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MAAH/MRRD/FAO/WFP
NATIONAL CROP OUTPUT ASSESSMENT

10th May to 5th June 2003



Farmer met in Badghis while weeding his rain-fed wheat field, 23 May 2003.

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I. EXECUTIVE SUMMARY

In May and June 2003, the MAAH, MRRD, FAO and WFP conducted a National Crop Output Assessment (NCOA) covering more than 100 districts across the country. The NCOA is the most comprehensive crop assessment undertaken since the SCA agricultural survey in the early 1990s. The NCOA was followed by the annual joint FAO/WFP Crop Output Assessment Mission (CFSAM) who visited the country between the 15th June and the 8th July 2003. The CFSAM took the NCOA data in the field and further cross-checked the findings through field measurements, farmer's interviews, discussions with local authorities and organisations active at local level. Taking into consideration latest agricultural observations and recent satellite imageries, minor adjustments were made on the NCOA database. The NCOA and CFSAM reports have thus been harmonised.

The main NCOA findings are the followings:

- Aggregated total wheat production in the country is forecasted at **4.37** million MT. Irrigated wheat production is forecasted at **3.02** million MT and rain-fed wheat at **1.35** million MT. This is the best anticipated harvest for at least the last 25 years.
- Irrigated wheat area planted is estimated at **1.06** million ha, a level similar to last year, while rain-fed wheat area planted have dramatically increased and is estimated at **1.24** million hectares. The total estimated irrigated land planted with a first crop in 2003 is **1.79** million hectares (orchards/vineyards not included).
- Estimated wheat yield has significantly increased as compare to previous estimates, though the methodology used is conservative. In irrigated area, the average wheat yield this year is estimated at **2.85** Mt/Ha. The use of fertilizers and improved varieties are now generalised in most of the country and markets play a central role in supplying timely agricultural input.
- In rain-fed areas, the average wheat yield is estimated at **1.09** Mt/Ha. The increase in yield is explained by the favourable climatic conditions in the rain-fed belt in Northern Afghanistan.
- Barley planted in 2002-2003 (irrigated and rain-fed) is estimated at **0.276** million hectares and the total production at **0.41** million Mt. The average barley yield (rain-fed and irrigated) in 2003 is estimated at **1.49** Mt/ha.

Wheat prices in Northern Afghanistan are lower than last year, while wheat prices in Southern and Eastern Afghanistan are higher. The main reason for low wheat prices in North, North Eastern and Western Afghanistan (in May/early June) seems to have been due to significant commercial imports of flour from Kazakhstan and Pakistan which were dominating many markets combined with the fact that traders were also trying to get rid of old stocks of grain left over from the 2002 harvest of which there was still a quantity in store, prior to the new harvest. The impact of Food Aid wheat on grain prices was found to be insignificant. Low wheat prices in the market can affect negatively farmers who may sell part of their wheat harvest.

II. INTRODUCTION

In most countries crop and food supply estimations are conducted under the responsibility of host Governments. In Afghanistan, this capacity needs to be re-established. In 2002, the CFSAM¹ conducted a crop output exercise with external FAO and WFP consultants. In 2003, the Nationwide Crop Output Assessment (NCOA) was implemented by the Ministry of Agriculture (MAAH) in close supervision of FAO/Food and Agriculture and Information Team (FAIT) in Afghanistan. The Ministry of Rural Rehabilitation and Development (MRRD) also participated in the mission for collecting market data.

The objective of the NCOA is to produce estimates on crops output in the country in order to provide early estimates of food production, anticipate any food shortages/surplus or crop failures and monitor the wheat market prices at provincial level. The findings of the NCOA also provide baseline data for emergency seed/fertilizer distribution program planning for the next agricultural season.

The NCOA was implemented in the frame of the OSRO/AFG/111/USA project and is part of an overall effort undertaken by FAO to forecast crop production in Afghanistan. In 2002-03, FAO/FAIT has been gathering information from various sources to estimate crops yield:

- Joint MAAH/MRRD/FAO/WFP Winter 2002/2003 agriculture Survey.
- Rainfall data from more than 40 rainfall stations installed with FAO support in various parts of the country.
- Satellite imageries.
- Reports from various agencies in the field.

Besides, FAO and WFP will carry out a joint ex post Crop Production Survey as a component of the National Risks and Vulnerability Assessment (NRVA) from July to September 2003.

Initially, the NCOA was intended to collect baseline data on wheat yield and production in various part of the country for the coming CFSAM (Crop and Food Supply Assessment Mission) mission from Rome. However, the 2003 CFSAM mission was reduced to two team members (both economists)² visiting Afghanistan for a period of 3 weeks (between the 15th June and the 8th July 2003). Therefore, the NCOA has become the agriculture component of the CFSAM mission.

The CFSAM took the NCOA data in the field and further cross-checked the findings through field measurements, farmer's interviews and discussions with local authorities and organisations active at ground level. Taking into consideration latest agricultural observations and recent satellite imageries, minor adjustments were made on the NCOA database. The NCOA and CFSAM reports have thus been harmonised³.

¹ Crop and Food Supply Assessment Mission.

² Shukri Ahmed, agriculture economist, ESCG, Rome and Daniel Molla, economist, WFP/VAM seconded to MRRD, Kabul.

³ Therefore, the data presented in this report may slightly vary from the Powerpoint presentation made at the MAAH on the 16th of June 2003.

III. METHODOLOGY

1. Estimation of Yield

1.1 Field Measurements for Yield Estimates

The methodology for the crop output estimates was to measure the actual parameters that compose the cereal yield and to interview farmers when available. The yield estimates were calculated as per the equation below.

$$\text{Estimated Yield} = \left(\frac{\text{Head/m}^2 \times \text{Spikelets/Head} \times \text{Grains/Spikelet} \times \text{Weight 1000 Grains}}{1000} \right) - 10\% \text{ Harvest Losses}$$

The cereal yield parameters were measured/estimated as follows:

- **Head/m² (density):** The density was measured with a 1 sqm frame produced in Kabul for that purpose (see pictures 1 to 3 below). A minimum of 20 fields per province have been measured in various locations/districts within the province. In each field, a minimum of 3 measurements were taken. The type of farming system (Rain-fed - R -, Irrigated - I and Opportunistic Irrigated - OI -) was noted for every field measured.
- **Spikelets/Head & Grains/Spikelet:** The average number of spikelets per head was estimated in the field sampled by the assessment. The average number of grains per spikelet was measured in crop cutting samples in Herat and Farah province⁴; to err on the safe side, conservative figures were retained by eliminating the highest samples: thus the average was 2.3 grains/ spikelet in irrigated fields and 2.2 grains/spikelet in rain-fed fields.
- **Weight of 1000 grains:** The weight of 1000 grains was measured in crop cutting samples in Herat and Farah province⁵; here also to err on the safe side, conservative figures were retained by eliminating the highest samples: thus the

⁴ In Farah and Herat, one square meter sections of mature wheat were cut in different fields. The samples collected were threshed manually and weighted in Herat FAO office. The total number of grains was counted and the average number of grains per spikelet calculated. Conservative figures were retained for the survey:

- Irrigated : 2.3 grains/spikelet
- Rain-fed : 2.2 grains/spikelet

The samples varied from 2.1 to 2.7 grains/spikelets in irrigated and 2.1 to 2.4 grains/spikelets in rainfed.

⁵ From the same field samples from Farah and Herat, 1000 grains from each sample were weighted to estimate the average weight of grains produced in 2003. The average weight of the sampled grains was (conservative figures):

- Irrigated : 36 g/1000 grains
- Rain-fed : 30 g/1000 grains

The average grain/spikelet and weight of 1000 grains from these samples was used for yield estimations in other provinces of the country.

With the support of Mr. Habibi of the FAO Kunduz office, the team number 3 conducted some grain weighing of different grade of seeds. The results are presented here for comparison only with the measurements made in Herat:

1. Small sized grain – typical of rain-fed wheat in North-East region: 33 g/1000 grains
2. Medium sized grain: 37 g/1000 grains
3. Large sized grain: 40 g/1000 grains
4. Average small, medium and large size grain – conservative estimates for irrigated wheat in North-East region: 36.5 g/1000 grains

average was 36 g/1000 grains in irrigated wheat and 30 g/1000 grains in rain-fed wheat.

- Harvest Losses: A flat rate of 10% was deducted from the estimates for the harvest losses. This reflects losses incurred before and during the harvest process, and does not include post-harvest losses.

From each field sampled, three density measurements were made and averaged to arrive at the gross yield. The gross yield has then been reduced by 10% to cover losses before and during the process of harvesting, to arrive at an estimate for effective yield of grains harvested. Post-harvest losses (estimated at 15%) are not included in these estimates but they are taken into account in the cereal balance sheet of the coming 2003 CFSAM report.



Picture 1 : Frame used for field measurements. Jawzjan, 16 May 2003.



Picture 2 : Density measurements on a rain-fed barley field in Kishindi district, Balkh province, 14 May 2003.



Picture 3 : Density measurements on a particularly good irrigated wheat field in Herat province (Injil district). 26 May 2003.

The main weakness in the implementation of the NCOA lies in the fact that in the Southern provinces, the average number of spikelets per head was not recorded. Therefore, for these provinces, a very conservative correlation was established between the density and wheat yield, based on the correlation observed in the Northern provinces. The Southern provinces had the highest wheat head densities recorded. The estimated yields from the Southern provinces are lower than all the yields recorded by the farmers interviewed.

In provinces and districts, located at elevations where crops were not sufficiently developed to conduct field measurements, conservative yield estimates were made based on the 2002 CFSAM estimates.

As a whole, the methodology applied for field measurements to estimate yield is conservative.

1.2 Crop Development Stage at the Time of the Assessment

The timing of the NCOA in the low and mid-elevation land was appropriate for the implementation of field measurement and yield estimates. In the provinces visited, except at higher elevation, in the case of spring sown wheat, all autumn sown wheat crops, both on irrigated and rain-fed land were well in ear at the time of the assessment. By the end of the assessment (early June), the autumn sown wheat crops, both in irrigated and rain-fed land were well in ear at elevations up to 2,600 meters. In early May, the team 1 visited fields being harvested in Jalalabad, Kandahar and Helmand. The team followed the harvesting period while proceeding to the provinces between Kandahar and Kabul. During the last week of May, when the team 3 visited the province of Herat, the wheat harvest had just started, while in the lowland districts of Farah province, 60-70% of the cereals were harvested.

In the case of spring planted wheat in higher elevations, particularly on rain-fed land, the wheat crops were still at an immature stage, or approaching 'booting' stage. Therefore, sample measurements and estimates of yield could not be taken in these samples. A second phase of the NCOA will be conducted in July/August to capture the high elevation spring cultivated cereal fields and the second crops in the lowlands.

