FAO or in isolation. The SCA, one of the pioneers of seed aid in Afghanistan, continues to multiply wheat seed on their own rented farms in country, and sell it together with fertilizers to progressive farmers in nine provinces.[4] They sold about 1,000 MT of wheat seed and 2,000 MT of fertilizers in autumn 2002. The price per package of 50 kg each of seed, urea and DAP varies according to regions: PakRs.1,000 in Kabul, Rs 1,600 in Ghazni, etc.[5]

[4] Badakhshan, Takhar, Kunduz, Baghlan, Laghman, Kapissa, Ghazni, Logar and Wardak.
[5] Communication from Olivier Cossée, FAO evaluation officer.

3. Agriculture context: Survey Findings Relevant to the Seed Sector

During two decades of war, FAO and the Ministry of Agriculture (MAAH) did not conduct systematic crop surveys in Afghanistan. Since 1996, FAO has been conducting crop assessments on an annual basis mainly for purposes of food security surveillance. Up to 2001 such assessments were only based on limited field observations during harvest and limited satellite information, since no capability existed neither for conducting rigorous sample surveys nor for producing ground based meteorological data (necessary to interpret satellite imageries). It is only since 2002 that systematic crop surveys at national level have been undertaken in Afghanistan. In particular, the following surveys were conducted:

- ✓ In May-June 2002 and in December 2002-January 2003, FAO and WFP conducted two sample Agriculture Surveys covering all the country and interviewing nearly 5000 farmers (both surveys).
- ✓ In May-June 2003 and August-September 2003, the MAAH and FAO led a National Crop Output Assessment - NCOA - to estimate area planted and crop production in the country.
- ✓ In May-June 2003, field review and adjustment of the 1990/93 FAO Landcover Atlas data for the development of a land base sampling frame for 2002-03-04 use. The findings are presented in annex of the 2002-03 winter survey.
- ✓ In 2002 and 2003, a number of seed program evaluations have been conducted within the framework of FAO emergency seed distribution programs.

Key findings on the agriculture context relevant to the seed sector are presented below. The implications these findings have on the seed sector are explicitly noted in each sub-chapter.

3.1 Cultivated Land and Farmers

The FAO 1993 landcover Atlas shows that irrigated land (including intermittently irrigated) represents 5% of the national territory, rain-fed 6.9%, rangeland 44.7% and water-bodies and permanent snow cover 3.2%. Between, 1972 and 1993, the total agriculture land declined by 14% (affecting both rain-fed and irrigated land), mainly due to the collapsed of customary land and water right laws (see annex I). Further agriculture rehabilitation in the coming years will unlikely result in significant increases in cultivated areas (although this was suggested by a number of irrigation reports[6]).

[6] For instance, Sheladia Associate Inc., "*Draft Final Report for Rapid Assessment and Draft Report for Framework of Water Resources Management*", Submitted to AACA, October 2003.

In 2003, FAO estimated that 1.79 million hectares of land was cultivated with a first crop - excluding vineyards, orchards and other trees and 0.25 million hectares of second crops (rice and maize). Pulses represent approximately 0.1 million hectares. FAO estimates that 10% of the total irrigated land is orchards. Therefore, an estimated total of 2.4 million hectares have been irrigated in 2003 (including double crops)[7].

The winter survey estimates the number of farms to 1.06 millions (0.94 million access irrigated land, 0.44 million rain-fed land out of which 0.32 million access both rain-fed and irrigated).

Implications for the seed sector:

- *Seed programs and regulatory framework need to support a seed multiplication system adapted to the seed need that can be determined by the cultivated land in 2003.*
- *Seed programs and regulatory framework should protect the interest of more than one million Afghan farmers engaged in wheat cultivation.*

[7] Favre, Raphy; Fitzherbert, Anthony; Escobedo, Javier; "*MAAH/MRRD/FAO/WFP National Crop Output Assessment. First Phase. 10th May to 5th June 2003*", FAO, 25th July 2003; FAO Food and Crops Supply Assessment, 13 August 2003; FAO Food and Crops Supply Assessment, 8 June 2001; and Maletta, Hector and Favre, Raphy, "*Agriculture and Food Production in Post-war Afghanistan. A Report of the Winter Agriculture Survey 2002-2003*", FAO, Kabul, August 2003.

3.2 Cereal Production

Cereal production in 1998, 2002 and 2003 reached and surpassed pre-war production level despite war, failed governance and the impact of the drought. In 2003, aggregate cereal harvest is the highest on record with an estimated 5.37 million tones.

Cereal yield and production level in all surveys are significantly higher than previous years projection based on pre-war baselines (produced in 1967/68). Therefore, projected production had probably been under-estimated in previous estimates. This is corroborated by the SCA agriculture survey findings in the early 90s[8]. Also, looking at the FAO official data between 1999 and 2001, an uncovered 1 million MT cereal deficit (including food aid) was reported which represents the food requirements for 6 million people (or nearly 30% of the total population). This reported worrying food situation did not result into famine in Afghanistan and therefore the uncovered deficits were covered either by non registered imports and/or non-recorded (underestimation) in-country cereal production (see Annex II).

The proportion of cereal in the crop production pattern was lower than expected indicating a much more diversified cropping system. The National Crop Output Assessments showed that in irrigated land, wheat represents 59% of the first crops (this percentage does not include perennial crops such a fruit trees/vineyards, etc…). Discussion with farmers showed that decision on the type of crops cultivated is determined by prices and market opportunities. Farmers have

[8] SCA, "*Agricultural Survey in Afghanistan. First Report*", 1988; SCA, "*Agricultural Survey for Afghanistan*", 1990; SCA, "*1991 Survey. Report 14*", 1992.

demonstrated to be responsive to market signals. There are several examples such as the fruits production in the South and Central regions, mung beans in the Northeast[9], black cumin seed in the West, early season vegetables in the South and West (grown under plastic tunnels), green-gram and rice in the North, potatoes in the West-Centre, and … opium poppy now grown in all parts of the country.

Implications for the seed sector:

- *Significant progresses were made in agriculture production and crop diversity in the past 25 years, in the absence of a functioning government. Any programs and regulation on the seed sector should not hamper progresses made in the past years.*
- *So-far the seed multiplication and related programs are focusing on wheat. Other crops occupy an important share of the cropping patterns and their specificity should be covered by existing and future initiatives..*
- *The Seed Multiplication system in Afghanistan should respond to market demands by the private sector (farmers and traders) which have been in the driving seat of agriculture production in the past decades.*

[9] The change over to wheat followed by mung beans - seems to have mainly occurred on the old cotton land - and is a very good example of Afghan farmers reacting to market opportunities and market forces. As the market for cotton collapsed, so Afghan farmers caught the market opportunities for 'gram' in Pakistan.

3.3 Improved Seed Use

The winter agriculture survey indicates that that improved seed are widely used in Afghanistan as more than half (53%) of all wheat seed planted in 2002 were improved seed which have been introduced in each production area for less than 10 years. From this, slightly more than a quarter (28.6%) of all seed planted originated from FAO seed program and another quarter (24.4%) from other origin (other improved seed). The rest (47%) were local seed or improved seed introduced for more than 10 years, such as the widely used "*zardana*" variety in Northern Afghanistan.

The multiplication of "improved/modern seed" by FAO in Afghanistan on contract farmers field had widespread demonstration effects as neighboring farmers could see/compare crop results. The NCOA survey[10] also observed that the use of improved seed is significantly lower in the provinces of Faryab, Sari Pul and Ghor provinces. These provinces are located far away from FAO seed multiplication program and did not benefit from the demonstration effects of these activities.

By introducing and multiplying new varieties in Afghanistan, FAO in-country seed multiplication program can be credited for at least part (>50% of the "improved/modern varieties used) of the cereal production progress in the past years.

[10] Favre, Raphy; Fitzherbert, Anthony; Escobedo, Javier; "*MAAH/MRRD/FAO/WFP National Crop Output Assessment. First Phase. 10th May to 5th June 2003*", FAO, 25th July 2003. www.fao.org/world/afghanistan/

Implications for the seed sector:

- *Despite the absence of a functioning government for the past 2 decades, significant progresses were made in the use of "improved/modern variety" seed. Any regulation on seed should not limit the choice of seed that farmers may want to grow as ½ of the improved seed used have other origin than the FAO supported seed program.*
- *Any seed regulation and seed policy should not hamper farmers to access seed from other sources through market mechanisms than the ones produced by FAO inside the country.*
- *Existing seed programs should relocate and support the adoption of improved/modern variety seed in areas where surveys have recognized that the use of such seed is significantly lower (i.e. by encouraging production in areas where "improved/modern seed" are not multiplied).*

3.4 Origin of Irrigated Wheat Seed planted by Farmers

The winter survey showed that in irrigated wheat fields in 2003, 3.8% of the wheat seed farmers cultivated were received from both humanitarian organizations and local social solidarities, 58% where farmer's own seed and 39% were procured in local bazaars. The total amount of irrigated wheat seed purchased (39% procured from bazaar) by farmers in 2003 is estimated at 63,000 MT (to plant 0.41 million hectares or 39% of the total wheat seed cultivated area in 2003). These data shows the importance of market and trade in supplying seed to farmers.

In irrigated wheat, the data show a replacement rate of 39% for seed undertaken by farmers (39% originating from bazaars) and highlights important characters of Afghan farmers; they are taking risks to improve their yield and production. The replacement rate is reportedly much lower (below 5%) in neighbouring countries [11] ! The high replacement rate found in Afghanistan in 2003 perhaps denotes of a process of fast adoption of "improved/modern seed" triggered by the new context in the country. Farmers interviewed during the National Crop Output Assessment (Favre & all, 2003) informed that non FAO seed were accessed from the market and directly imported or sent by relatives in neighboring countries. Several returnees farmers are cultivating crop varieties they have identify in neighboring countries (Favre and all, 2003).

Implications for the seed sector:

- *The current size of the seed market in Afghanistan (63,000 MT procured by farmers on the market) is as such that a Seed Regulatory system is fully relevant.*
- *Given the current size of seed trade, any regulatory framework should promote and strengthen a market-oriented seed industry in Afghanistan.*

[11] Communication from FAO Chief Advisor in Seed Development for Afghanistan, N. Tunwar.

3.5 Origin of Rain-fed Wheat Seed planted by Farmers

The winter survey showed that in rain-fed (*lalmi*) wheat fields in 2003, 2.8% of the wheat seed farmers cultivated were received from both humanitarian organizations and local social solidarities, 43% were farmer's own seed and 53% were procured from the bazaars. The total amount of rain-fed wheat seed purchased by farmers in 2003 is estimated at 60,000 MT (which were used to plant 0.65 million hectares of rain-fed wheat fields).

These data also demonstrates the capacity of the market and trade in supplying adapted seed to Afghan farmers and particularly in *lalmi* cultivation. Indeed, market supplied in 2003 more than 50% of the total seed requirements! These seed supplied by the market proved to be well adapted as the rain-fed wheat yield in 2003 was a record high with an average of 1.09 Mt/ha.

Unfortunately, the winter survey did not differentiate the rain-fed and irrigated farming systems when asking about the type (improved-modern vs local) of the wheat seed used by farmers. Therefore, the type of seed used in rain-fed area remains little documented. However, field monitoring showed that an important proportion of the rain-fed wheat seed planted are landraces[12].

Implications for the seed sector:

- *Seed program and regulatory frameworks should not hamper the trade of rain-fed seed on local markets as market forces seem to be able to supply adapted rain-fed seed.*
- *Any seed regulation should clearly distinguish the specificities of landraces seed and "improved/modern" varieties seed.*

[12] See Fitzherbert, Anthony, "*Mission Brief. Northern and Central Afghanistan. March 25th to April 8th 2002*", FAO, 2002.