1.3 Interviews with Farmers in the Field

Farmers were interviewed in as many fields as possible. Teams 2, 3 and 4 assessed the crop situation mostly before the harvest started while team 1 followed the harvesting time. Before the harvesting time, farmers may not necessarily be in their fields, while during the harvesting period the population is busy working in the field. Team 1 could interview farmers in almost every field measured, while teams 2, 3 and 4 did so in less than 50% of the fields.

Most of the farmers interviewed showed reluctance to forecast the yield of their wheat, few weeks before the harvest. In almost all cases it appeared that there was a tendency for farmers to underestimate the yield of promising fields of wheat. As much as anything this demonstrates a sensible natural caution born of experience that accidents can happen, but it also reflects a natural superstition against forecasting a good yield lest it attract misfortune (*cheshemeh bad dur – the eye that casts evil*). Farmers were not generally very comfortable if pressed to give a yield forecast. However, this tendency is reduced at the harvesting period and in fact in the Southern

regions assessed by the MAAH team, the farmers interviewed almost consistently over-estimated yields.

It should be noted that never any farmer objected to the work being undertaken in their field, and on every occasion the work in hand was carefully explained and the reasons for it. On many occasions the farmers themselves assisted the mission team with their work of counting wheat heads per square metre. Only in a few rain-fed land, at some distance from settlements, it was difficult to find the farmers responsible for the particular fields being recorded, but in these cases it was usually possible to talk to the farmers in their villages to obtain more information on sowing dates, expected harvesting dates and other relevant information.

For the NCOA estimates, yield reported by farmers were used to verify data obtained in field measurements.

1.4 Selection of Districts and Transects

A preliminary selection of districts was made in Kabul before departing to the field. In each province visited, the districts where most of agricultural production is concentrated were selected in priority. The main criterion for the district selection was that every farming system existing in each province should be assessed (based on the land cover atlas i.e. intensively irrigated, intermittently irrigated, and flat or sloping rain-fed land). In total, the NCOA covered more than 100 districts.

Once the teams were in the province, fine tuning of the selection were made based on the agriculture information made available to the team members. In each province, the provincial agriculture administration was visited and meetings were held on the agriculture situation this year. The agricultural provincial administrations flagged to the visiting teams the areas that have faced agricultural constraints this year. These areas were included in the NCOA. For instance, the remote district of Lash wa Joweyn in Farah province was not planned to be visited, but we assessed the situation in the area as the provincial agriculture department reported severe sand encroachment problems that had affected wheat planting and gardens.

A primary selection of transects was also made in Kabul before departure. The bottom line for the transect selection, from where wheat fields were sampled, was the feasibility within the time allocated for the assessment and the necessary travelling time along transect roads.

Within the time limitations, the selection of transects intended to provide a good cross section of each particular area covered by the teams – including different altitude levels, different farming systems and different sections (head/middle/tail) of irrigation systems. Usually the team drove out to the furthest point of the selected transect and worked back from there, unless the transects coincided with the route to be taken from one provincial centre to the next. In irrigated areas, such in the North, the transects were selected to provide a cross section of the whole irrigated land from the head to the tail of the irrigation system and across the main irrigation canals. The teams often travelled on difficult donkey carts roads between canals and fields.

The NCOA is the most extensive crop output assessment conducted in Afghanistan since the detailed SCA agriculture surveys in the early 1990s. Annex III shows the itinerary of the four teams participating in the assessment.

1.5 Selection of Fields

The fields were selected randomly at intervals along the transect roads. At each selection point where the vehicle stopped, one field was selected at each side of the transect road and in each field three measurements were taken.

In total more than 600 fields measurements were taken in 104 districts. Field measurements and observations were made in 30 provinces of Afghanistan.

Central :			
Ghazni	Moqur, Ghazni center, Qara Bagh, Andar	Kunduz	Kalafgan, Farkhar Kunduz, Khanabad, Aliabad, Iman Sahib, Chahar Dara
Kabul	Paghman		
Kapisa	Kohistan, Nejrab		
Khost	Khost (Matun), Tani	North :	
Logar	Baraki Barak, Puli Alam, Mohammad Agha	Balkh	Khulm, Deh Dadi, Dawlatabad, Balkh, Sholgara Kishindi
Paktika	Khair Koot, Sharan, Urgoon, Zelok	Faryab	Dawlatabad, Maimana, Pashtun Kot, Almar, Qaisar
Paktya	Gardez, Zormat	Jawzjan	Sheberghan, Khawaja Du Koh, Aqcha, Mingajik Mordian
Parwan	Charikar, Bagram, Jabulsaraj, Ghobrand	Samangan	Khuram was Sarbagh, Aybak, Hazrat Sultan, Dara-i Suf
Wardak	Nirkh, Maydanshar	Sar-i Pul	Sari Pul, Sozma Qala, Sayad
Central Highlands :			
Bamyan	Yakaolang, Bamyan, Shibar	West :	
Ghor	Shahrak, Chackcharan, Lal wa Sarjangan	Badghis	Bala Murghab, Qadis, Ghormach, Qala-e Naw, Qadis, Kushk-e Kuna
East :		Farah	Bala Buluk, Qalah-e Kah, Pusht Rod, Lash wa Juweyn
Kunar	Norgal, Chawki, Narang, Assadabad, Pusht Sar Kanai, Khas Kunar	Herat	Kushk-e Rubat Sangi, Adraskan, Shindand, Injil, Guzara, Kohsan, Ghoryan, Zinda Jan, Cheshti Sharif
Laghman		South :	
Nangahar	Kama, Behsood, Pati Koot, Shinwar, Dara-e-Noor, Sorkhrood, Jalalabad	Helmand	Nad Ali, Marja, Gireshk, Nawa Barikzai, Garmser, Musa Qala, Kajaki, Sangin, Nahri Saraj
North-East :		Kandahar	Maiwand, Panjwayee, Arghandab, Arghistan, Daman
Badakhshan	Fayzabad (Argo), Baharak, Jurm, Kishem	Uruzgan	
Baghlan	Andarab, Khinjan, Doshi, Pul-e Khumri, Dahaneh Ghori, Baghlan, Baghlani Jadid	Zabul	Arghandab, Mizan, Tarnak, Qalat, Shinkai, Shah Joi
Takhar	Taluqan, Bangi, Khwaja Ghar,		

Figure 1 : NCOA coverage – Districts sampled.

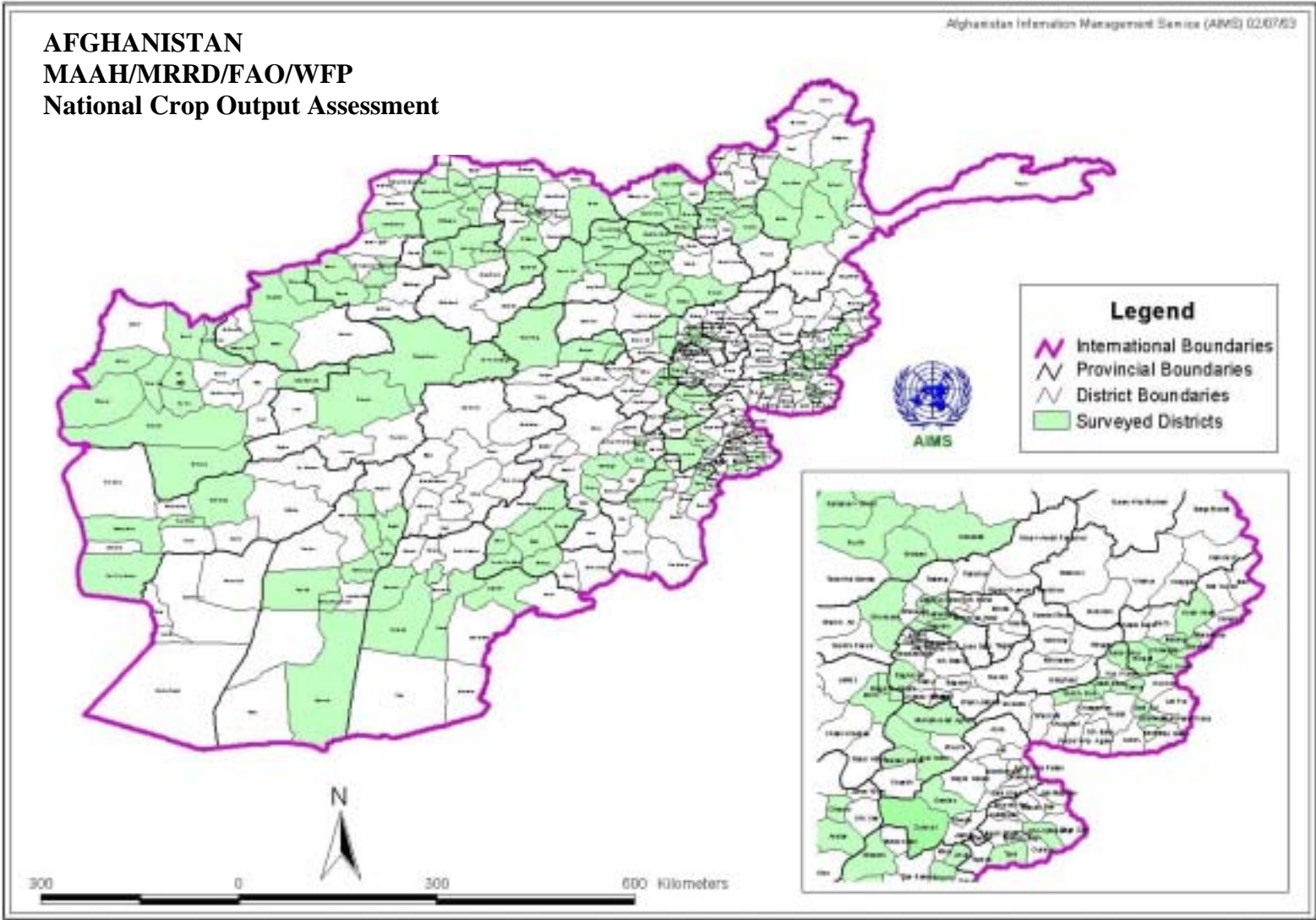


Figure 2 : NCOA coverage map – District sampled.

2. Estimation of Land planted

In various provinces, the team leaders made estimations on the proportion of land that have been put under cultivation this year compared to the landcover map. For each province, the teams were equipped with detailed land cover maps at provincial level that included districts, roads, rivers and all settlements. The maps were printed for the NCOA by AIMS Kabul office. These estimations are based on visual observations along transect roads and compared with the provincial FAO landcover maps. View points along the road were particularly important for estimating the proportion of land planted. Similarly, visual estimation on the proportion of cereals planted compared to the total land cultivated (crop composition) were made by the Team leaders. In total the four teams covered more than 12,000 km on all sorts of road for the implementation of the NCOA.

Consultation with representatives of the provincial agriculture departments and discussion on farming land utilization as well as farmer interviews helped fine tuning the field visual observations.

3. Market Prices

The NCOA also collected market prices for wheat grain, wheat flour and other commodities. The members of the teams from the MRRD were made responsible for collecting local market prices and other details for grain, flour and fertiliser. Due to time limitations during the NCOA, market prices were mostly collected at provincial level and in some instances at district level when it was possible. When not thus engaged the MRRD person helped the other members of the team with the crop assessment work.

IV. RESULTS

4. Estimated Planted Area

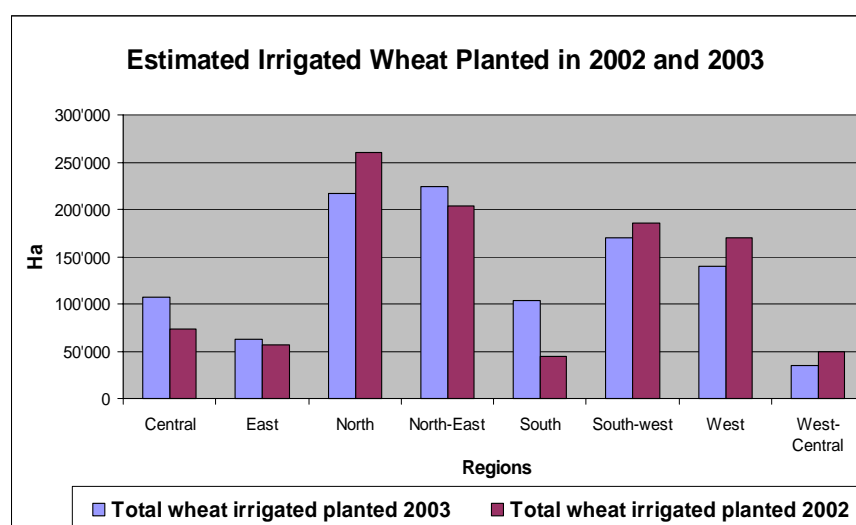
4.1 Irrigated Land

The table 1 shows that according to the NCOA, the total estimated irrigated land planted with a first crop in 2003 is **1.79** million hectares (orchards/vineyards not included). The total irrigated wheat planted amounts at an estimated **1.06** million hectares. In 2002, the CFSAM reported 1.045 million hectares of irrigated wheat cultivated.

The amount of irrigated land planted in 2003 is similar to the 2002 level. Graph 1 shows that in the North, despite very good rainfall throughout the winter, the amount of land planted that was found by the mission is lower than 2002. This is due to the fact that the NCOA recognised this year on-going changes in irrigation water management on the irrigated perimeters of the Khulm, Balkh-ab, Ab-e Safid and Shirin Tagab rivers. These changes in effect increased the amount of water used at the head and middle sections of the system, and kept much of the tail uncultivated due to uncertainties over irrigation water availability.

Graph 1 also shows a reduction of area planted in the West and South-West regions, despite increased irrigation water availability. This is due to the fact that the NCOA recognised this year sand dune encroachments on irrigation structures at the tail of the irrigation systems of Farah and Nimroz provinces, following four years of drought and occasional severe sand storms. Also, in Zabul and Kandahar, planting was missed in karez and spring irrigated fields due to water shortage.

On average, wheat represents 59% of the irrigated land planted with a first crop in 2003 (orchards/vineyards not included). This suggests an increase in crop diversification compared to previous years.



Graph 1 : Estimated irrigated wheat planted in 2002 (CFSAM data) and 2003 (NCOA data).

REGION	PROVINCE	Total intensively irrigated land*	% cultivated in 2003	Total intensively irrigated in 2003	Total intermittent irrigated land*	% cultivated in 2003	Total intermittently irrigated in 2003	Total irrigated planted in 2003	% cereal irrigated cultivated in 2003	Total cereal irrigated planted in 2003	Ratio Irrigated Wheat/ Barley**	Total wheat irrigated planted in 2003	Total irrigated Barley planted in 2003
		Ha	%	Ha	Ha	%	Ha	Ha	%	Ha	%	Ha	Ha
CENTRAL REGION		164'498	87	143'717	71'390	64	45'397	189'114	57	108'027	99	107'162	865
Central	KABUL	40'640	70	28'448	21'890	50	10'945	39'393	50	19'696	99	19'539	158
Central	KAPISA	16'305	90	14'674	820	50	410	15'085	60	9'051	99	8'978	72
Central	LOGAR	21'737	100	21'737	12'084	100	12'084	33'822	70	23'675	99	23'486	190
Central	PARWAN	53'339	90	48'005	6'612	60	3'967	51'972	60	31'183	99	30'934	250
Central	WARDAK	32'476	95	30'852	29'984	60	17'990	48'842	50	24'421	99	24'225	196
EAST REGION		98'342	92	90'432	46'939	24	11'188	101'620	62	63'008	100	62'878	130
East	KUNAR	12'010	90	10'809	10'420	25	2'605	13'414	60	8'048	100	8'032	17
East	LAGHMAN	18'936	100	18'936	2'043	70	1'430	20'365	70	14'256	100	14'226	29
East	NANGARHAR	66'785	90	60'107	29'326	20	5'865	65'972	60	39'583	100	39'501	82
East	NURISTAN	612	95	581	5'150	25	1'287	1'868	60	1'121	100	1'119	2
NORTH REGION		265'719	89	236'901	397'207	34	135'455	372'356	68	252'313	86	217'360	34'953
North	BALKH	101'480	95	96'406	173'760	20	34'752	131'158	70	91'811	86	79'092	12719
North	FARYAB	52'288	95	49'674	81'535	80	65'228	114'901	60	68'941	86	59'390	9550
North	JAWZJAN	64'502	70	45'151	119'517	15	17'928	63'079	75	47'309	86	40'756	6554
North	SAMANGAN	11'865	100	11'865	9'360	90	8'424	20'289	70	14'202	86	12'235	1967
North	SARI PUL	35'583	95	33'804	13'035	70	9'124	42'929	70	30'050	86	25'887	4163
NORTH-ESAT REGION		346'577	89	307'034	44'050	81	35'840	342'873	69	236'948	95	224'363	12'585
North-East	BADAKHSAN	34'793	90	31'314	18'060	90	16'254	47'567	55	26'162	95	24'773	1389
North-East	BAGHLAN	90'655	85	77'057	17'397	80	13'918	90'975	60	54'585	95	51'686	2899
North-East	KUNDUZ	149'771	85	127'305	7'312	60	4'387	131'692	80	105'354	95	99'758	5595
North-East	TAKHAR	71'358	100	71'358	1'281	100	1'281	72'639	70	50'847	95	48'147	2701
SOUTH REGION		191'165	73	139'341	222'063	15	33'846	173'187	60	103'912	99	103'016	896
South	GHAZNI	104'859	70	73'401	140'632	15	21'095	94'496	60	56'698	99	56'209	489
South	PAKTIKA	29'711	75	22'283	34'131	15	5'120	27'403	60	16'442	99	16'300	142
South	PAKTYA	32'389	75	24'292	36'564	15	5'485	29'776	60	17'866	99	17'712	154
South	KHOST	24'206	80	19'365	10'736	20	2'147	21'512	60	12'907	99	12'796	111
SOUTH-WEST REGION		262'355	76	198'908	525'074	16	82'575	281'483	61	170'793	99	169'809	985
South-West	HELMAND	119'040	90	107'136	117'515	15	17'627	124'763	60	74'858	99	74'426	432
South-West	KANDAHAR	51'706	70	36'194	199'324	15	29'899	66'092	60	39'655	99	39'427	229
South-West	NIMROZ	616	90	555	73'930	25	18'483	19'037	70	13'326	99	13'249	77
South-West	URUZGAN	62'085	70	43'460	62'721	15	9'408	52'868	60	31'721	99	31'538	183
South-West	ZABUL	28'908	40	11'563	71'584	10	7'158	18'722	60	11'233	99	11'168	65
WEST REGION		189'025	91	172'901	277'445	32	87'675	260'575	62	161'100	87	139'363	21'737
West	BADGHIS	17'454	100	17'454	31'005	60	18'603	36'057	80	28'845	87	24'953	3892
West	FARAH	20'655	95	19'622	147'522	20	29'504	49'127	55	27'020	87	23'374	3646
West	HERAT	150'916	90	135'825	98'918	40	39'567	175'392	60	105'235	87	91'036	14199
WEST-CENTRAL REGION		41'973	86	36'021	63'968	48	30'790	66'811	60	40'087	88	35'355	4731
West-Central	BAMYAN	12'212	100	12'212	22'766	90	20'490	32'702	60	19'621	88	17'305	2316
West-Central	GHOR	29'761	80	23'809	41'202	25	10'301	34'110	60	20'466	88	18'050	2416
GRAND TOTAL		1'559'654	85	1'325'254	1'648'136	28	462'766	1'788'020	64	1'136'189	93	1'059'307	76'882

Table 1: Estimated irrigated cultivated land in 2003; Total irrigated land cultivated in 2003, irrigated Wheat cultivated and irrigated Barley cultivated in 2003.

* Total intensively irrigated land (1 and 2 crops per year) and intermittently irrigated land. Source: the FAO Land cover Atlas.

** Ratio by region from the joint MAAH/MRRD & FAO/WFP Winter Agriculture Survey.

4.2 Rain-fed Land

The table 2 shows that according to the NCOA, the total estimated rain-fed land planted in 2003 is 2.52 millions hectares (which also includes melon and watermelon). The total rain-fed wheat planted amounts at **1.24** million hectares. In 2002, the CFSAM reported 0.57 million hectares of irrigated wheat cultivated.

The increase of rain-fed wheat planted compared to 2002 is very significant (+ 117%). In the Northern region, the increase of rain-fed wheat in 2003 is almost 3 fold compared to last year (see graphs 2). The provincial agriculture administration recognised the significant increase of rain-fed farming compared to last year⁶.