3.6 Fertilizer Use

The winter survey indicates that an average use of combined fertilizer products of about 179 kg/ha and only on irrigated wheat fields. The highest application rates on wheat in 2002 were observed in Kabul or Central region with 345 kg/Ha. Far below was the Helmand River basin (mostly Helmand and Kandahar) with only 80 kg/Ha which may partly be explained by the continuing drought in these provinces during that year. All in all, 78 percent of the surveyed farmers with irrigated wheat reported to have applied fertilizer on wheat and for wheat alone applied a total of 187,000 MT nationally. These figures indicate a major increase in fertilizer use as compared to the pre-war level that reached approximately 50,000 MT per year applied on all crops (total fertilizer use) just before the Soviet invasion[13].

These fertilizers are timely imported and made available to farmers by traders across the country. Such progresses were remarkably achieved by farmers alone in the absence of any significant program focusing on fertilizer used since the late 70s. This further strengthens the thesis that free market had a key role for the successful agriculture progress in Afghanistan in the past 25 years.

Implications for the seed sector:

- *The Seed Law should recognize the fact that markets can provide the necessary adapted input for Afghan farmers.*
- *Farmers have learned to choose the best seed available. The Seed Law should not circumscribe, or limit the farmers' discretion and right of choosing the varieties/seed and input, which they wants to grow.*

[13] www.fao.org

4. Estimation of Seed Needs: Distinction between Two different Types of Seed Needs

The two most common justifications for providing relief seed are that a) seed accessible to farmers are of poor quality or b) there is a problem of seed availability for the next cultivation campaign. These justifications preclude that seed needs assessments are conducted before any emergency seed intervention[14] and reflects two different types of seed needs:

- the needs for high quality/high yielding "improved/modern seed"
- the needs of destitute farmers who have lost access to any adapted seed that can be planted on farmer's land

In Afghanistan, both needs are not differentiated by the various actors involved in seed programs. This has led to fundamental conceptual problems in the way emergency programs have operated and dramatic differences of the perceived scale of emergency seed needs between (and within) agencies. These seed needs estimates are discussed below.

In the text below, we differentiate the following terminology:

- "seed requirements" which is the total seed planted by farmers (total area cultivated x seed rate);
- "emergency seed needs" which is the volume of seed needed for an emergency distribution and
- "certified or QDS seed needs" which is the volume of high quality/high yielding "improved/modern seed" seed required by farmers for renewing their seed stocks. QDS seed are produced in Afghanistan through a seed production scheme, which is mainly implemented by FAO.

The certified seed needs are estimated based on seed replacement rate. The Winter Survey estimated a current replacement rate of 39%. However, calculations below are made based on a foreseen rate of 25%, which is generally considered as optimal in the Afghanistan context (FAO, ICARDA). As it is hoped that certified seed quality will improve in Afghanistan, farmers will not see the need to continue maintaining a higher replacement rate.

[14] See FAO, "*Guidelines for funding Farmer and Variety Sensitive Seed Relief. Working Group: Restoring Farmers' Seed System in Disaster Situation*", Rome, 3-5 November 1998.

4.1 Needs for "Improved/Modern Seed"

The methodologies used by FAO to estimate the seed needs in Afghanistan are aiming at estimating the needs for "improved/modern seed". The overall seed requirement (total seed planted) for Afghanistan is estimated by multiplying the total acreage cultivated by the seed rate practiced in irrigated and rain-fed fields. A replacement rate of 25% for "improved/modern seed" is considered necessary (farmers should replace their seed every 4 years). Therefore, the seed needs are estimated by dividing seed requirement by four. The FAO Crop and Food Supply Assessment mission in 2001 estimates the seed needs for Afghanistan at 70,000 MT (see figure 1). However, as the methodology used was increasingly challenged, the 2002 and 2003 FAO Crop and Food Supply Assessment did not produce any seed needs estimate.

This estimation of seed needs in Afghanistan is based on a wrong assumption, which is not reflecting realities in the field. This assumption considers that 100% of the fields cultivated in Afghanistan are cultivated with "improved/modern seed" that need to be replaced. This 100% "improved/modern seed" assumption leaves little room, in terms of program planning, for the genetic diversity conservation of crops in Afghanistan. Furthermore, before the 2002-2003 Winter Agriculture Survey, no national survey could determine the strategy of farmers as regards to the choice of their seed.

Since 2002, various actors with various interests have produced estimates on seed needs with conflicting figures (sometime within the same agency):

- FAO project documents of the emergency program in 2002 state that "the total national requirement for quality seed is estimated to be about 60,000 MT".
- FAO Strategy Action Plan, 2002 to 2006, identified even more seed needs as the document states that "under ideal conditions, up to 300,000 tons of quality seed would be required every year to cover the entire area of cereal crops, while currently barely 10,000 tons of QDS are available in-country [15] ". This estimate assumes that 100% of the fields cultivated in Afghanistan are cultivated with "improved/modern seed" and also assumes a seed replacement rate of 100% (which is even not a reality in the world most modern agriculture systems in the West!). Yet, to reach these 300,000 tons, one had to artificially inflate the wheat cultivated area from the official FAO CFSAM figures.
- ICARDA estimates that between 27,000[16] to 30,000 MT[17] of seed are needed in Afghanistan. This is based on a 390 households interviews in 6 provinces conducted in 1998.
- NGOs on their side have presented seed project proposal with various scales of emergency seed needs in their respective area of operation.

However, in irrigated area, even during the drought, with or without emergency program, wheat fields continued to be planted as the estimated area planted of

[15] Strategy Action Plan, 2002 to 2006, FAO - September 2002.

[16] ICARDA, "*Restoring Seed Security in Afghanistan. Work Plan for 2002*", The Future Harvest Consortium to Rebuild Agriculture in Afghanistan, 2002.

[17] ICARDA, "*Afghanistan Seed and Crop Improvement Situation Assessment. April-May 2002*", 2002.

the FAO CFSAM wheat cultivated estimations and field observations demonstrate [18] . In irrigated farming system in Afghanistan, there is NO need for any emergency seed distribution as "seed stock" depletion does not occur even during the worst drought as there is always enough water to irrigate sufficient wheat fields to maintain minimum seed stocks. Therefore, despite fantasist figures over emergency seed needs and huge sum invested in emergency seed distribution programs in 2002-2003 targeting irrigated land, analysis of irrigated seed system shows that there is NO emergency wheat seed need in irrigated system[19].

However, needs for high quality/high yielding "improved/modern seed" do exist in irrigated area or in other words, there is a need of demonstrating the values of "improved/modern seed" to farmers so that these are widely adopted. This requires a longer term development approach and emergency seed distribution may not achieve the target.

The 2002-2003 winter survey found that more than half (53%) of all wheat seed planted in 2002 were improved seed which have been introduced in each production area for less than 10 years. Also, the winter survey shows that in 2002 in irrigated fields, 39% of the seed where procured in local bazaars, while in rain-fed wheat fields 53% were procured from the bazaars. This reflects an important market demand (63,000 Mt in 2003) for quality "improved/modern seed" in the country.

Considering a normal replacement rate of 25% and that 53% of the irrigated wheat cultivated are "improved/modern seed" introduced less than 10 years, the annual requirement for "improved/modern seed" is estimated at approximately 20,000 MT (see figure 2). This may express the sustainable annual market demand for high quality/high yielding "improved/modern seed" in Afghanistan upon which a long term national seed multiplication program could be based. However, this rate would increase as the proportion of improved seed use is raising.

The reasons for the wide discrepancies in assessing seed needs between agencies and actors involved reveal one fact: minimum standards on emergency seed distribution programs do not exist and therefore methodologies to assess (or not) seed needs and implementation protocols are left to the creativity of actors on the ground.

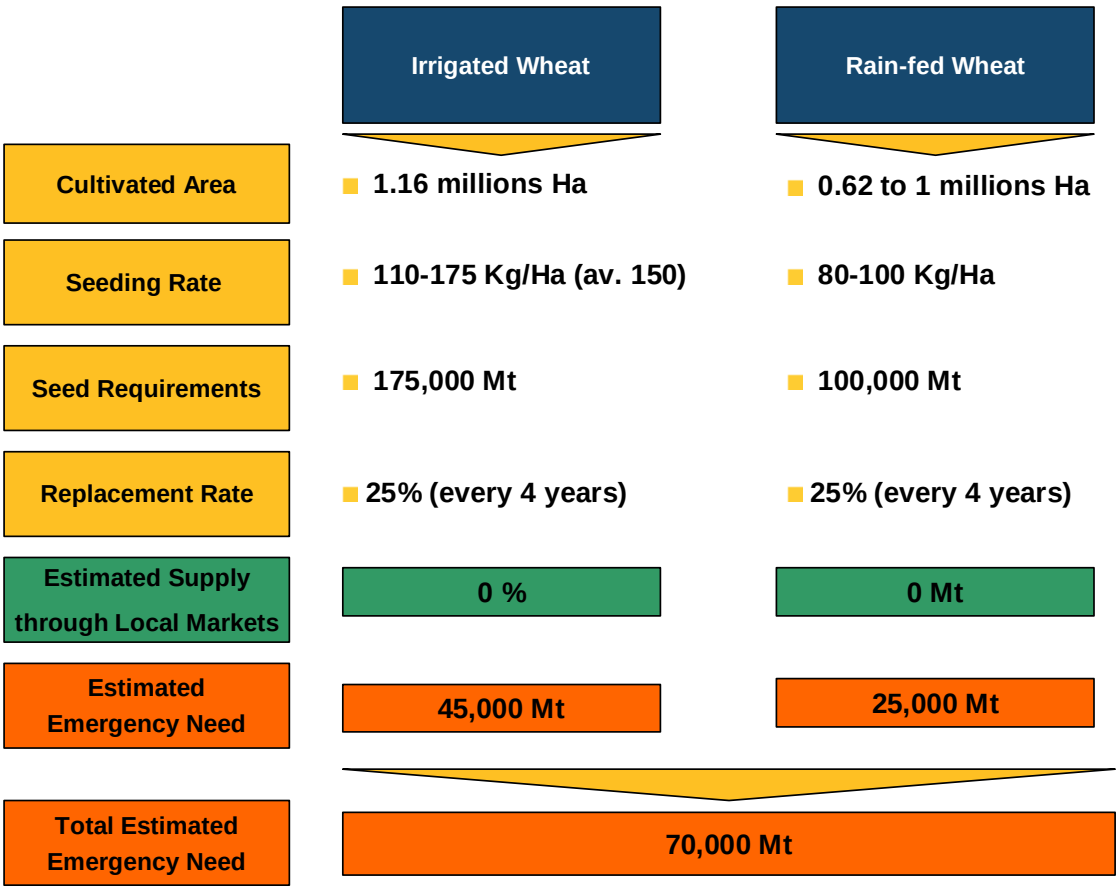
In the 2002-03 Winter Agriculture Survey, farmers reported that 3.8% of the seed planted or 6,100 MT were received for free (from both organizations and social solidarity networks). The significant difference with the total amount of seed distributed (~23,000 MT[20] of wheat seed distributed from the FAO network of contract growers alone) may be due to marketing or consumption of distributed seed by recipient farmers.

[18] FAO, "*Crop and Food Supply Assessment Mission to Afghanistan*", 1999 to 2002; Fitzherbert, Anthony, "*Mission Brief. Northern and Central Afghanistan. March 25th to April 8th 2002*", FAO, 2002; Fitzherbert, Anthony, "*Mission to Bamyan, April 15th to 17th 2002*", FAO, 2002; Fitzherbert, Anthony, "*Mission to Panjsher, Baghlan, Kunduz, Takhar, Samangan, Balkh. March 3rd to March 10th 2002*", UNDP, FAO, UNOPS, Kabul, 2002.

[19] On the discussion on whether there is or not a "seed famine" in Afghanistan, see the paper prepared by Anthony Fitzherbert for the Code of Conduct Work-shop, "*Presentation to the 'Seed Code of Conduct' Workshop, May 21st to 23rd 2002. Seed Aid, the Afghan Experience 1998-1995; 1996-2001*", Kabul, May 2002.