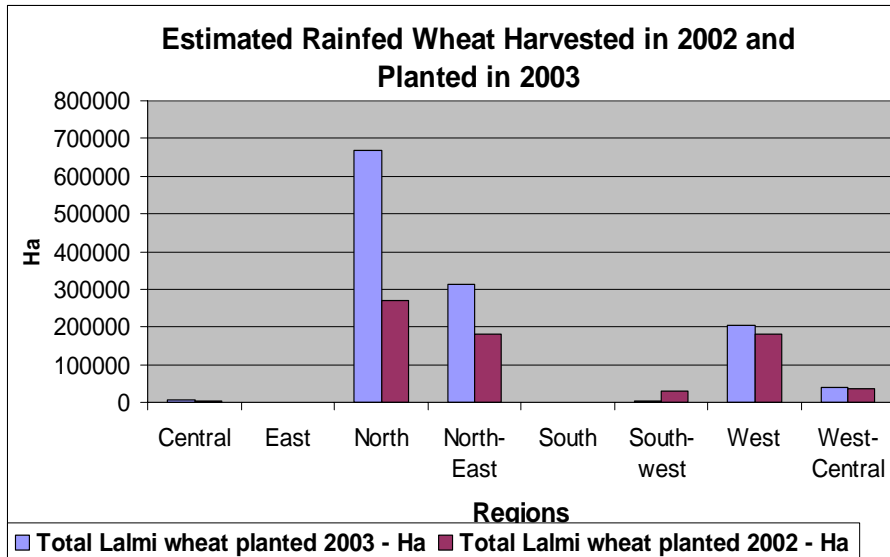
The significant increase of rain-fed land planted this year is explained by the following factors:

1. Good and sustained rainfall from December to late spring in the Northern rain-fed belt. The first cold spell hit Afghanistan in the first week of December 2002 with heavy rain and snowfall. Sustained rain/snowfall was experienced in the following months up to the NCOA (mid-May). Therefore, the planting period in the lowlands extended for several months from December up to February, while in normal years, farmers would have only a short window of a few weeks only, when the top soil moisture would be suitable for planting.
2. The porous Northern loess hills have absorbed important stocks of water in the lower soil layers, which are sufficient for the crop cycle of late planted melon/watermelon intercropped with sesame. Planting of rain-fed melon/watermelon-sesame was on-going in every Northern provinces/districts at the time of the mission. Planting continued until the end of June 2003.
3. With the fair rain-fed harvest in 2002 rain-fed land in the north mainly, rain-fed seeds were available in the market for farmers.
4. Three to four years of drought have forced most of the rain-fed land into fallow. Therefore, almost all the rain-fed land could be put under cultivation this year.
5. Rain-fed farming has encroached into pastureland in all provinces of Northern and Western Afghanistan. The NCOA mission estimated that grazing encroachment represents between 10-15% of the total rain-fed land under cultivation this year (252,000 to 378,000 hectares). In March 2003, FAO led a joint helicopter mission in Dasht-e Laili to assess the extend of grazing being encroached. In Dasht-e Laili alone, an estimated 16,000 hectares of grazing land have been ploughed in 2003⁷.

⁶ The provincial agriculture department officials participating in the mission estimated the increase of rain-fed land as follows:

- Balkh province: 10 times more than 2002.
- Sari Pul province: 5 times more than 2002. The agriculture department reported that they have not seen in their lifetime so much rain-fed land being cultivated.
- Jawzjan province: did not report as no rain-fed land registered in their cadastre, but much grazing land have been encroached.
- Faryab province: 4 to 5 times more than 2002.
- Badghis province: 1.5 times more than 2002.

⁷ See R. Favre, "Grazing Land Encroachment. Joint Helicopter Mission to Dasth-e Laili. 25-27 March 2003. FAO, Kabul, 2003.



Graph 2: Estimated rain-fed wheat harvested in 2002 (CFSAM data) and planted in 2003 (NCOA data).

On average, wheat represents only 49% of the rain-fed land planted with a first crop in 2003. Much of the rain-fed land has been planted with other crops this year. Flax is an important crop and may represent 10-15% of the rain-fed land this year. Rain-fed black cumin seed is also an important crop, mostly cultivated in Western Afghanistan (Badghis and Herat provinces). In the central Highlands and in higher elevation parts of the Northern rain-fed belt, rain-fed chick-peas are also cultivated. But, after wheat, the second main rain-fed crop is melon/watermelon which is intercropped with sesame and represents 30-35% of the total rain-fed cultivated land. In some districts, rain-fed melon/watermelon is more important than rain-fed wheat (e.g. Sayad district in Sari Pul province).

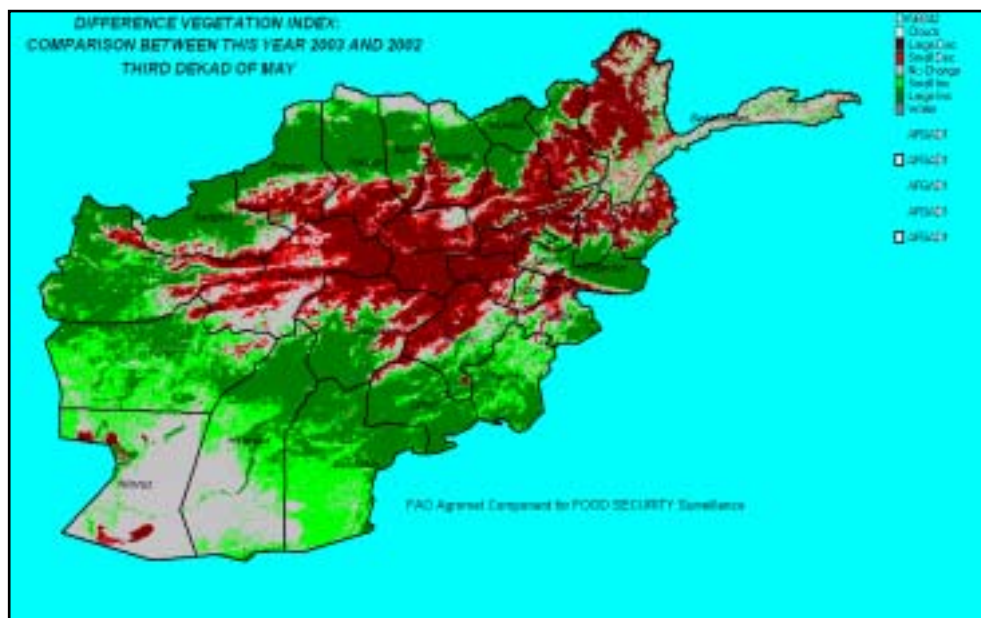


Figure 3: Comparison of NDVI between 2003 and last year (2002) as at the third decade of May. The below average Vegetation Index in the Highlands may be related to the particularly cold spring and later vegetation growth compared to last year.

Farmers in the Northern rain-fed belt started cultivating rain-fed wheat as early as the first dekad of December 2002. As the rains continued in a sustained manner, farmers continued planting until spring. When the period for rain-fed wheat planting was over (or enough of it was planted), farmers diversified their rain-fed crops mostly with oilseeds – mainly flax and sesame intercropped with melon/watermelon.

The significant increase of rain-fed area planted in the Northern rain-fed belt has influenced the NDVI on satellite imagery. Indeed, as most of the rain-fed land and part of the existing pasture land have been ploughed throughout the winter and in spring for rain-fed cultivation, the NDVI by late May was lower this year than in 2002 (see figure 3 above). This is not an indication of a reduction in areas planted or crop growth. It is due to the fact that the indigenous vegetation, growing both on rangeland and rain-fed land that was uncultivated for the past years, sprout in early spring, while rain-fed wheat germinates and covers the land much later. This results in delayed “greenness” in the spring season. For the rain-fed land that was cultivated late in the season with melon or watermelon intercropped with sesame (see picture 4), the impact on “greenness” is more dramatic as the land remains uncovered until late June at least. This “greenness” delay, which was well spotted by the satellite imagery this year, is therefore an indication of an increase rather than a decrease in crops.



Picture 4 : Land preparation in low rain-fed land was still on-going at the time of the mission for other crops such as melon/water-melon intercropped with sesame. Sare-Pul province, 16 May 2003.

REGION	PROVINCE	Total rain-fed land* Ha	Proportion rain-fed land cultivated 2003 %	Total rain-fed cultivated in 2003 Ha	% rain-fed cereal planted 2003 %	Total rain-fed cereal planted in 2003 Ha	Ratio rain-fed Wheat/ Barley %	Total rain-fed wheat planted in 2003 Ha	Total rain-fed barley planted in 2003 Ha
CENTRAL REGION		74'221	8	5'946	90	5351	92	4940	412
Central	KABUL	4'114	30	1'234	90	1111	92	1025	85
Central	KAPISA	4'471	0	0	70	0	92	0	0
Central	LOGAR	36'209	0	0	0	0	92	0	0
Central	PARWAN	13'462	35	4'712	90	4241	92	3914	326
Central	WARDAK	15'964	0	0	0	0	92	0	0
EAST REGION		6'014	3	204	90	184	98	180	4
East	KUNAR	4'089	5	204	90	184	98	180	4
East	LAGHMAN	0	0	0	0	0	98	0	0
East	NANGARHAR	25	0	0	0	0	98	0	0
East	NURISTAN	1'899	0	0	0	0	98	0	0
NORTH REGION		1'966'075	70	1'384'239	55	767'070	87	669'614	97'456
North	BALKH	409'600	80	327'680	60	196'608	87	171'629	24'979
North	FARYAB	626'006	60	375'604	50	187'802	87	163'942	23'860
North	JAWZJAN	98'756	100	98'756	100	98'756	87	86'209	12'547
North	SAMANGAN	364'463	70	255'124	60	153'075	87	133'627	19'448
North	SARI PUL	467'250	70	327'075	40	130'830	87	114'208	16'622
NORTH-EAST REGION		1'266'607	54	684'404	55	377'946	83	313'516	64'430
North-East	BADAKHSAN	406'609	50	203'304	50	101'652	83	84'323	17'329
North-East	BAGHLAN	244'223	60	146'534	60	87'920	83	72'932	14'988
North-East	KUNDUZ	87'249	20	17'450	80	13'960	83	11'580	2'380
North-East	TAKHAR	528'527	60	317'116	55	174'414	83	144'681	29'733
SOUTH REGION		74'057	3	2'551	79	2'016	70	1'415	601
South	GHAZNI	48'546	5	2'427	80	1'942	70	1'363	579
South	PAKTIKA	2'480	5	124	60	74	70	52	22
South	PAKTYA	10'530	0	0	0	0	70	0	0
South	KHOST	12'501	0	0	0	0	70	0	0
SOUTH-WEST REGION		120'227	3	3'127	89	2'793	92	2'568	225
South-West	HELMAND	4'168	5	208	80	167	92	153	13
South-West	KANDAHAR	53'524	5	2'676	90	2'409	92	2'215	194
South-West	NIMROZ	0	0	0	0	0	92	0	0
South-West	URUZGAN	57'694	0	0	0	0	92	0	0
South-West	ZABUL	4'841	5	242	90	218	92	200	18
WEST REGION		858'690	43	368'085	61	225'603	90	203'529	22'074
West	BADGHIS	461'788	30	138'536	80	110'829	90	99'985	10'844
West	FARAH	14'321	0	0	0	0	90	0	0
West	HERAT	382'581	60	229'549	50	114'774	90	103'544	11'230
WEST-CENTRAL REGION		151'823	49	74'225	72	53'307	74	39'343	13'964
West-Central	BAMYAN	16'860	40	6'744	90	6'070	74	4'480	1'590
West-Central	GHOR	134'963	50	67'481	70	47'237	74	34'863	12'374
Grand Total		4'517'714	56	2'522'781	57	1'434'271	86	1'235'106	199'165

Table 2: Estimated rain-fed cultivated land in 2003; Total rain-fed land cultivated in 2003, rain-fed Wheat cultivated and rain-fed Barley cultivated in 2003.

* Total rain-fed land (flat and sloping land). Source: FAO Land Cover Atlas. Includes portions devoted to grassland, and also non cultivable sectors (gullies, steep slopes, etc.)

** Ratio by region from the joint MAAH/MRRD & FAO/WFP Winter Agriculture Survey.

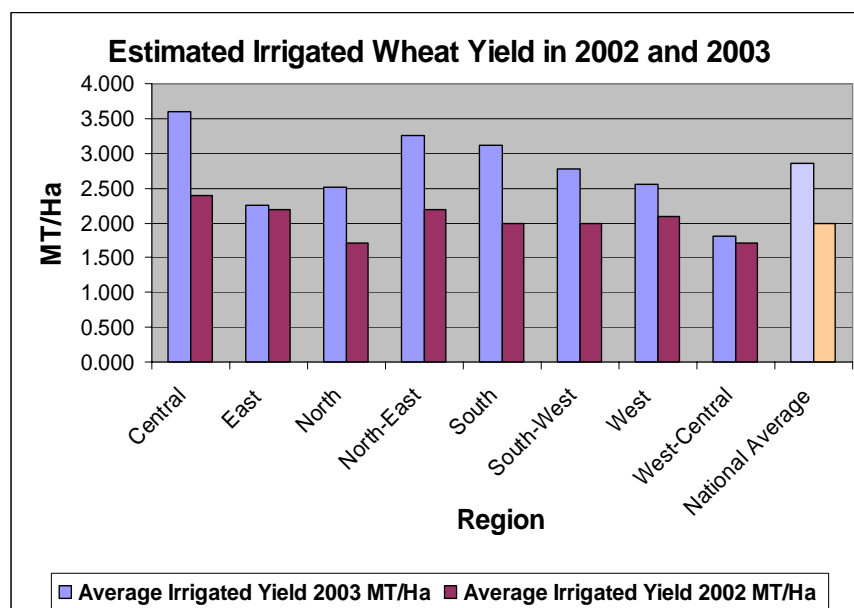
5. Estimated Wheat Yield

5.1 Irrigated Land

Table 3 shows that according to the NCOA, the average estimated irrigated wheat yield in 2003 will reach **2.85** Mt/Ha. In 2002, the CFSAM reported an average irrigated wheat yield of 2.00 Mt/Ha.

The increase of yield is very significant and represents 0.85 Mt/Ha, equal to 43% increase. Graph 3 below shows that the irrigated wheat yield has increased in all regions of Afghanistan compared to CFSAM 2002 data, except in Faryab and Ghor provinces (see table 5)⁸.

However, the “actual” yield increase in 2003 compared to 2002 may in reality be lower, as the CFSAM mission in 2002, noted in the annual report that “an average yield of 2.0 tonnes/ha, which given the seed type and fertilizer use noted, may be conservative”.⁹ One NCOA team member noted that “the previously rather low average yields assessed in previous years were questioned by some members of the team of internationals who participated in the 2002 Crop and Food Supply Assessment. From their own field observations and measured sampling they argued that yields of irrigated wheat in Afghanistan are almost certainly generally higher than previously thought”¹⁰.



Graph 3: Estimated irrigated wheat yield in 2002 (CFSAM data) and 2003 (NCOA data).

⁸ In Sari Pul province the increase of yield in 2003 is less significant than in other provinces. In Ghor, Sari Pul and Faryab, the use of improved wheat seeds is lower than other provinces. In Sari Pul and Faryab, the farming situation has been complicated by insecurity caused by (at times violent) conflict between the Jumbesh-e Islami and the Jamiat-e Islami factions during this year.

⁹ FAO/WFP Crop and Food Supply Assessment Mission to Afghanistan (CFSAM), 16 August 2002.

¹⁰ Note from Anthony Fitzherbert who participated in the NCOA (Team 3 report) and acted as Senior Technical Adviser for FAO in 2002 when the CFSAM mission visited Afghanistan last year.

Higher wheat yields should not come as a surprise in view of the widespread use of fertiliser and improved selected varieties which were promoted under a succession of nationwide programmes initiated since the withdrawal of the Soviet forces 1988/1989. The 1992-93 Swedish Committee surveys showed that average yields between 2.8 and 3.6 Mt/Ha were obtained in various regions for the improved seeds available at the time¹¹. The NCOA observed that markets play a central role in timely supplying farming input in Afghanistan.

Compared against the 1978 irrigated wheat yield data, the average this year shows an increase of 65% (2.85 Mt/Ha against 1.73 Mt/Ha reported in 1978). In 2002, the very conservative and probably underestimated yield reported per hectare had already surpassed the 1978 level.



Picture 5 : Irrigated wheat fields in Bala Murghab. Note the density and regularity of these improved wheat fields. Badghis province, 22 May 2002.

¹¹ The table below summarize the findings of the Swedish Agricultural Survey of 1991/1992 and 1992/1993. This is valuable as it indicated the production potential of irrigated areas. As the result of twelve years of regular and widespread inputs of improved wheat varieties throughout most of the main river basins of Afghanistan, there is now a high percentage of improved genetic material being cultivated in Afghanistan under irrigated conditions. Improved seeds available now have significantly higher yields than those available in 1991/92 and 1992/93.

Region	1992		1993	
	Improved	Local	Improved	Local
North-east	3.26	1.61	3.15	1.68
North	2.77	1.02	3.19	1.09
South-east	3.19	2.10	3.15	2.21
East-central	3.64	2.10	3.47	2.21
South-west	3.22	2.28	3.40	2.38
North-west	2.80	1.47	2.98	1.44

Table 3: Yields of improved and local wheat varieties, 1992 and 1993. Source: SCA Agriculture Surveys..



Picture 6 : Wheat fields (improved varieties) being harvested in the Panjshir valley. Parwan province, 19 June 2003.



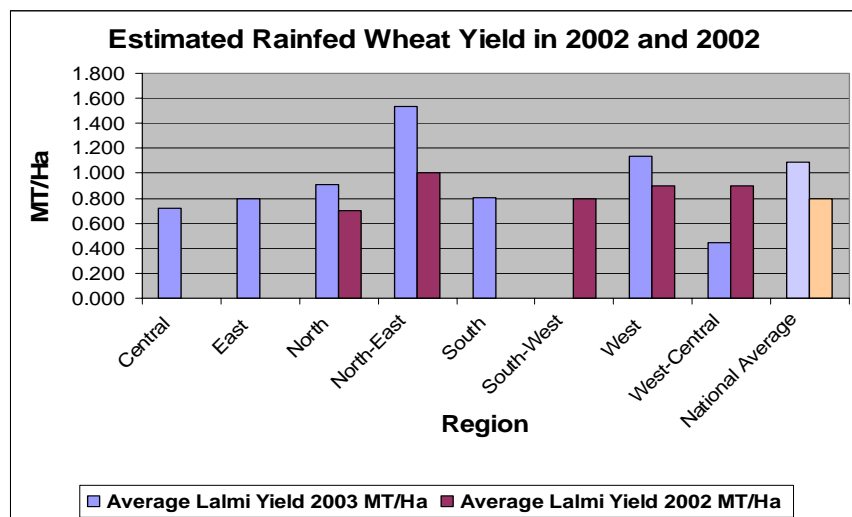
Picture 7 : Low use of fertilizers and improved wheat seeds have resulted in a low yield average in Sare-Pul and Faryab provinces. Insecurity and conflict this year in both provinces may have affected farmer's cropping decisions. Sare-Pul province, Sozma Qala district, 16 May 2003.

5.2 Rain-fed Land

Table 4 shows that according to the NCOA, the average estimated rain-fed wheat yield in 2003 will reach **1.09** Mt/Ha. In 2002, the CFSAM reported an average rain-fed wheat yield of 0.8 Mt/Ha.

The increase of yield is significant and represents nearly 0.3 Mt/Ha, equal to a 36% increase). Graph 4 below shows that the rain-fed wheat yield estimated this year is higher in all regions of Afghanistan as compared to yields estimated by the CFSAM 2002, except in the West-Central and South-West Regions.

The increase of rain-fed yield this year is explained by consistent rainfall from the planting period of wheat until maturity. In Faryab province, the average yield is lower than in other provinces due to excess of rainfall in winter that have slightly delayed the planting period.



Graph 4: Estimated rain-fed wheat yield in 2002 (CFSAM data) and 2003 (NCOA data).