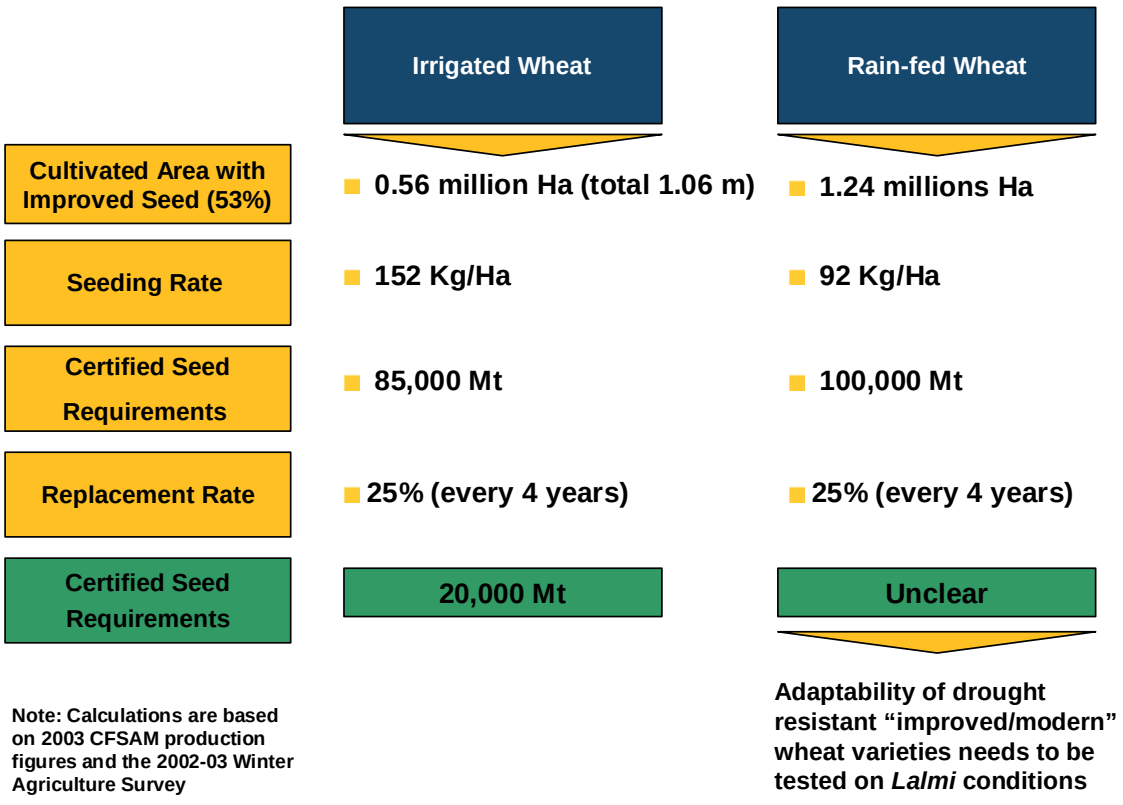
[20] Annual Report of the Seed Production Program for 2002 – N. S. Tunwar, FAO, in print.

Figure 1
Graphic representation of FAO CFSAM seed needs estimation for Afghanistan in 2001



Note: FAO calculations were based on 1998 to 2002 production figures

Figure 2
Graphic representation of "Improved/modern" wheat seed estimation for Afghanistan. Estimations made by the author



Note: Calculations are based on 2003 CFSAM production figures and the 2002-03 Winter Agriculture Survey

4.2 Needs Estimation of Rural Poor having lost Access to Seed (Seed Security)

In rain-fed farming, the situation is slightly different as "*lalmi*" are notoriously known for being an extensive, low-input and opportunistic type of farming due to the high risks associated to the possibility of rainfall failure. Therefore, the high percentage of seed procured for rain-fed farming in the bazaar in 2002 was probably in direct relation to the seed stock depletion in rain-fed area after 3 years of severe drought. Seed stock depletion relates to the second type of seed needs which are the needs (whether landraces or "improved/modern" seed) of the poorest farmers who have lost access to seed (seed stock depleted and no access to seed in the market) as a result of acute food insecurity (drought, pests, conflicts, etc.). The most vulnerable farmers to "seed insecurity" are the ones relying on "low-productivity/marginal" farming lands such as rain-fed farming or high elevation farming. In rain-fed areas, the limiting factor is water shortage, while in higher elevations early frost can damage crops.

The seed needs estimation methodologies applied in previous years (see section 4.1 above) were designed independently from farmer's food/economic security considerations. Therefore, there were no reliable figures available that can be used for planning an emergency seed intervention that is actually targeting farmers having lost access to sufficient quantity of adapted seed (seed stock) to plant their fields.

For rain-fed areas in particular, the cooping strategies adopted by farmers to insure their seed security should be assessed. Farmers cooping strategies to retain access to seed in time of adversity are the links that relate "food security" information with "seed security". In other words, estimating "seed security" is about understanding "how food insecure farmers in a given farming system should be that their normal coping strategies do not allow them to keep access to sufficient quantities of adapted seed for cultivation?"[21].

The succession of events during the recent drought reveals some important mechanisms on seed security in rain-fed areas:

- Two to three successive years of drought results in a general depletion of rain-fed seed stock (typically 1999 to 2001 in Northern Afghanistan).

[21] In rain-fed areas, the following cooping strategies have been identified although the importance of each of them is not well known:

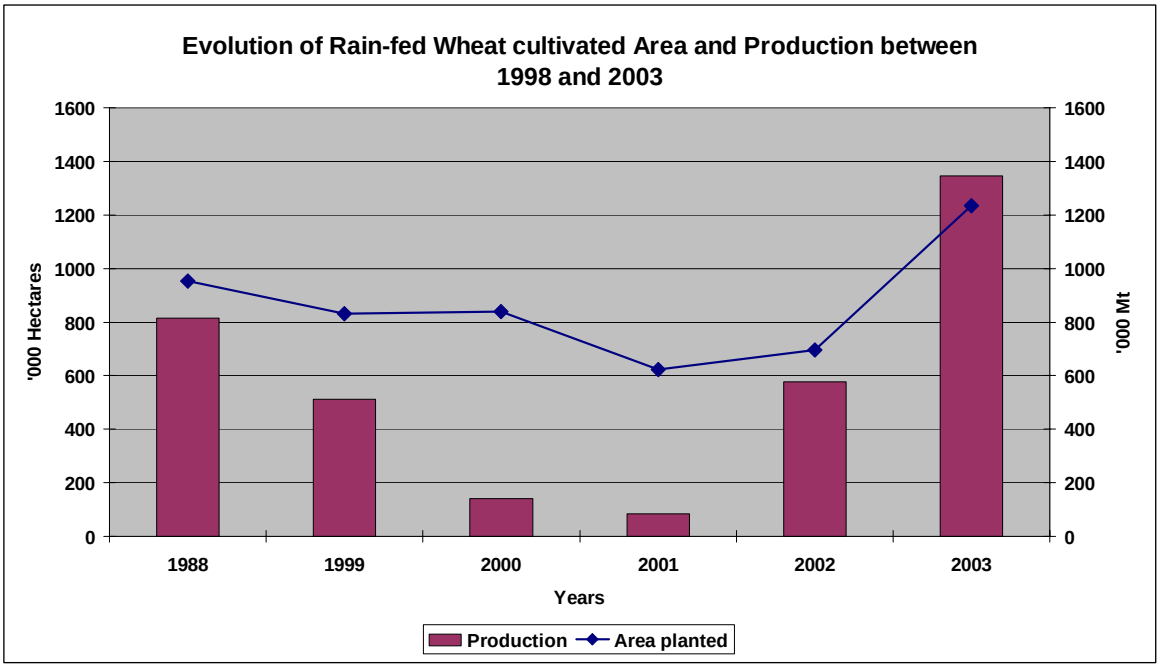
- In drought period affecting certain districts, landraces seed are exchanged between regions of surplus and deficit. The exchanges are mainly organized by the market or by landowner/rich individuals.
- In areas where farmers have both irrigated and rain-fed fields, rain-fed landraces or "improved/modern" varieties with wide adaptability may be cultivated in irrigated land to insure seed availability even after a succession of dry years.
- Farmers would plant their rain-fed fields even if they are confident enough that they would recover not more than the double of their seed input[21]. The thickness of the snow cap seems to play a major role in the farmer's decision. If the spring indicators are not favorable, rain-fed fields are not cultivated and the seed are stored for the following year.
- In order to prevent seed insecurity after a failed crop, rain-fed farmers may store sufficient landraces seed to cover their needs for more than one year.
- Food distribution timely responding to identified food insecurity situation is an efficient way to prevent seed insecurity as poor farmers may be able to retain their seed for cultivation and consume relief food.

- It takes two “good” years for the rain-fed seed stock to be replenished and for the production capacity to recover (typically 2002 and 2003). In 2002, just after 3 years of drought, rain-fed seed stocks have been depleted and impoverished rain-fed farmers could not take on the opportunities offered by good rain-falls. The graph 1 shows that the area planted significantly dropped in 2001 but the increase was minimal in 2002 although rain-fall was satisfactory. Yield of rain-fed wheat planted increased resulting in higher production. Unfortunately, the emergency seed response to drought affected farmers focused on irrigated seed, leaving the most affected farmers in rain-fed areas to fend for seed by themselves while millions dollars of donors’ funds were pored into seed emergency programs (rain-fed seed are available from dry land production areas in Pakistan and Iran).
- Pockets of successive failures in rain-fed area does not necessarily results in seed insecurity as the recovery between 2002 and 2003 in rain-fed areas have demonstrated; in 2002, rain-fed cultivation was patchy with entire rain-fed regions that could not cultivate their land due to lack of seed, while in 2003, literally the whole rain-fed area in Northern Afghanistan was cultivated, resulting in an historical record acreage planted and production. Encroachment of rain-fed cultivation into grazing land was observed in various parts of the country as a result of land right crisis. Landraces rain-fed 2002 production was largely redistributed through local markets and sold by local traders as adapted rain-fed seed for 2003 cultivation.

Table 1
Evolution of the rain-fed area planted and production between 1999 and 2003

Years	Area	Production
1988	952	814
1999	831	512
2000	840	140
2001	623	83
2002	697	576
2003	1 235	1 345

Graph 1
Evolution of the rain-fed area planted and production between 1999 and 2003. Source: FAO CFSAM 1998 to 2003



As discussed in section 3.6, in 2003, farmers had to procure from local market 53% of the rain-fed wheat seed they planted. Based on a seed rate of 92 kg/ha, the total amount of rain-fed wheat seed purchased by farmers in 2003 is estimated at 60,000 Mt (see figure 3). This amount of seed can be considered as a baseline for emergency seed needs for farmers who have lost their own seed stock to cultivate their *lalmi* fields following 2-3 consecutive years of nation-wide drought. Part of these needs can however be supplied by markets as not all farmers are equally affected. As in rain-fed areas, the production is determined more by the adaptability of the seed to the rain-fed conditions and the generosity of the climate, landraces seed may be more adapted than "improved/modern seed" for emergency response.

Unfortunately, the winter survey did not differentiate the rain-fed and irrigated farming system when asking about the type of the wheat seed used by farmers. Therefore, data cannot be disaggregated. However, the recent drought has highlighted the suitability of "improved/modern varieties" in marginal land and the important role that the landraces are playing in Afghanistan. Indeed, in rain-fed areas, field monitoring showed that an important proportion of the wheat seed planted are being cultivated with landraces[22].
FAO seed multiplication program is producing only limited quantities of rain-fed QDS seed. Due to the paucity of rain-fed "improved/modern" wheat varieties in the FAO regular seed program to supply the emergency seed market (high demand from the international organization), FAO started in 2001 its first year of variety testing of FAO "irrigated" wheat varieties under rain-fed conditions. In any case, formal "improved/modern seed" multiplication programs are not matching with the possible raising needs in rain-fed areas.

Addressing seed insecurity in rain-fed areas in the event of 2 or more consecutive dry years could be done through the following interventions:

- Rain-fed wheat seed swap from regions that have received sufficient rains to regions where rain-fed crops have failed. Rain-fed seed could be procured and cleaned from food secure areas and distributed in food insecure areas to vulnerable farmers, as part of an emergency response program. Moreover, the procurement of local rain-fed wheat varieties through small farmers and the distribution to rain-fed farmers in areas where rain-fed crops has failed is maximizing the impact of the program to the most vulnerable. Indeed, cash would be invested to procure seed to vulnerable rain-fed farmers that have been successful in a particular year while adapted landraces seed would be redistributed to the most drought affected farmers[23].
- Rain-fed wheat seed could be multiplied by contracted seed growers in irrigated areas and creation of a buffer stock. The irrigated production and buffer stock would insure a sufficient level of availability of seed that could be transferred to the rain-fed areas after

[22] See Fitzherbert, A., "*Mission Brief. Northern and Central Afghanistan. March 25th to April 8th 2002*", FAO, 2002.

[23] In addition to the direct economic impact, such interventions would have long-term positive impact on the production aptitude of rain-fed landraces since the genetic potential is maintained/increased through seed exchanges between provinces. The exchanges of local varieties between areas are traditionally implemented by afghan farmers, not only as a coping strategy to maintain access to seed after a bad year, but also to maintain the genetic diversity of the local landraces (genetic regeneration).

a generalized/nation-wide drought (of similar extend as the recent 1998-2002 drought).

- Cleaning and processing of local rain-fed seed. One of the limiting factor for rain-fed production is the quality of the landraces seed used. Indeed, as rain-fed is prone to soil moisture stresses, the filling of the grains are rarely optimal which is resulting in low germination rate. Cleaning the landraces seed will increase the germination rate and eventually the performance of the cultivation. It would also reduce the losses of small grains that do not germinate in the field but could be saved as food. Seed treatment would also control the incidence of soil born fungus and "smut" diseases. According to FAO, "smut" on rain-fed wheat alone accounts up to 30% of crop losses [24] . Cleaning and processing farmers' seed would also be relevant in irrigated land. In Wardak province, experience have demonstrated that yield of irrigated wheat have increased by 20% with appropriate cleaning/processing of local seed [25] . Feasibility studies would define the type of implement/machineries (at HH, village, district or province level) that would be adapted for such supports.

Agencies involved in emergency seed program are providing some other justifications to fund their activities. These include the followings:

- Some farmers in irrigated or rain-fed farming systems are too poor to have maintained their seed stocks and therefore required the support of an emergency program.
- Farmers involved in opium poppy farming may have lost their wheat seed stocks and therefore in order to facilitate the conversion from opium poppy to wheat, emergency wheat seed distribution is required.

The proportion of the seed cost to the total cost of wheat production may be also interesting to discuss. According to Maletta [26] , the sowing operation for irrigated wheat (seed + labor) represent $36/ha or 10% of the total production cost of $345/ha. For rain-fed wheat, the sowing operation represents $ 20 or 15% of the total production cost of $132/ha. Beside requiring access to land and water, farmers decision to engage in wheat cultivation after a shock (drought, etc..) will depend on their ability to secure the other costs (beside seed) which represent the majority. One may conclude that for farmers who are too poor to access land and cover other production costs, an emergency seed distribution program may not change their decisions. For better off farmers who have access to land/irrigation and can afford to cover the other costs, they can certainly afford to access wheat seed as well. The needs for rain-fed seed remains important in the event of a generalized drought which result in depletion of seed stocks in an entire region as it occurred in 2002.

[24] FAO, "*Integrated Crop and Food Production in Afghanistan. An account of the Achievements of the AFG/94/002 program 1995-1997 and opportunities for 1997-1999*", Islamabad, April 1997.

[25] Baba, Najib, Favre, Raphy, "*L'avenir de la banque de céréales et la nouvelle stratégie de développement agricole*", ACRD, June 1994.

[26] Maletta, Hector, "*The Grain and the Chaff: The Cost of Production of Wheat in Afghanistan in a Farming System Perspective*", FAO, December 2003. www.fao.org/world/afghanistan/

For opium poppy farmers, the decision to move away from poppy cultivation is complex and the topic cannot be debated here. However, the followings can be useful:

- Opium poppy farmers continue to cultivate wheat on their land as only a portion of their holdings is allocated to poppy production [27]. Therefore, it is unlikely that these farmers will experience a break-down in their ability to access wheat seed.
- Recent studies have shown that the entrepreneurial cash flow of opium poppy is far superior to wheat ($ 180/ha for wheat and from $2,300 to $14,000/ha for opium poppy depending on the farm gate price[28].
- Opium poppy crop cycle is shorter than wheat and it therefore allows early planting of the second crop which can subsequently benefit from better water availability. Indeed, river flows decrease rapidly in summer and water availability is a constraint for second crops particularly if planted late. Changing to wheat may mean for some farmers dropping the option of cultivating a second crop.

Implications for the seed sector (general):

- *Minimum standards on emergency seed operation need to be prepared through a broad based consultation of stakeholders*

Implications for the seed sector on irrigated wheat:

- *Donors and seed regulatory framework should discourage emergency seed distribution in irrigated area in whatever situation (drought, opium poppy).*
- *Seed regulatory framework does not need to foresee any entity (i.e. government) to be responsible to maintain emergency seed stocks for irrigated area.*
- *Seed multiplication system of "improved/modern" wheat varieties in Afghanistan should be based on the current seed demand (20,000 MT). The capacity and relevance of various actors to fulfill these needs (at various level of the seed multiplication chain) should be reviewed.*
- *The seed multiplication system may be reviewed every decade and may be based on updated findings from assessments of the certified or QDS seed needs.*
- *The regulatory framework should insure that quality declared seed or certified seed are of higher quality than seed otherwise found in the market.*

Implications for the seed sector on rain-fed wheat:

- *Seed programs and regulatory frameworks should recognize the specific seed needs in rain-fed areas in terms of the seed type (landraces) being cultivated and the important role of market in mitigating the impact of regional or national seed stock depletion.*
- *Seed regulatory frameworks may recognize the possibility of national seed emergency in rain-fed area (maximum needs of 60,000 Mt) and consequently entitle an institution to take responsibility to coordinate the response.*

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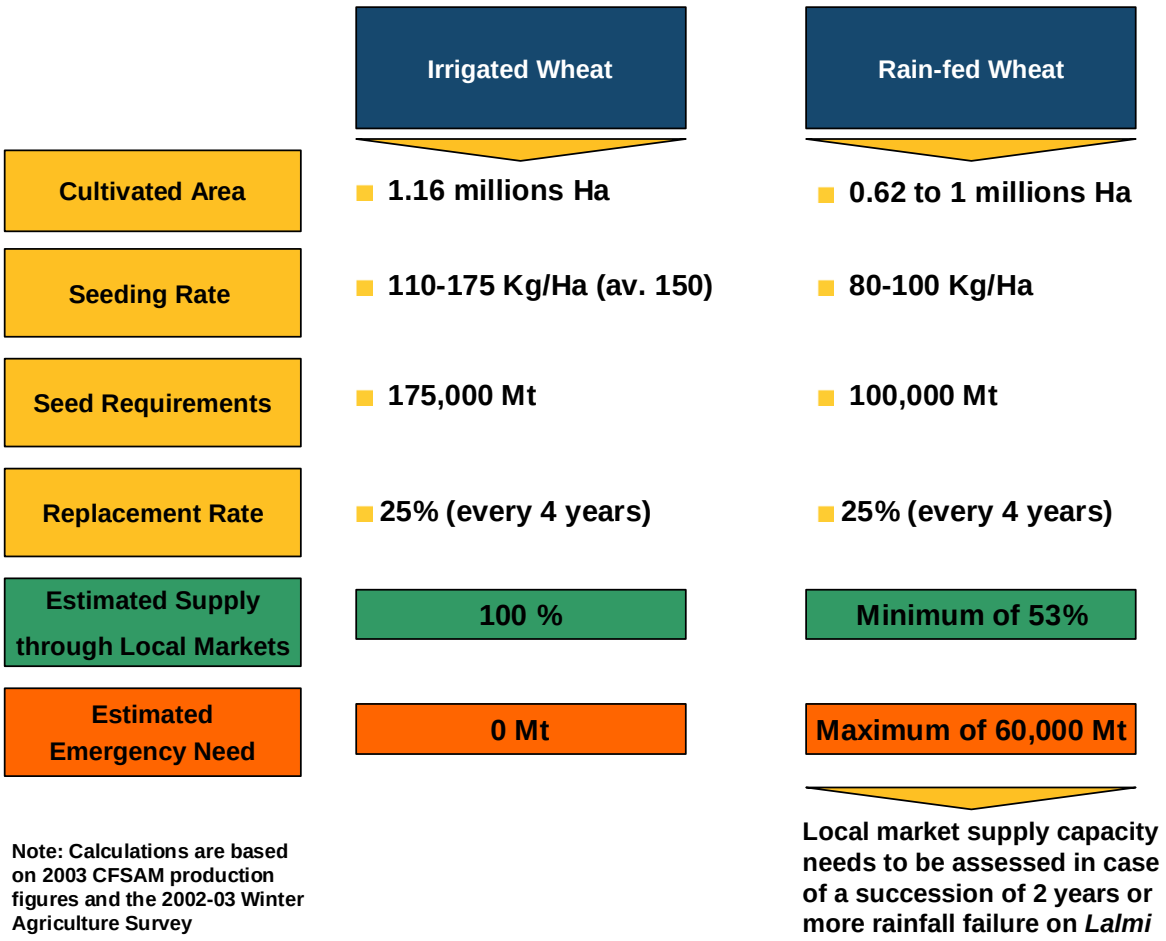
[27] See Fitzherbert, Anthony, "*Mission to Helmand. World Bank/FAO*", March 2002 and Fitzherbert, Anthony, "*FAO/WFP/MAAH/MRRD Crop Output Assessment Mission. May 5th to 20th*", 2003.

[28] Favre, Raphy; Baudeau, Rodolphe; Tea, Hakara; Beley, Mathieu and Mercier, Violaine, *"Market Sector Assessment in Horticulture. Feasibility Studies and Business Plans. Phase 2-3*" August 2004, MoC, UNDP, Altai Consulting, 2004, www.altaiconsulting.com/dyn/consulting/projects/horticulture.html

Figure 3
Graphic representation of the "seed security" needs in the event of drought in Afghanistan. Estimations made by the author



Note: Calculations are based on 2003 CFSAM production figures and the 2002-03 Winter Agriculture Survey

5. Quality of Seed currently produced in Afghanistan

5.1 Planting (Sowing) Quality

The FAO seed multiplication program is aiming at providing high quality/high yielding "improved/modern seed" to Afghan farmers. Tunwar (2002) indicates that production of Quality Declared Seed (QDS) was ranging between 2,510 MT to 4,856 MT per year, until 2000 when production was doubled. In fall 2002, FAO seed multiplication program estimated a wheat seed supply of up to 5,000 MT of QDS (by paying contract growers with food grain 1.25 kg WFP food grain is exchanged for 1.0 kg of seed – food for seed) and another 5,000 MT that could be purchased from contract growers with cash (seed that would otherwise be used by seed growers for farmers to farmers seed exchange).

FAO - in the absence of seed certification - supervised production of Quality Declared Seed and certified the seed produced. Using the stationary seed cleaning plant, portable seed cleaners, and traditional methods, FAO took care of cleaning, testing, and packing, and provided machinery and certification materials. However, Tunwar (2002)[29] notes before the massive seed emergency procurement inside Afghanistan that; "Quality control is weak. In absence of enough trained human resources and seed laws inspection of seed fields and rouging of seed crops are not done timely"… and further "after the recent looting the seed testing facilities are almost non existent. The enforcement of the quality control and the upgrading of the quality of seed would be impossible without means of accurately evaluating the germination and purity of the seed". Earlier in 2000, the PEACE project annual report notes that "precautions should be taken that stocks should not be infested by bunt and/or smut diseases and also do not have heavy mixture of other crop seed such a barley and wild oat".