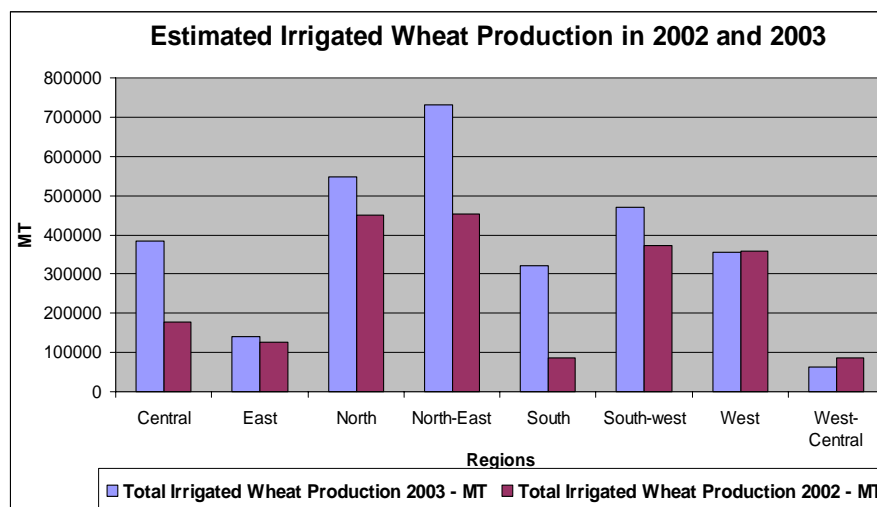
REGION	PROVINCE	Total irrigated wheat planted in 2003 Ha	Average irrigated wheat Yield in 2003 Mt/Ha	Total Irrigated Wheat Production in 2003 Mt	Total rain-fed wheat planted in 2003 Ha	Average rain-fed wheat Yield in 2003 Mt/Ha	Total Rain-fed Wheat Production in 2003 Mt	Total Wheat production in 2003 Mt
CENTRAL REGION		107'162	3.60	385'413	4'940	0.72	3'542	388'955
Central	KABUL	19'539	2.99	58421	1025	0.40	410	58831
Central	KAPISA	8'978	3.16	28371	0	0.00	0	28371
Central	LOGAR	23'486	3.97	93239	0	0.00	0	93239
Central	PARWAN	30'934	3.64	112599	3914	0.80	3131	115730
Central	WARDAK	24'225	3.83	92784	0	0.00	0	92784
EAST REGION		62'878	2.24	141'133	180	0.80	144	141'277
East	KUNAR	8'032	1.94	15581	180	0.80	144	15726
East	LAGHMAN	14'226	2.71	38553	0	0.00	0	38553
East	NANGARHAR	39'501	2.15	84928	0	0.00	0	84928
East	NURISTAN	1'119	1.85	2070	0	0.00	0	2070
NORTH REGION		217'360	2.52	547'547	669'614	0.91	608'489	1'156'036
North	BALKH	79'092	3.12	246768	171629	0.93	159615	406383
North	FARYAB	59'390	1.54	91461	163942	0.89	145908	237369
North	JAWZJAN	40'756	2.76	112485	86209	1.02	87933	200418
North	SAMANGAN	12'235	3.45	42211	133627	0.84	112246	154457
North	SARI PUL	25'887	2.11	54622	114208	0.90	102787	157409
NORTH-EAST REGION		224'363	3.26	731'463	313'516	1.54	482'065	1'213'528
North-East	BADAKHSAN	24'773	2.75	68125	84323	1.38	116366	184490
North-East	BAGHLAN	51'686	3.74	193305	72932	2.09	152428	345733
North-East	KUNDUZ	99'758	3.37	336186	11580	2.05	23739	359925
North-East	TAKHAR	48'147	2.78	133848	144681	1.31	189532	323380
SOUTH REGION		103'016	3.12	321'122	1'415	0.80	1'138	322'260
South	GHAZNI	56'209	3.22	180992	1363	0.80	1091	182083
South	PAKTIKA	16'300	3.22	52486	52	0.90	47	52533
South	PAKTYA	17'712	3.07	54375	0	0.00	0	54375
South	KHOST	12'796	2.60	33269	0	0.00	0	33269
SOUTH-WEST REGION		169'809	2.77	470'241	2'568	0.00	0	470'241
South-West	HELMAND	74'426	2.83	210627	153	0.00	0	210627
South-West	KANDAHAR	39'427	2.89	113944	2215	0.00	0	113944
South-West	NIMROZ	13'249	2.62	34713	0	0.00	0	34713
South-West	URUZGAN	31'538	2.64	83260	0	0.00	0	83260
South-West	ZABUL	11'168	2.48	27697	200	0.00	0	27697
WEST REGION		139'363	2.55	355'450	203'529	1.14	231'739	587'189
West	BADGHIS	24'953	2.62	65378	99985	1.22	121982	187359
West	FARAH	23'374	2.79	65214	0	0.00	0	65214
West	HERAT	91'036	2.47	224859	103544	1.06	109757	334616
WEST-CENTRAL REGION		35'355	1.82	64'213	39'343	0.45	17'574	81'786
West-Central	BAMYAN	17'305	2.00	34610	4480	0.81	3629	38239
West-Central	GHOR	18'050	1.64	29602	34863	0.40	13945	43548
GRAND TOTAL		1'059'307	2.85	3'016'581	1'235'106	1.09	1'344'690	4'361'271

Table 4: Estimated wheat production in 2003; irrigated wheat, rain-fed wheat and total wheat production.

6. Estimated Wheat Production

6.1 Irrigated Land

Table 4 shows that according to the NCOA, total estimated irrigated wheat production in 2003 will reach **3.02** million Mt. In 2002, the CFSAM reported a total irrigated wheat production of 2.11 millions Mt. The increase of irrigated wheat production is significant and represents more than 0.9 million Mt, or a 43% increase. Irrigated wheat production has increased in all regions of Afghanistan compared to 2002, except in the West-Central region (see Graph 5). As the planted area in 2003 is pretty much similar as last year, the increase of production is mainly due to a significant increase of wheat yield.



Graph 5: Estimated irrigated wheat production in 2002 (CFSAM data) and 2003 (NCOA data).

This in part may be a reflection of an under-estimation of yields last year. However, beside the discussion on wheat yield estimations in Afghanistan, the increase of yield compared to last year is also explained by the following:

1. A majority of the wheat fields visited were cultivated with improved wheat seeds, except in the provinces of Sari Pul, Faryab and Ghor. The main sources for wheat seeds are the local markets (which include seeds imported commercially), emergency seeds distribution, FAO seeds multiplication program and seeds brought along by returnees mostly from Iran and Pakistan.
2. Almost all farmers interviewed invariably apply fertilizers in irrigated fields.¹² Farmers have generally a good knowledge of fertilizer quality as well as how much and when fertilizers should be applied in wheat fields. Fertilizer applications are generally split in a sensible manner to follow the wheat crop development stages.
3. No significant outbreaks of diseases have been observed during the NCOA or reported this year in Afghanistan (apart from sunn pest in Helmand).
4. The good rainfall throughout the winter and spring has positively affected the development of irrigated wheat.
5. The exceptionally cool spring weather this year has been beneficial to wheat crops. Indeed, very hot days in late spring when the wheat is at the grain filling stage can have a negative effect on production in Afghanistan.

¹² In rain-fed fields, only few farmers are applying fertilizers as it is being considered too risky. Some may use a little Nitrogen for top dressing if rain seems certain, but these are rare.

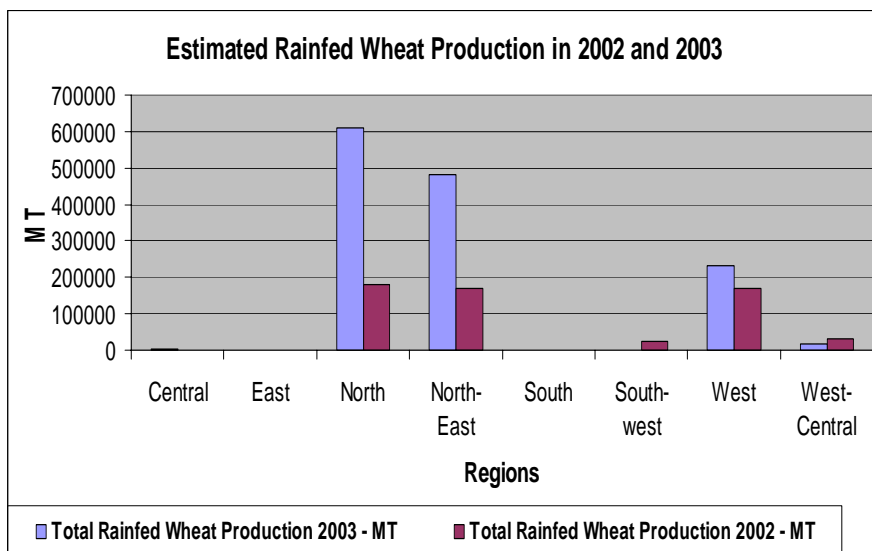
In the South-West region, the increase of production compared to last year denotes that the area is recovering from four years of drought, but is still badly affected by lack of irrigation water and low water tables. The Karez and spring irrigated villages from Helmand to Zabul and part of Ghazni are still facing serious water shortages. After four years of drought, the aquifers have dramatically declined, and water tables are still low, leaving the Karez almost dry. Despite reasonable winter rainfall, the replenishment of aquifers in Southern Afghanistan will take a minimum of 12 months with good rainfall (or one more winter/spring with good rainfall).

The situation is reportedly particularly severe in Zabul district where water for HH consumption is not available in some villages and the prevailing security situation is complicating the delivery of assistance. In Kandahar, as the water table has dropped lower than most of the irrigation wells, orchards have further dried out this winter/spring.

However, along the main rivers such as the Helmand valley, the Tarnac and Arghastan rivers and the Khash Rud and Khuspa Rud, the situation has improved, marking a significant contrast to last year.

6.2 Rain-fed Land

Table 4 shows that according to the NCOA, total estimated rain-fed wheat production in 2003 will reach **1.35** million Mt. In 2002, the CFSAM reported a total rain-fed wheat production of 0.58 millions Mt. The increase of rain-fed wheat production is significant and represents nearly 0.8 million Mt, or more than a 130% increase. Graph 6 below shows that rain-fed production has significantly increased in the North and North-East regions compared to last year. In the West-Central and South-West regions, rain-fed wheat production has however decreased this year.



Graph 6: Estimated rain-fed wheat production in 2002 (CFSAM data) and 2003 (NCOA data).

The increase of wheat production in rain-fed land this year is explained both by the dramatic increase in area planted and the better yield due to good and sustained rainfall from December throughout late spring.

6.3 Total Production

Table 4 shows that according to the NCOA, total estimated wheat production in 2003 will reach **4.36** million Mt. In 2002, the CFSAM reported a total wheat production of 2.69 millions Mt. The increase of irrigated wheat production is significant and represents almost 1.7 million Mt (or a 62% increase). Total wheat production has increased in all regions of Afghanistan compared to 2002, except in the West-Central region. In 2003, a number of positive factors have exceptionally converged for a high production level in both irrigated and rain-fed land. This situation may not be repeated in the coming years. Some of these factors such as increased use of improved seeds and fertilizers may well sustain in the coming years. However, rainfall varies from year to year, and rain-fed land has to be rotated (fallow), leaving only part of the rain-fed land for cultivation every year instead of the higher proportion planted in 2002/03 following a drought period.

Also, it should be stressed here that rain-fed wheat production represents 30% of the total wheat production this year. Almost all possibly cultivable rain-fed land has been cultivated this year in much of the Northern rain-fed belt. Rain-fed production is by nature opportunistic in Afghanistan and next year rain-fed area planted will certainly decrease.

Nevertheless, when compared against the 1978 production data, total wheat production this year show an increase of 55%. Total wheat production in 1978, often considered as the reference year for self-sufficiency in grain was estimated at 2.81 million Mt. This makes 2003 the best wheat harvesting year for at least 25 years. Thus, the NCOA would suggest that Afghan farmers have continued to improve their wheat cultivation techniques on their farms despite war and conflicts.