These reports recommended before the large scale emergency operation of 2002 that quality control mechanisms have to be improved already for the procurement of 5,000 MT of QDS seed (food for seed) in Afghanistan. However, regardless of quality concern, FAO advocated in the Seed Code of Conduct Work-shop in May 2002 that import of non-tested wheat seed should be banned when large scale emergency seed distribution were to start[30]. In

[29] Tunwar, N.S., "*FAO Annual Report 2001, Crop Improvement and Seed Components*", FAO, Islamabad, January 2002, p.33.

[30] The text proposed at the Code of Conduct Work-Shop was the following: "With particular emphasis on seed if procured in Pakistan, Iran, Turkey, India the Central Asian Republics but including any other countries from which seed might be procured for Afghanistan. NO seed should be procured or accepted as a donation in kind for Afghanistan of varieties that have not already been well tested and proven as appropriate for the localities where they are intended to be distributed or made available to Afghan farmers. On this condition the following Guidelines apply to the procurement of seed for Afghanistan from outside the country, with special emphasis on procurements of seed from Afghanistan's neighboring countries in the region. All orders for export / import quality seed placed

advocating so, FAO seed multiplication IPs in Afghanistan would gain the monopoly of seed market for the emergency seed operation. Eventually, the Code of Conduct was not endorsed by the MAAH and not implemented by several agencies (for instance ICARDA, French Government).

Nonetheless, in autumn 2002, FAO and most organizations engaged in "seed aid" in Afghanistan (e.g. ICARDA, EuronAid, UNHCR) procured some over 23,000 MT [31] of wheat seed from the FAO network of contract growers[32]. This is nearly 5 times more than the contracts made with farmers for QDS seed on a food for seed basis. Agencies involved in emergency seed aid did compromise on already uncertain seed quality to make for the 23,000 MT. Yet, at the Code of Conduct Workshop in May 2002, FAO wrote that "the (in-country seed multiplication) program is able to meet the demand of all aid agencies interested in procuring seed of adapted and high yielding varieties for the fall season of 2002-03"[33].

From field visits conducted during the emergency seed operation, anecdotal evidences were collected showing that contracted seed farmers and Implementing Partners have been taking advantage from the absence of a functioning quality control system by mixing their seed production with local grains in order to increase the seed weight for emergency seed procurements.

In any situation (emergency or not) Quality Declared Seed or Certified seed must be superior to farmer's saved seed or seed made available by traders. When this is not the case, farmers may have increasing mistrust over seed programs which may hamper the implementation of any long term seed multiplication system.

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in Pakistan or other countries under the FAO and other Program for assisting Afghanistan's agriculture needs the approval of the Government(s) concerned. This includes the Afghan Ministry of Agriculture and the appropriate Ministry or Government office of the country where the seed will be procured. Responsibility for obtaining this approval, on the basis of these guidelines, lies with the FAO or other authorized agency representative", Suggested Regulations for export/Import Quality Seed for Afghanistan. Revised from Guidelines developed by FAO in 1991 for procurement of seed from Pakistan for the FAO's Afghanistan Agricultural Rehabilitation Program. Revised annexure I for May 2002 Work-shop", FAO, May 2002.

[31] Annual Report of the Seed Production Program for 2002 – N. S. Tunwar, FAO, in print.

[32] The FAO emergency program procured 3,773 MT of wheat seed.

[33] Tunwar, N. S., "*FAO's Experience with Regulatory Systems and Seed Security Programmes: How are these relevant to Afghanistan?*", Seed Workshop, May 2002. p. 6.

Picture 2
Seed contract farmer rouging his wheat field. Balkh province, Sholgara district, 14 May 2003

5.2 Genetic Quality

The promotion of "improved/modern varieties" is a key element to increase food production in Afghanistan. The maintenance of the genetic potential of the adapted varieties multiplied inside the country is essential to maintain the current staple food production level.

Practically, the introduction of new varieties means the following screening and multiplication process[34]:

a) 10 grams of each new imported lines of wheat [35] will produce pre-basic seed three years later, after testing, strict selection and multiplication;
b) Pre-basic seed are multiplied to produce foundation seed, and
c) Multiplication of foundation seed produce FAO declared quality seed".

Therefore, a minimum of 5 years is required to produce a small amount of QDS seed. Increasing the volume of production would take another 2 to 3 years.

In order to continue further the multiplication of these introduced seed, the genetic standard of the "improved/modern varieties" must be

[34] See FAO, "*Integrated Crop and Food Production in Afghanistan. An account of the Achievements of the AFG/94/002 program 1995-1997 and opportunities for 1997-1999*", Islamabad, April 1997, p.17

[35] Potential variety in early plant breeding process.

maintained in country. Before the war, Breeder Seed was handled by the Crop Improvement Department of MAAH (breeder) which produced small amounts which were given to ISE (Improved Seed Enterprise) to re-multiply into Foundation seed on its farms. During the period of conflict when the Crop Improvement Department was not functioning, ISE re-multiplied some of its own seed to be used as Foundation seed substitutes. ICARDA notes that "in recent years, supply of Breeder Seed was *interrupted*"[36].

On the ISE, FAO reports that "at the time of the collapse of Dr. Najibullah government all (ISE) facilities were lost due to large scale looting"[37]. Another problem faced by the ISE is the disruptive seizure of their land and facilities by commanders and sometimes communities.

FAO seed multiplication reports are rather "silent" on the activities related to Breeder Seed and Foundation Seed. But in between the lines, it seems that breeder seed are not regularly imported and/or redistributed in the country as FAO seed multiplication program considered recently replacing with new selections "ageing" wheat varieties such as Pamir-94"[38], which was released in 1994. It should be noted that the majority of FAO wheat seed varieties have been released in 1996 or earlier (14 out of 18 irrigated wheat varieties). FAO NPPPs[39] are acknowledging that FAO is "losing" its varieties in Afghanistan (degeneration) as there is no longer sufficient technical skills available to maintain the genetic standard of the introduced "improved/modern seed" multiplied in Afghanistan. Moreover, given the very difficult working conditions, the frequent looting of the program assets and unreliable communication in Afghanistan since the beginning of the program, seed of different generations may have been confused, mixed or lost at different level of production.

Genetic quality is at the "heart" of the program since the key goal of FAO seed program is to make available to Afghan farmers "improved/modern seed" that have the full genetic potential of the varieties. When varieties multiplied by the seed multiplication programs are not genetically different from the seed multiplied by farmers (number of generations - from the early breeder plant material - is similar in both cases), then the only difference between farmers own "improved/modern seed" and FAO multiplication program seed is the processing and treatment (affecting the planting quality).

Therefore, the considerations from agencies involved in seed multiplication programs in Afghanistan on the ideal replacement rate of 25% - which aims at rejuvenating the genetic stock of farmers' seed - become irrelevant when these QDS seed are considered. Therefore, the 39% replacement rate observed by Afghan farmers has no relation to genetic quality but only to the advantages gained by seed cleaning and fungicide treatments applied on FAO QDS seed or seed available on local markets.

Reports and other information sources available are all silent on the genetic quality of the seed produced in Afghanistan. This key aspect was overlooked by all actors involved in seed programming, by the Seed Code of Conduct Work-shop in May 2002, by the emergency seed program evaluation initiative and the recent FAO drafted Seed Law. The reasons for that lay with

[36] ICARDA, *Op cit.,* 2002, p. 17.
[37] Tunwar, N.S., *Ibid*., January 2002, p.22.
[38] Tunwar, N.S., *Ibid*., January 2002, p.14.
[39] FAO national staff.

the fact that the two different types of seed needs have not been distinguished in the first place (section 4). On irrigated land, the only bonus of a seed distribution or a seed certification program is the difference in yield between seed available to farmers (his own or seed he could access from the bazaar – since there is no seed stock depletion in irrigated area) and the yield with the seed distributed. When there is no genetic difference between the two, the impact of the program are largely spoiled.

Similarly, the Seed Law should stress that the "genetic quality" of the seed multiplied and certified is insured. For doing so, the MAAH and donors should request that history from the Breeder Seed to the Certified or QDS Seed is traceable. FAO seed program and its IPs as well as other NGOs multiplying seed in Afghanistan should provide evidence of this and certification granted only to those who can attest the historical origin of its material. If necessary, early generation "breeder seed" and "foundation seed" of tested varieties could be imported from abroad for multiplication in the country.

Implications for the seed sector:

- *Seed programs and regulatory frameworks should be flexible for importing seed that may have higher quality standard than what Afghanistan can produce.*
- *Seed regulatory frameworks should clearly specify that in any situation (emergency or not) NO compromise should be made on certified seed quality.*
- *Seed regulatory frameworks should stress that the "genetic quality" of the seed multiplied and certified is insured. The Seed Law should request that history from the Breeder Seed to the Certified or QDS Seed is traceable. FAO seed program and its IPs as well as other NGOs multiplying seed in Afghanistan should provide evidence of the genetic/breeding history of its material back to the Breeder Seed.*

6. Seed Adaptability and Farming Practices

6.1 Adaptability to Specific Agro-ecological Conditions

A. Emergency Seed Distribution

Inappropriateness of seed is a concern in any emergency seed programming. At the seed Code of Conduct Work-shop, FAO [40] warned that "although such assistance (seed distribution) might benefit some countries in the short-term, especially in easing food shortages, the poor performance of untested seed material, serve genetic contamination or complete displacement of local landraces and farmers' varieties may cause enormous damage to the traditional production systems of the country. In some cases expensive seed of hybrid varieties requiring high inputs are supplied without required amount of inputs and appropriate technology. It causes mismatch between low technology and high technology as a result poor yield"[41].

Over centuries farmers have selected a number of distinct wheat landraces to suit the various seasonal ecological systems from the interaction of various climatic and topographic situations in Afghanistan. In complex emergencies when knowledge on the seed systems in place are not accessed, distribution of landraces seed procured in similar agro-ecological zones than the affected area is the best and safest option (see Annex IV as an illustration). Interestingly, it is ICRC[42], a non agriculture organization that distributed landraces seed rather than "improved/modern seed" as a response to the drought in Afghanistan.

[40] Tunwar, N.S., "*FAOs Experience with Regulatory Systems and Seed Security Programs: How are these relevant to Afghanistan*", Paper presented at the Seed Work-Shop, Kabul 21-23 May 2002.

[41] Tunwar (2002) further noted that "in Rwanda, the International Center for Tropical Agriculture (CIAT) observed that the so-called 'high yielding' varieties provided by aid agencies produced 30% less than the supposedly 'low yielding' local Rwandan varieties. As a result of several bad experiences, humanitarian agencies have started to insist that seed should meet some minimum standards and preferably procured locally".

[42] International Committee of the Red Cross.

B. Seed Selection and Multiplication Program

In order to insure the adaptability of introduced "improved/modern varieties" in the different areas of Afghanistan, FAO is conducting variety trials. According to Tunwar, since 1996 more than 2,333 genetically diverse wheat varieties and other crops have been compared with the best "improved/modern varieties" [43].

This program has made its own agro-ecological classification of Afghanistan in 6 zones[44] without integrating/reflecting previous classification conducted in Afghanistan. Such a classification takes the risk of conducting seed testing which is not capturing the various agro-ecological zones (AEZ). This may lead to sub-optimal adaptability of the varieties selected for multiplication in some regions. Yet, it should be noted that despite numerous works on AEZ, there is no consensus amongst scholars regarding the AEZ classification in Afghanistan. The latest AEZ classification district-wise was prepared by (Maletta and Favre, 2003). Since no proper AEZ classification is available for Afghanistan, it is recommended to use Maletta and Favre's classification or Humlum (1959) [45] "Classification des Régions Naturelles" which is the scientific basis on which other classifications have been prepared (e.g. Dupree, 1973 [46] and Berding, 1996 [47]).

So far, the high elevation farming and specific agro-ecological zones of Afghanistan have not been captured by the testing component of FAO and fine tuning of the AEZ classification for seed programs is necessary.

The variety tests/comparisons are made in small plots which are prepared by hand and rakes (similar to home gardening). The conditions of the trials are different from the cultivation practices applied by farmers using traditional land tillage methodologies. Therefore, the data demonstrating "golden yield" potential of "improved/modern varieties" on testing plots may not replicate on farmer's field. Testing best wheat varieties on farmer's field is necessary to insure adequate adaptability (see also section 6.2 below).

Most of the varieties introduced by FAO in Afghanistan are facultative wheat varieties [48]. Facultative wheat can be planted in spring [49] but also autumn under mild climate. When planted in autumn, frost damages can occur especially in higher elevation. However, the sudden cold spell experienced in early December 2002 in Northern Afghanistan did not affect wheat field and therefore showed that FAO varieties can stand cold whether for short period of time. Nonetheless, winter killings have been reported previously [50]. The

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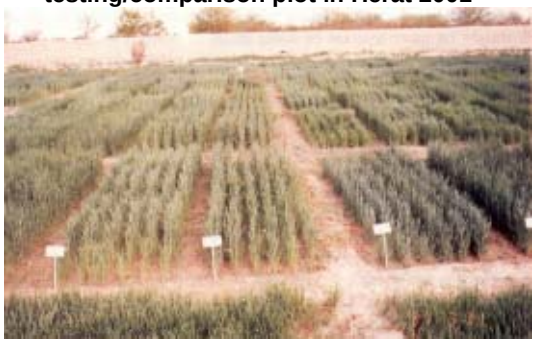
[43] Tunwar, N.S., "*FAO Annual Report 2001, Crop Improvement and Seed Components*", FAO, Islamabad, January 2002.
[44] Tunwar, *Ibid*., 2002, Fig 3.
[45] Humlum, J., "*La géographie de l'Afghanistan. Etude d'un pays Aride*", Scandinavian University Books, Copenhagen, 1959.
[46] Dupree, Louis, "*Afghanistan*", Rama Publi., New Dehli.
[47] Berding, F.R., "*Promotion of Agricultural Rehabilitation and Development Programs. Land Management*", in Agricultural Strategy, FAO, Rome, January, 1977; a report part of the Afghanistan Agricultural Strategy, FAO, Rome, 1997.
[48] Apart from a very small quantity of rain-fed wheat.
[49] They have a low requirement in cold days (vernalization) to allow flowering and production when planted in spring.
[50] For instance, the Afghan NGO, ACRD, reported 80% winter killing by severe frost in Wardak/Jeghatu district (~2000 m elevation) on

question of winter hardiness was recognized by FAO as early as 1992[51], yet the first true winter wheat was released in Afghanistan only 11 years later, in 2003.

Most of the varieties introduced by FAO in Afghanistan are irrigated wheat varieties. It is only in 2001, in the middle of a severe drought, that FAO started in 2001 its first year variety testing of FAO "irrigated" wheat varieties under rain-fed conditions in anticipation of emergency seed programs.

Picture 3
View of land preparation for a seed testing/comparison in Herat[52]

Picture 4
View of an "improved/modern variety" testing/comparison plot in Herat 2001[53]



Implications for the seed sector:

- *Emergency seed program, which may occur in rain-fed areas, should focus on local landraces wheat varieties.*
- *Seed program should review the AEZ classification for their program based on existing AEZ work or alternatively request a new AEZ classification which would be adapted to seed programming*
- *Seed testing methodologies should include on-farm testing*
- *Seed regulatory frameworks should be flexible for seed and varieties that are not made available but adapted to specific farming systems (e.g. true winter wheat for higher elevation above 2,000 meters, drought resistant varieties for rain-fed cultivation) by any seed multiplication inside the country, but for which needs exist.*

FAO facultative wheat imported from Pakistan planted in December 1991 ACRD, "*Annual Report 1992-1993*", 1993.

[51] Fitzherbert, A. and Stevens, E., "*Meeting Emergency Requirements for Seed in Afghanistan 1988-1992. A Case Study from FAO's Program for the Rehabilitation of Agriculture in Afghanistan*", paper presented by FAO at the International Seminar on Seed (iso-seed), 14-16 December 1992.

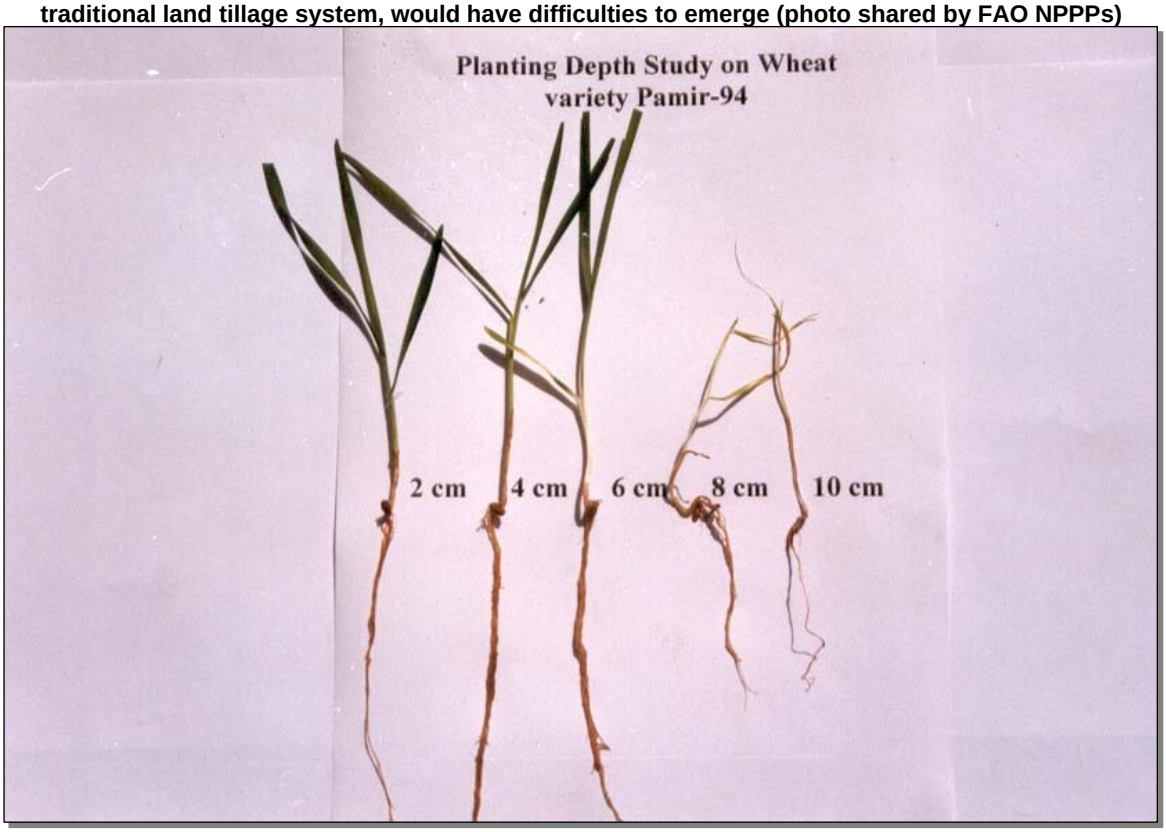
[52] FAO, "*Food Security through Sustainable Crop Production in Afghanistan. An account of the achievements of AFG/96/004 program 1997-1999*", Islamabad, November 1999.

[53] *Photo 7 : FAO, "*Integrated Crop and Food Production in Afghanistan. An account of the achievements of AFG/94/002 program 1995-1997*", Islamabad, April 1997.*

6.2 The Question of Traditional Land Tillage

The use of tractors in Afghanistan is on the increase in both the irrigated and rain-fed lands. The winter survey showed that in 2002/03 about 46% of the irrigated and rain-fed lands are plowed by tractors. In irrigated areas, land preparation is however executed, by and large, hiring the services of tractors. The percentage of farms using tractors is highest in the Helmand Valley zone, where 98% of the land is plowed by tractors. It was also very high in the Southern Mountains zone to which Kabul pertains with all the surrounding provinces. The diffusion of tractors is the lowest in Badakhshan, the Central Mountains and the Northern rain-fed foot hills due to the rugged nature of the terrain in those mountainous parts of the country.

Picture 5
This picture shows that Pamir 94 seed planted below 6 cm from the soil surface, as it is the case in traditional land tillage system, would have difficulties to emerge (photo shared by FAO NPPPs)



However, whether tractors are used or not, land tillage technology remain traditional and always implies the use of traditional wooden implements. Indeed, farmers integrate the mechanical operations with the use of their draught animals in complex soil preparation operation that largely varies on soil types and from one region to another. Generally, farmers in irrigated lowland are plowing their land first with tractors using the iron plough (picture 6) and a rapid second pass is normally made with the wooden plough pulled by oxen to

level the land with the wooden plough (see figure 4). The seed are broadcasted by hand after leveling the land (picture 8). The use of mechanical seed drillers is very rare in all regions of Afghanistan. After broadcasting the seed, farmers would normally do another pass with the wooden plough to cover the seed with soil (picture 9) and finally the **"***mala***"** or "wooden board" is applied to further level the land and slightly compact the top soil (picture 10).

With the traditional land tillage technology the deepness of the seedbed is approximately 15 cm. Therefore, the seed planted are located in the soil at a depth ranging from 0 to 15 cm and this result in seed losses to be compensated by increasing the seed rate. Indeed, seed on the surface of the soil can be eaten by birds, while seed deeply seeded (i.e below 6-8 cm) may not have the capacity to emerge (picture 5 and Annex IV).

The capacity of "improved/modern varieties" to emerge properly when seeded deeply in the soil varies from one variety to the other. According to FAO NPPPs[54], the landrace seed have the capacity to emerge from deep in the soil as their seed coleoptile is vigorous and can extend up to the soil surface. For instance, Pamir 94, a variety producing better in cooler areas but with a rather long cycle[55] (279 days in Kabul area), seems to be quite sensitive to deep seeding (see picture 5).

Higher seed rate and the technical qualities of "improved/modern" processed seed may compensate the problem of emergence of deeply planted seed. Indeed, seed cleaning and processing increase the germination rate above the farmers own saved seed and seed treatment (coating with fungicide) reduces the incidence of fungus [56] on germinating seed, thus improving significantly the emergence. However, the following years, as farmers maintain their own produced seed, the genetic weakness of some "improved/modern seed" to emerge after planting becomes fully apparent (as seed are not processed).

As a key factor regarding the variety performance in the Afghan context, the capacity of the seed to maintain a good and fast germination in a deep seed bed. Germination rates for seed multiplied and distributed in Afghanistan should be tested below 6-8 cm and this should be set as a standard for seed quality testing in Afghanistan (at least until the use of seed drills becomes generalized).

Implications for the seed sector:

- *Seed regulatory frameworks should foresee procedures to determine seed planting (sowing) quality and adaptability (genetic potential) to the land preparation techniques prevailing in Afghanistan. This could include emerging capacity tests below 6-8 cm for variety release or seed certification.*

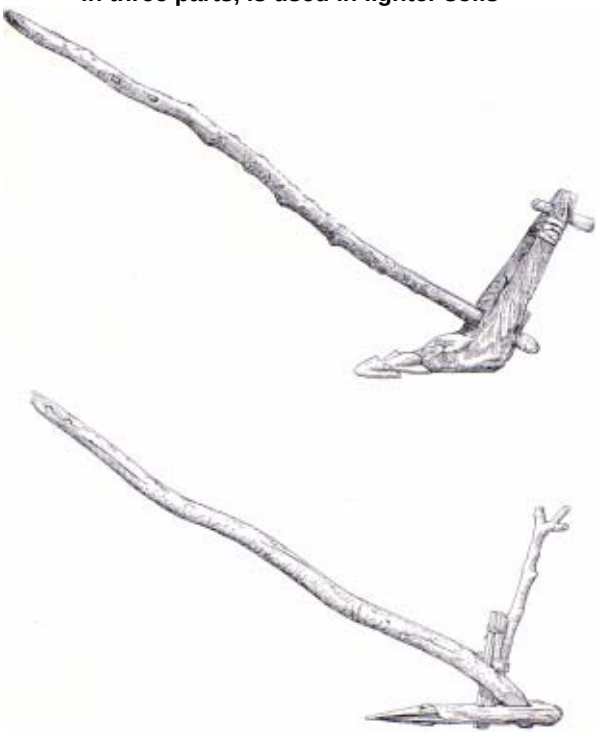
[54] FAO national staff.