6.4 Agricultural Constraints in 2003

Good yields and production at national level should not hide the fact that some districts/areas have experienced crop failures. However, the discussion of these particular agricultural problems is not in the scope of this report, though they have been taken into consideration for the NCOA data. However, the major agricultural problems that have affected cereal production this year are simply listed below:

1. Serious water shortage in Karez and spring irrigated systems in Southern Afghanistan (Helmand to Zabul and part of Ghazni province).
2. Localised floods and water-logging in Northern and central Afghanistan.
3. Hailstorm in Kohsan district of Herat province and part of the Panjshir valley.
4. Sand dunes encroachment in Lash wa Joweyn of Farah province.
5. Changes in irrigation water user rights in the Northern Turkistan plain.
6. Cropping decisions affected by conflict and insecurity in Faryab and Sari Pul provinces.
7. Lower use of quality seeds in the provinces of Sari Pul, Faryab and Ghor.
8. Soil erosion on sloping rain-fed land (particularly when land is cultivated with tractor parallel to the slope).
9. Lack of rainfall at planting time in rain-fed fields of Ghor province.
10. Fire on rain-fed wheat encroaching pastureland in Dasht-e Laili.
11. General increase of poppy cultivation, except in the Helmand, Herat and part of Nangarhar provinces.

REGION	PROVINCE	Total irrigated wheat planted in 2003	Average irrigated wheat Yield in 2003	Total Irrigated Wheat Production in 2003	Total irrigated wheat planted in 2002	Average irrigated wheat Yield in 2002	Total Irrigated wheat Production in 2002	Total rain-fed wheat planted in 2003	Average rain-fed wheat Yield in 2003	Total rain-fed Wheat Production in 2003	Total rain-fed wheat planted in 2002	Average rain-fed wheat Yield in 2002	Total rain-fed wheat Production in 2002
		1000 Ha	Mt/Ha	1000 Mt	1000 Ha	Mt/Ha	1000 Mt	1000 Ha	Mt/Ha	1000 Mt	1000 Ha	Mt/Ha	1000 Mt
CENTRAL REGION		107	3.60	385	74	2.40	178	5	0.72	4	3	0.00	0
Central	KABUL	20	2.99	58	20	2.40	48	1	0.40	0	1	0.00	0
Central	KAPISA	9	3.16	28	5	1.80	9	0	0.00	0	0	0.00	0
Central	LOGAR	23	3.97	93	14	2.40	34	0	0.00	0	0	0.00	0
Central	PARWAN	31	3.64	113	20	2.40	48	4	0.80	3	0	0.00	0
Central	WARDAK	24	3.83	93	15	2.60	39	0	0.00	0	2	0.00	0
EAST REGION		63	2.24	141	57	2.20	125	0	0.80	0	0	0.00	0
East	KUNAR	8	1.94	16	10	2.00	20	0	0.80	0	0	0.00	0
East	LAGHMAN	14	2.71	39	14	2.60	36	0	0.00	0	0	0.00	0
East	NANGARHAR	40	2.15	85	33	2.10	69	0	0.00	0	0	0.00	0
East	NURISTAN	1	1.85	2				0	0.00	0			
NORTH REGION		217	2.52	548	260	1.70	449	670	0.91	609	269	0.70	180
North	BALKH	79	3.12	247	80	2.00	160	172	0.93	160	40	0.70	28
North	FARYAB	59	1.54	91	87	1.60	139	164	0.89	146	80	0.70	56
North	JAWZJAN	41	2.76	112	37	1.40	52	86	1.02	88	10	0.30	3
North	SAMANGAN	12	3.45	42	26	1.80	47	134	0.84	112	129	0.70	90
North	SARI PUL	26	2.11	55	30	1.70	51	114	0.90	103	10	0.30	3
NORTH-EAST REGION		224	3.26	731	204	2.20	452	314	1.54	483	180	1.00	171
North-East	BADAKHSAN	25	2.75	68	24	2.00	48	84	1.38	116	30	1.00	30
North-East	BAGHLAN	52	3.74	193	35	2.00	70	73	2.09	152	60	0.90	54
North-East	KUNDUZ	100	3.37	336	75	2.40	180	12	2.05	24	30	0.90	27
North-East	TAKHAR	48	2.78	134	70	2.20	154	145	1.31	190	60	1.00	60
SOUTH REGION		103	3.12	321	44	2.00	87	1	0.80	1	0	0.00	0
South	GHAZNI	56	3.22	181	20	2.30	46	1	0.80	1	0	0.00	0
South	PAKTIKA	16	3.22	52	2	1.50	3	0	0.90	0	0	0.00	0
South	PAKTYA	18	3.07	54	6	1.30	8	0	0.00	0	0	0.00	0
South	KHOST	13	2.60	33	16	1.90	30	0	0.00	0	0	0.00	0
SOUTH-WEST REGION		170	2.77	470	186	2.00	374	3	0.00	0	30	0.80	24
South-West	HELMAND	74	2.83	211	63	2.60	164	0	0.00	0	0	0.00	0
South-West	KANDAHAR	39	2.89	114	58	2.00	116	2	0.00	0	0	0.00	0
South-West	NIMROZ	13	2.62	35	20	1.40	28	0	0.00	0	10	0.80	8
South-West	URUZGAN	32	2.64	83	15	1.20	18	0	0.00	0	20	0.80	16
South-West	ZABUL	11	2.48	28	30	1.60	48	0	0.00	0	0	0.00	0
WEST REGION		139	2.55	355	170	2.10	358	204	1.14	232	180	0.90	170
West	BADGHIS	25	2.62	65	50	2.20	110	100	1.22	122	80	1.00	80
West	FARAH	23	2.79	65	25	1.90	48	0	0.00	0	40	0.90	36
West	HERAT	91	2.47	225	95	2.10	200	104	1.06	110	60	0.90	54
WEST-CENTRAL REGION		35	1.82	64	50	1.70	87	39	0.45	18	35	0.90	31
West-Central	BAMYAN	17	2.00	35	24	1.80	43	4	0.81	4	30	0.90	27
West-Central	GHOR	18	1.64	30	26	1.70	44	35	0.40	14	5	0.80	4
GRAND TOTAL		1'059	2.85	3017	1'045	2.00	2110	1235	1.09	1346	697	0.80	576

Table 5 ; Comparison NCOA 2003 data with the CFSAM 2002 data; Irrigated & rain-fed wheat planted, wheat yield and wheat production.

REGION	Total irrigated barley planted in 2003	Average irrigated barley Yield in 2003	Total Irrigated barley production in 2003	Total rain-fed barley planted in 2003	Average rain-fed barley Yield in 2003	Total rain-fed barley production in 2003	Total barley planted in 2003	Average barley yield in 2003	Total barley production in 2003	<i>Total barley planted in 2002</i>	<i>Average barley yield in 2002</i>	<i>Total barley production in 2002</i>
	1000 Ha	Mt/ha	1000 Mt	1000 Ha	Mt/Ha	1000 Mt	1000 Mt	Mt/Ha	1000 Mt	1000 Mt	Mt/Ha	1000 Mt
CENTRAL	1	3.51	3	0	0.70	0	1	2.61	3	17	1.60	28
EAST	0	2.19	0	0	0.79	0	0	2.15	0	3	1.80	5
NORTH	35	2.46	86	97	0.89	87	132	1.31	173	69	1.40	97
NORTH-EAST	13	3.19	40	64	1.47	94	77	1.75	135	83	1.50	125
SOUTH	1	3.05	3	1	0.79	0	1	2.14	3	4	1.40	6
SOUTH-WEST	1	2.70	3	0	0.00	0	1	2.20	3	6	1.60	10
WEST	22	2.49	54	22	1.12	25	44	1.80	79	35	1.40	49
WEST-CENTRAL	5	1.77	8	14	0.44	6	19	0.78	15	19	1.40	27
GRAND TOTAL	77	2.57	197	199	1.07	213	276	1.49	410	236	1.50	345

Table 6 : Estimation of barley area planted, yield and production for irrigated and rain-fed and comparison with the CFSAM data 2002.

7. Estimated Barley Production at Regional Level

Measurements on barley fields were taken randomly along the way. However, the number of measurements is too low to present data at the provincial level. Therefore yield estimates are presented at regional level.¹³

Table 6 shows that according to the NCOA total barley planted in 2002-2003 (irrigated and rain-fed) is estimated at **0.276** million hectares¹⁴ and the total production at **0.41** million Mt. The average barley yield (rain-fed and irrigated) in 2003 is estimated at **1.49** Mt/ha. The average yield in irrigated barley is higher and estimated at 2.57 Mt/ha (see table 6). In 2002, the CFSAM reported a total of 0.236 millions hectares planted, 0.345 million Mt of barley production and an average yield of 1.5 Mt/ha. The increase in area planted with barley denotes a slight recovery of livestock population this year following the drought. Barley is mostly cultivated and used as animal feed.

8. Wheat Grain Prices

Graph 7 shows that wheat grain prices are generally lower in the Kabul, Faizabad, Mazar and Herat markets compared to the same period the year before (May 2002). However, in Jalalabad and Kandahar, the wheat grain prices are significantly higher than last year. The wheat market in Afghanistan is dominated by imported flour from Kazakhstan in the North and North-East, and from Pakistan in the Central, East and South. The quantity of wheat food aid in the market is very limited.

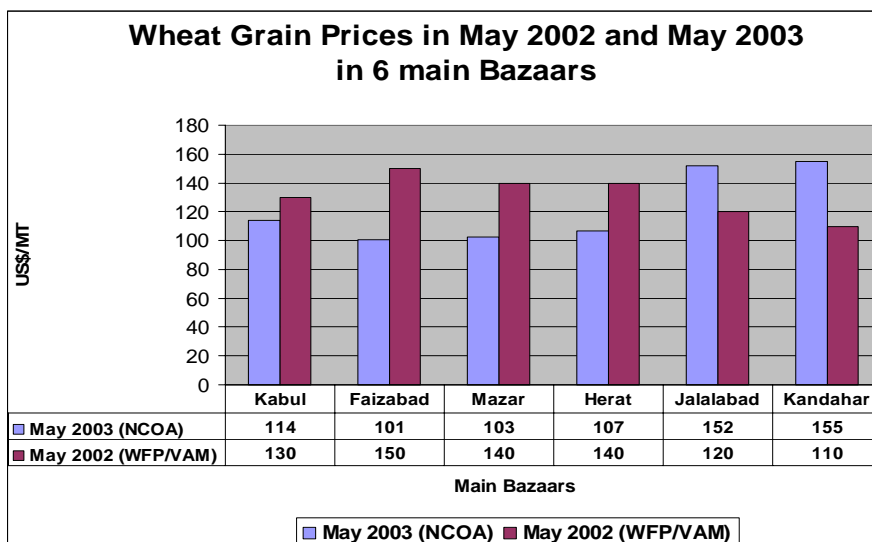
Table 7 summarizes wheat grain and wheat flour prices in the provinces where the prices could be collected by the NCOA. In general, the price of wheat is slightly lower in the main regional bazaars (graph 7) than in the provinces (table 7), except for the North and South-West regions. In the North, the price of wheat appeared slightly lower in the remote districts where much rain-fed land has been cultivated.