[55] Probably too long for higher elevation areas where early frost is a limiting factor.

[56] Beside soil born diseases that are reducing the emergence of seed, seed born diseases such as "smut" can cause yield reduction up to 30%.

Pictures 6 & 7
The first passage can be done either by tractor (above) or the traditional wooden plough (below).
Above: Faryab province, Almar, 19th May 2003; Below: Balkh province, Sholgara, 13th May 2003

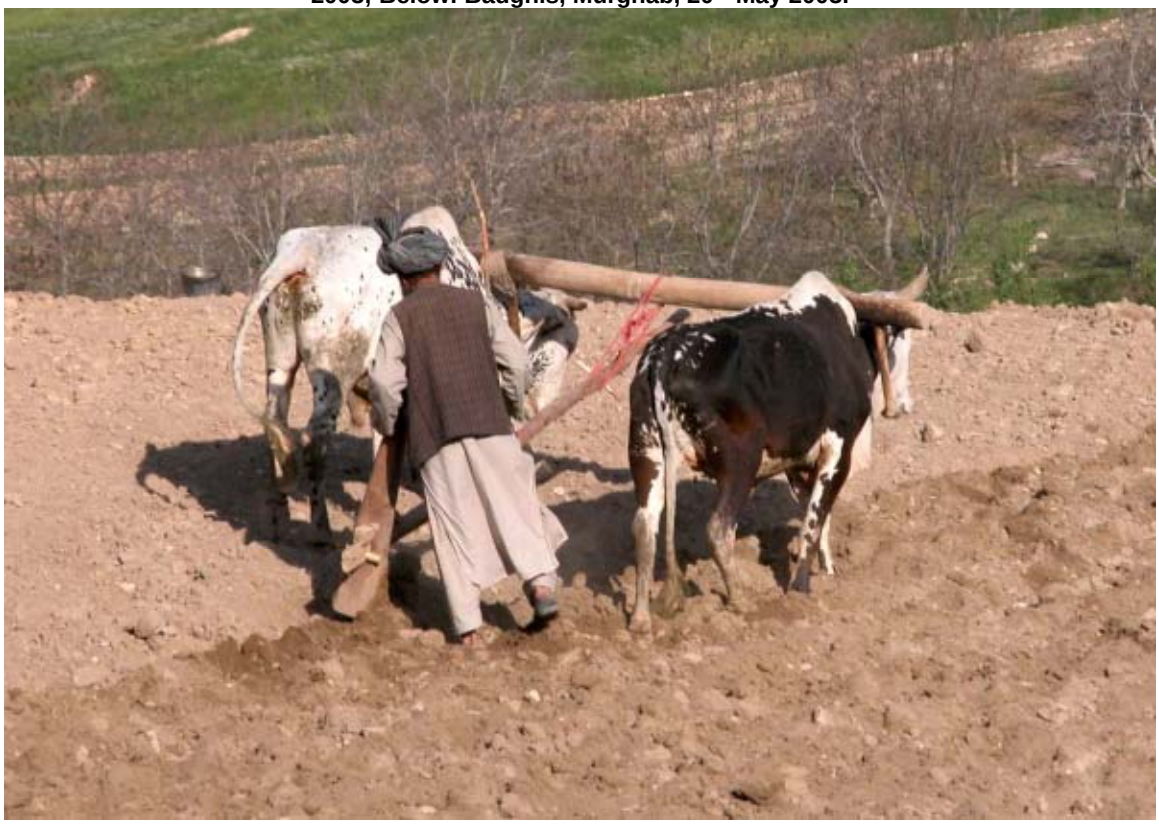
Figure 4
View of two different types of wooden breaking ploughs used in Afghanistan. The model on top, made in two parts, is more robust and used in difficult and heavy soils while the model below, made in three parts, is used in lighter soils[57]



Picture 8
Seed are generally broadcasted after the first passage. When a tractor is used, a second passage is generally made with the wooden plough before sowing. Here is Faryab province, Pashtun Kot district, 18th May 2003.

[57] From Humlum, J., "La géographie de l'Afghanistan", 1959, p. 191-192.

Pictures 9 & 10
After broadcasting the seed, farmers are either applying a passage with the wooden plough (above) and/or with the traditional "*mala*" (below). Above: Faryab province, Pashtun Kot district, 18th May 2003; Below: Badghis, Murghab, 20th May 2003.



7. Challenges to the Seed Multiplication System in Post-War Afghanistan

The emergence of a new government in Afghanistan is modifying considerably the settings in which seed programs are implemented. With the strong recovery of the Agriculture sector in 2002 and 2003, there are more pressures to move away from emergency seed distribution to longer term support to a sustainable seed multiplication system, involving relevant government bodies. There is also a need to promulgate a formal regulatory framework.

The main challenges for the current seed multiplication system in post-war Afghanistan are two folds:

- The necessary transformation of highly subsidized seed multiplication program by aid agencies into a market/local demand oriented seed multiplication system (privatization).
- The necessary upgrading of the quality of seed produced from Afghanistan to get closer to international standard (from QDS to Certified seed?) while maintaining the required seed supply to farmers.

In the absence of any other nation-wide data on seed other than the 2002-03 Winter Survey, the best estimates of the market demand for wheat quality seed is 20,000 MT per year (see section 4.1) These may however increase in the coming years with an anticipated increase in the use of "improved/modern varieties" by farmers. The key question for the future of the seed multiplication system may be the following:

> "What should be the best appropriate strategy to promote a vibrant seed sector in Afghanistan that is capable of delivering the right amount of the right quality of seed to farmers at reasonable price?"

Agencies involved in seed programs in Afghanistan do not always agree on the approach to tackle these future challenges in the seed sector. The approaches of FAO and ICARDA are summarized here:

> FAO seed program, which is largely financed from emergency seed distribution (main market for seed multiplied being international agencies), refers to itself as the "formal" seed sector, although a formal seed sector as such could not be developed in Afghanistan (see section 1 above). Foreseeing future changes, FAO is anticipating the development of a costly and centralized formal seed sector (see Draft Seed Law, article 11 and Chapter 3). On the program side, FAO has recently proposed to support the creation of 100 group enterprises nationwide involving up to 1,000 existing contract growers in strategic locations across the country. With an average area of 20 hectares per enterprise, FAO estimates that up to 30,000 tons of quality declared seed would be produced and sold to the communities[58]. However, FAO seed project have so far not envisaged the privatization of the ISE.
>
> For ICARDA[59], "Afghanistan does not need the formal seed sector

[58] FAO project proposal for privatization of the seed industry in Afghanistan, 2003.
[59] ICARDA, *Ibid*., 2002.

business with large volumes of seed, large staff, marketing over wide areas to farmers who pay cash. Afghanistan needs a decentralized informal seed sector, composed of village seed enterprises which would produce high-quality seed to supply a village area. This should be a quality-oriented informal sector with government support and guidance. ICARDA stresses that the approach proposed is neither a highly-structured, expensive formal seed sector which serves only rich farmers, nor an orphan informal seed sector which puts out seed of unknown and often low quality. Each village should have its own minimal infrastructures to produce the seed it needs. With intensive support and guidance, a Village Seed Enterprise can produce high-quality seed to benefit farmers while keeping prices low enough so that all farmers can produce higher crop yields. The basic unit would be the Village Seed Enterprise, under the management guidance of the village "*shura"*. Emphasis should be given to community-driven interventions to the maximum extent possible. ICARDA [60] considers that "there is serious doubt as to whether ISE (Improved Seed Enterprise) can play an effective role in Afghanistan under today's conditions. Some feel that ISE should be closed, and more appropriate systems supported".

The approach of working at community level may be interesting. However, work on community has shown that more than the village, the "*manteqa*" reflects the territory of social groups. "*Manteqa*" are composed of groups of villages/cluster settlements[61].

[60] ICARDA, *Ibid*., 2002.

[61] On the "*manteqa*", See Favre, Raphy, "*Interface between State and Society. An Approach for Afghanistan. Draft*", October 2003.

The author view is that in principle, a formal seed is a better option given the higher quality objectives of the seed material produced and the compatibility with international standards. However, given the Afghan context, it is most likely that this may not be possible to implement it within the next 10 years of so:

- The low economic base of wheat farmers and the current farming practices (e.g. land tillage techniques) may limit the demand for more expensive high quality certified seed.
- The limited capacity of the government and particularly the Ministry of Agriculture and the corruption of the administration are serious challenges for the implementation of a formal seed production system.
- The limited ability of the government to raise revenue through taxes poses a challenge for the sustainability of operating a complex seed system. Therefore, funding a formal seed multiplication system would have to come solely from donor source which raises ownership and sustainability issues.

Therefore, it seems that although a formal seed multiplication system should be seen as a goal in Afghanistan, in the short/medium term this may not be feasible. Therefore, an "intermediate" strategy is required to insure that the gains made in seed programs and the general adoption of improved/modern seed in Afghanistan are not lost. Neither the support of a purely community based approach (ICARDA) nor a formal and centralized seed sector (FAO) is able to address the challenges. An intermediate strategy may address these two critical objectives in the seed sector:

- Rejuvenation of the genetic quality of the "improved/modern" wheat produced in Afghanistan.

- Amelioration of the “planting” quality through cleaning, sorting and treatment of seed.

The rejuvenation of the genetic quality is essential to sustain the current level of wheat yield in Afghanistan and this is therefore in the interest of the nation to insure rejuvenation. Currently, the genetic quality of the “improved/modern seed are deteriorating, which may lead to reduced yield in years to come if adequate interventions in the seed sector are not made. The MAAH, with the technical assistance of an international institution, could be assigned to import, multiply and maintain early generation seed (pre-basic/foundation) on research farms. Once multiplied, early generation seed could be distributed to selected farmers to communities. These farmers would benefit from higher yield and would have to redistribute part of the seed they have produced to farmers within their communities. Traditional community structures, possibly at “*manteqa*” level (*shura-e mahali*) could be activated to insure adequate implementation of the seed multiplication activities. This would allow a fast rejuvenation of the improved/modern seed stock in country and maintain/increase yield. The cost of such operation would be limited, particularly when compared to the cost of emergency seed distribution programs. Beside the capacity of the MAAH would be built to produce, maintain and distribute to communities small quantities of high quality seed.

In parallel, small private seed cleaning enterprises could be created to clean, sort and treat seed produced with the assistance of matching grants and technical assistance. These small enterprises could process for the local market “certified” seed on the basis of the MAAH foundation seed or farmers’ seed based on the local demand. As the private sector would emerge (though the creation of these small private enterprises), the MAAH would develop its capacity to regulate the sector.

8. Conclusion

Misunderstanding of seed systems have resulted in a false "emergency" attitude[62], misidentification on where needs are, fantasy over seed needs figures estimated by various agencies, unsatisfactory quality of seed procured and distributed to farmers and ultimately uncertain impact of significant resources invested on agriculture development in Afghanistan. The Afghanistan experience on seed emergency program highlights the imperative needs for developing minimum standard for emergency seed operations through a wide consultation of stakeholders.

The analysis of seed systems shows that emergency seed needs on irrigated wheat farming do not exist. However, in irrigated area, there are needs for high quality "improved/modern seed", which a well designed and cost effective seed multiplication system could address. The best available estimates of the market demand for irrigated wheat quality seed is 20,000 MT per year. These demands may however increase in the coming years with an anticipated increase in the use of "improved/modern varieties" by farmers. The main players in the seed sector have not provided a viable strategy for a longer term seed multiplication system considering the changing context of Afghanistan.

In rain-fed areas, important emergency seed needs exist when two consecutive dry years occurs on a large geographical scale. The maximum rain-fed emergency seed needs are estimated at 60,000 MT, based on estimation of seed purchased by farmers for rain-fed areas in 2003 (due to depleted rain-fed seed stocks, farmers have procured seed in the market). Part of these needs could be supplied by the local markets. After one good rainfall year following a generalized drought, seed stocks are replenished and thus emergency rain-fed seed needs significantly reduce. Sadly, the emergency response to the recent drought which affected most severely rain-fed areas has been diverted to massive distribution of "irrigated wheat seed" - either imported form Pakistan or multiplied inside Afghanistan - across the country. As a results, most affected farmers where left alone to fend for rain-fed seed by themselves while most rain-fed farmers could not take advantage of the opportunities offered by good rainfall in Northern Afghanistan in 2002.

The emergence of a new government in Afghanistan and the strong agricultural recovery of the Agriculture sector since 2002 are modifying considerably the settings in which seed programs are implemented. The main challenges for the current seed multiplication system in post-war Afghanistan are two folds:

- The necessary transformation of highly subsidized seed multiplication program by aid agencies into a market/local demand oriented seed multiplication system (privatization).
- The necessary upgrading of the quality of seed produced from Afghanistan to get closer to international standards (from QDS to Certified seed?) while maintaining the required seed supply to farmers.

[62] On this, see in particular Fitzherbert, Anthony, "*Presentation to the 'Seed Code of Conduct' Workshop, May 21st to 23rd 2002. Seed Aid, the Afghan Experience 1998-1995; 1996-2001*", Kabul, May 2002.

Agencies involved in seed programming in Afghanistan have conflicting approaches, while none are proposing options which can address the issues and challenges of the sector. Progresses were made in the seed sector in the past years as Afghan farmers have widely adopted "improved/modern" wheat seed in their farming practices. It appears that one determinant factor for success may not have been the free seed distribution which took place over the years of drought and political chaos, but rather the demonstration effect from contract farmers producing seed… for the emergency seed distribution activities (seed processed within FAO IPs and sold to international agencies at high prices). Various FAO reports stress the importance of "farmer to farmer" exchange within the seed multiplication program. The contribution to the lives of Afghan farmers by the actors who strongly advocated for multiplying seed in Afghanistan instead of the "all imports from neighboring countries approach" should be recognized.

Another important factor in the farmers' adoption of "improved/modern seed" and increased production is the active seed exchange with neighboring countries through informal mechanisms:

- Traders marketing imported seed
- Afghans living abroad sending high yielding seed for their relatives
- Afghan returning home, carrying some high yielding seed with them.

The above were observed regularly during field visits in 2003. The winter 2002-03 agriculture survey showed that nearly 50% of the "improved/modern" seed are used by farmers are not FAO released varieties.

However, today, gains made from these programs and exchanges may be lost as the genetic quality of the "improved/modern" varieties is not maintained/rejuvenated in Afghanistan. Therefore, without adequate interventions, the indirect gains from emergency seed projects may partly be lost. In order to insure a smooth transition from emergency to longer term formal seed production system, the author recommends the following approaches in which the MAAH would play a crucial facilitating role:

1. To work with communities to insure multiplication and distribution of early generation wheat seed varieties in order to maintain/rejuvenate the existing varieties.
2. To promote the development of small private seed enterprise, through matching grants, which would market their products and services on the local market.

The first would allow sustaining the good progresses made in the past years while the second would set the basis for a vibrant, private sector oriented seed multiplication system.

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ANNEX - I

Changes in Landcover between 1970 and 1993

Two landcover data for Afghanistan have been produced by FAO; the first was produced in 1972 and the second in 1993. The table 2 shows that between 1972 and 1990/93 the main changes in landcover for agriculture land are the followings:

- The total agriculture land between 1972 and 1993 has declined by 14%. This decline is accounted in both rain-fed and irrigated land
- Rain-fed land declined by 16% of the total rain-fed land. The main reduction in rain-fed land is noted in flat laying land and in the central highlands. Changes in rain-fed area cultivated have been described in Maletta and Favre (2003).
- Irrigated land declined by 12% which is far from the 50% often reported by various aid agencies. The decline in irrigated land is chiefly due to intermittently irrigated land.
- On the other hand, the intensively irrigated land as a whole has increase by 20%. This reflects the collapsed of customary irrigation water laws in various parts of Afghanistan (see Maletta and Favre, 2003).
- However, the double cropped irrigated land has significantly dropped. However, the annual CFSAM reports shows higher figures in double cropping than the land cover and these are confirmed by recent Crop Output Assessments conducted by the MAAHF and FAO. In 2003, the total land double cropped is estimated at 380 000 hectares.
- Area planted with orchards (and vineyards) has increased by 4%.

Table 2
Comparison agriculture landcover irrigated and rain-fed land in 1972 and 1990/93

	1972	1990/93	Difference Ha	Difference %
Orchards	90946	94217	3271	4
Intensive irrigated land 2 crops/year	479678	188698	-290980	-61
Intensive irrigated land 1 crop/year	814867	1370956	556089	68
Total intensive irrig - ated	*1294541*	*1559654*	265113	20
Intermittently irrigated	2239570	1648136	-591434	-26
Total irrigated land	***3625057***	***3207790***	***-417267***	**-12**
Rain-fed flat laying land	1138155	668513	-469642	-41
Rain-fed slopping land	4264929	3849201	-415728	-10
Total rain-fed land	***5403088***	***4517714***	***-885374***	-16
Total Agricultural Land	**9028145**	**7725504**	**-1302641**	**-14**

The reason for the above changes in irrigated land may be related to the changes of water user rights (irrigation water management) with the appearance of military commanders in the Afghan scene in the last 2 and half decades[63].

[63] For more information, see Hector Maletta and Raphy Favre, "*Agriculture and Food Production in Post-war Afghanistan. A Report of the Winter Agriculture Survey 2002-2003*", FAO, Kabul, August 2003.

ANNEX - II

Cereal Import Requirements in the past 7 years

In the past years, cereal imports requirements have varied greatly due to the drought followed by strong agriculture recovery. The table 3 below shows that in the past 7 years the estimated import requirements varied between 0.39 and 2.32 million tons or 7 and 57% of the total cereal utilization in Afghanistan. Food aid also varied significantly as it represented between 9 and 34% of the estimated commercial imports requirements.

Table 3
Cereal Balance Sheet for the last 7 years in '000

	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	7 years Average
Domestic Availability	**3830**	**3894**	**3236**	**1763**	**1967**	**3588**	**5486**	**3395**
Opening Stock	170	190	0	-	0	0	114	**68**
Production	3660	3704	3236	1763	1967	3588	5372	**3327**
Total Utilization	**4540**	**4634**	**4363**	**4084**	**4145**	**4967**	**5878**	**4659**
Food Use	3120	3140	3393	3504	3556	3878	4073	**3523**
Feed	369	380	337	89	66	397	510	**307**
Seed and Waste	661	680	633	491	523	692	1095	**682**
Exports	160	170	0	0	0	0	0	**47**
Closing Stocks/Stock buildup	230	264	0	0	0	0	200	**99**
Import Requirements	**710**	**740**	**1127**	**2321**	**2178**	**1379**	**392**	**1264**
Commercial	**560**	**600**	**804**	**1049**	**760**	**911**	**392**	**725**
Food Aid (planned)	**150**	**140**	**97**	**225**	**386**	**468**	**- -**	**209**
Uncovered Deficit	**0**	**0**	**226**	**1047**	**1032**	**0**	**0**	**329**
Import Requirements as % of Total Utilization	**16**	**16**	**26**	**57**	**53**	**28**	**7**	**27**
Food Aid as % of Com. Import	**21**	**19**	**9**	**10**	**18**	**34**	**- -**	**17**
Uncovered Deficit as % of Com. Import	**0**	**0**	**20**	**45**	**47**	**0**	**0**	**26**
Population equivalent of uncovered Deficit	**0**	**0**	**1329**	**6159**	**6071**	**0**	**0**	**1937**

Based on an average annual cereal consumption of 170 kg per caput (last 3 years average[64]), the uncovered deficit represent an equivalent of 6.1 million people in the 2000/01 and 2001/02 marketing years. However, although the food security situation during the drought had dramatically deteriorated the situation did not result in famine and widespread acute malnutrition.

The uncovered deficits were either non registered imports and/or non-recorded (underestimation) in-country cereal production. It seems likely that estimation of domestic national production have been under-estimated (under-estimation of cereal yield) as farmers most probably adopted high yielding varieties and applied fertilizers in the past years before facts were captures by the winter agricultural surveys in 2002 and 2003.

[64] See CFSAM 2001, 2002 and 2003 reports.

ANNEX - III

FAO QDS Seed Multiplication Programs

The application of formal seed quality control program requires strong technical, organizational, financial and administrative capacities. Some developing countries could not introduce or implement formal seed legislation and its provisions for various reasons including economic reasons. The FAO/SIDA Technical conference on Improved Seed Production held in Nairobi, Kenya, in 1981, identified the need for new thinking on seed quality control. Further expert consultations convened by the seed service, FAO and held in Rome in 1983 concluded that, because of the relatively high level of resources needed for a comprehensive seed certification system, many developing countries were unable to introduce and sustain satisfactory seed quality control schemes. FAO therefore sought to devise a system which would nevertheless provide reasonable safeguards that the seed offered for sale would be of a quality satisfactory for crop production.

The initial outlines of the "Quality Declared Seed" (QDS) system were prepared following expert consultations in 1984 and further discussed and developed at subsequent meetings sponsored by FAO in 1985 and 1987. By 1987, the specific responsibilities for seed, quality standards, making appropriate quality tests and maintenance of standards were defined for the system. At that stage, it was generally accepted that the introduction of the "Quality Declared Seed" system would make use of resources already available in seed production organizations in those countries where human and physical resources for quality control were otherwise limited.

The QDS system was designed to provide quality control during seed production which would be less demanding on government resources than seed certification, but that it could be sufficiently adequate to provide good quality seed both within countries and in international trade. However, the "Quality Declared Seed" system places greater reliance on the conscientiousness of seed producing farmers and seed traders.

The system has not been designed as a replacement for a fully developed seed certification scheme but rather to make the best use of limited technical resources. The system is designed to develop technical expertise within the seed industry so that seed production and distribution become more efficient and with the responsibility placed on producers and traders a climate will be created in which the conscientious trader can prosper. This is becoming increasingly important as the governments of many countries are now placing more emphasis on private sector development and its increased participation in supply of improved seed to farmers for crop production.

QDS multiplication system was applied by FAO seed multiplication program and hence provided a source to get quality seed in Afghanistan. Since the collapse of a functional government in Afghanistan the QDS program has served as a basis for the production of seed of a certain quality inside the country. [65]

[65] This section is dapted from Tunwar, N. S., "*FAO's Experience with Regulatory Systems and Seed Security Programmes: How are these relevant to Afghanistan?*", Seed Workshop, May 2003.

ANNEX – IV

Landraces vs Inquilab 91 in Rainfed/"*Lalmi*" Fields in Faryab

Picture 11
Rain-fed farmers in Faryab province (Nicher Tepa village, Belcherak district) are standing on two adjacent fields planted at the same time, one with Inquilab 91 (a well known "improved/modern variety) and one with landraces rain-fed wheat. During the visit which was made on the 11th of April 2002 - approximately one month after the planting date - farmers explained that Inquilab 91 had a lower and later emergence (on the right side) than the landraces (on the left side). Significant reduction of yield was anticipated. The low emergence of Inquilab 91 could be related to the lower capacity of the Inquilab 91 seed than landraces to germinate from deep in the soil.
Courtesy of Assefa. Fitsum.

Pictures 12 and 13
Close up view of both rain-fed fields. Left: landraces wheat field; right: Inquilab 91.
Courtesy of Assefa. Fitsum, 2002

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