The main reason for low wheat prices in North, North Eastern and Western Afghanistan (in May / early June) seems to have been due to significant commercial imports of flour from Kazakhstan and Pakistan which were dominating many markets combined with the fact that traders were also trying to get rid of old stocks of grain left over from the 2002 harvest of which there was still a quantity in store, prior to the new harvest. The impact of Food Aid wheat on grain prices was found to be insignificant.

Low wheat prices in the market can negatively affect farmers who may sell part of their wheat harvest in Northern and Western Afghanistan.

¹³ For the barley yield estimation, the number of rows were counted and multiplied by 6 for the total number of grains per head. Barley grains could not be weighed, and therefore a conservative average weight of 38 g/1000 grains in irrigated and 34 g/1000 grains in rain-fed barley was adopted.

¹⁴ The methodology for estimating the area planted in barley in 2003 is different from previous years. In 2003, the proportion of barley as compared to the total cereal cultivated was given by a sample agriculture survey conducted in winter 2002-03. In 2002 and previous years, the CFSAM estimates were based on long time data series which baseline was the 1967/68 data recorded and published (the last reliable agricultural statistics).



Graph 7: Comparison of wheat grain prices in May 2003 (NCOA) and May 2002 (WFP/VAM figures) in 6 main Bazaars.

REGION	PROVINCE	Exchange Rate USD/AFS	Price wheat Grains Afs/seer	Price wheat Grains US\$/MT	Price wheat Flour Imported Afs/seer	Price wheat Flour Imported US\$/Mt	Main Origin of wheat flour present in bazaar
CENTRAL REGION		47.95	44	132	67	200	
Central	KABUL	48.30	50	148	69	204	Pakistan
Central	KAPISA						
Central	LOGAR						
Central	PARWAN	47.60	39	116	65	196	Pakistan
Central	WARDAK						
EAST REGION		48.50	43	128	62	183	
East	KUNAR						
East	LAGHMAN	48.00	45	134	60	179	Pakistan
East	NANGARHAR	49.00	42	121	64	188	Pakistan
East	NURISTAN						
NORTH REGION		48.40	35	102	62	183	
North	BALKH	48.50	34	99	60	177	Kazakhstan
North	FARYAB	48.25	39	114	63	187	Kazakhstan
North	JAWZJAN	48.40	33	98	60	177	Kazakhstan
North	SAMANGAN	48.50	not available	not available	65	193	Kazakhstan
North	SARI PUL	48.35	33	98	not available		
NORTH-EAST REGION		48.34	36	105	76	224	
North-East	BADAKHSAN	48.20	40	120	76	226	Kazakhstan
North-East	BAGHLAN	48.50	33	98	73	214	Kazakhstan
North-East	KUNDUZ	48.40	33	99	70	207	Kazakhstan
North-East	TAKHAR	48.25	36	105	85	250	Kazakhstan
SOUTH REGION		48.34	48	140	64	188	
South	GHAZNI	48.50	44	129	64	189	Pakistan
South	PAKTIKA	48.40	not available	not available	65	193	Pakistan
South	PAKTYA	48.25	51	152	65	191	Pakistan
South	KHOST	48.20	not available	not available	60	179	Pakistan
SOUTH-WEST REGION		48.17	49	146	64	189	
South-West	HELMAND	47.50	45	136	64	191	Pakistan
South-West	KANDAHAR	48.50	53	155	63	185	Pakistan
South-West	NIMROZ						
South-West	URUZGAN						
South-West	ZABUL	48.50	not available	not available	65	191	Pakistan
WEST REGION		48.18	42	123	63	187	
West	BADGHIS	48.35	36	106	58	171	Pakistan
West	FARAH	48.10	51	151	65	193	Pakistan, Kazakhstan
West	HERAT	48.10	38	113	66	196	Pakistan, Kazakhstan, Iran
WEST-CENTRAL REGION							
West-Central	BAMYAN						
West-Central	GHOR						

Table 7 : Price of wheat grain and wheat flour in the provinces where data have been collected.

V. CONCLUSION & RECOMMENDATIONS

The findings of the NCOA clearly suggest a much more dynamic rural Afghanistan than generally accounted for. Indeed, the NCOA shows that production level in irrigated fields is much higher than previously reported. Also, the rather low proportion of wheat in the farming system denotes the existence of a more diversified cropping system, at least in this year of good and sustained rainfall. In fact Afghan farmers are quite sensitive to market reactions and demands. There are several examples such as the fruit trees in the South and Central, mung beans in the Northeast¹⁵, black cumin seeds 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. The widespread Afghan diaspora has undoubtedly greatly helped their international trading links.

The NCOA findings also suggest that Afghan farmers are proving extremely resilient and open to technological changes by adopting improved seeds and using fertilizers despite the dramatic situation in the past 25 years. According to the NCOA, 2003 is the best wheat harvesting year since at least 1978.

The difference of findings between the NCOA and previous data set raises the question of baseline agriculture data for Afghanistan in the absence of proper sampling frames and scientific reporting of population. The NCOA recommends supporting the following activities next year:

1. A new land cover mapping exercise with satellite imagery being acquired in 2003 to update the 1993 dataset.
2. A formal NCOA in 2004 that would cover all districts of Afghanistan and fully involve all provincial and district agriculture administration. This would resolve possible discussion on wheat yield level in Afghanistan.

¹⁵ 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.

ANNEX I - CHANGES OF THE ITINERARY AND TEAMS COMPOSITION DUE TO SECURITY SITUATION IN SOUTHERN AFGHANISTAN

The NCOA was composed of four teams assessing yields in different lowland areas of the country and briefly visiting a few highland areas. Initially, 3 teams were to be led by international consultants: one team covering the south and west (from Ghazni to Farah provinces) was to be led by Anthony Fitzherbert¹⁶; one team covering the east and north-west (Jalalabad and from Balkh to Herat provinces) led by Raphy Favre¹⁷; and one team covering the central and north-east (Kabul area and from Samangan to Badakhshan), led by Javier Escobedo.¹⁸

Due to deteriorating security in the South and East, the missions could not leave as initially planned on the 8th of May 2003. The whole Southern and Eastern regions of Afghanistan were declared officially off-limits (level 4) for UN missions the very day before departure. Therefore, the mission had to be postponed by three days and two thirds of the planned itinerary of the NCOA had to be revised.

As the Eastern and Southern regions (from Jalalabad to Helmand) were off-limits for UN missions, a team composed only of government staffs (3 from MAAH and 1 from MRRD) travelling in an unmarked (rented) private vehicle was established and trained to assess these areas. The Western, Northern and North-Eastern regions were covered by three other teams led by internationals. Team 2, led by Raphy Favre, assessed the North-west and West (from Balkh to Farah) and briefly visited the Central Highlands. Teams 3 and 4 visited the North-east (from Samangan to Badakhshan) and the Central region (Kabul and surroundings). Team 3 was led by Anthony Fitzherbert (between the 11th and the 20th of May 2003) and team 4 by Javier Escobedo (between the 14th of May and 1st of June 2003) .

A preparatory workshop was held in Kabul on May 6th and 8th. On the 10th of May, the four teams went to the Shomali plain (Parwan province) to perform a field test of the methodologies and further train the government staffs who were to assess the Southern and Eastern regions. The teams finally left for the field on Sunday May 11th.

¹⁶ FAO Senior International Consultant, with more than 13 years experience in Afghanistan, and more than 40 years experience in Central Asia.

¹⁷ FAO/FAIT Agronomist Consultant.

¹⁸ FAO/Emergency Agronomist Consultant.

ANNEX II - PARTICIPANTS

Team 1 – Southern team

Abdul Qadim	MAAH, Extension department, Kabul
Mohammad Rahim	MRRD Analysis and Evaluation Unit, Kabul
Mohammad Alim	MAAH, Extension department, Kabul
Ahmad Fawad	MAAH, Extension department, Kabul
Mohammad Zahir	Private driver

Team 2 – North-western team

Raphy Favre	FAO Consultant, Mission Team Leader
Eng. Haideri	FAO national consultant
Sayyed Hakimullah	MRRD Analysis and Evaluation Unit, Kabul
Mohammad Hassib	FAO CLO Herat
Ghulam Farruk	MAAH, Extension department, Kabul
MirWais	Driver FAO
Ziah Ahmad	Driver WFP

Team 3 – North-eastern team

Anthony Fitzherbert	FAO Consultant, Team Leader May 11 th to 18 th
Sher Walizada	WFP/VAM officer, Kabul
Habibi	FAO NPP Agriculture Kunduz, May 18 th to 19 th
Mohamad Karim	MRRD Analysis and Evaluation Unit, Kabul
Mohammad Sediq	MAAH, Extension department, Kabul
Shah Mamoud	MAAH, Extension department, Kabul
Pirouz	Driver FAO
Mohammad Naseem	Driver WFP

Team 4 – North-eastern and Central team

Javier Escobedo	FAO Consultant, joined mission in Kunduz May 18 th to take over lead of the team 3 at the conclusion of Fitzherbert,s contract.
Kishtwards	FAO NPP, Fayzabad (14 th -16 th May 2003)
J. Shoening	FAO Area Manager, Fayzabad (14 th -16 th May 2003)
Pir Sakhi	Independent agronomist (14 th -16 th May 2003)

A private vehicle was rented for team 1, while teams 2, 3 and 4 consisted each of a two vehicle convoy, one provided by FAO and one by WFP.

In every province the team was joined and assisted by (usually two) members of the local agricultural administration from the agricultural extension service.

Provincial authorities met and/or participating in the Mission

In each province, the provincial agriculture administration was visited and meetings were held on the agriculture situation in the province this year. In each case the team were assisted in the field by one or more persons from the local Agricultural professional staff, who acted as local guide and received training in crop assessment methods. This assistance was in every case provided with good willingness and proved to be of material assistance in terms of guidance and practice help with the field work.

Team 1

Gulrang Khan	Head of Extension department, Kunar
Mohsil Khan	Head of Extension department, Nangarhar
Hamyoon	Extension worker, agriculture department, Nagarhar
Faiz mohd Khan	Head of Extension department, Helmand
Saleh M. Wijdan	Head of Extension department, Kandahar
Alhaj Mohd Arif	Head of Agriculture department, Zabul
Abdul Hadi Khan	Head of Extension department, Zabul
Ghulam Hussain Abasyar	Head of Agriculture department, Ghazni
Chaman Shah	Head of Extension department, Ghazni
Ahmad Yar	Head of Agriculture department, Paktika
Mohd Rahim	Head of Extension department, Paktika
Abdul Ghias	Extension worker, agriculture department, Paktika
Mohd Ayaz Anwari	Head of Agriculture department, Paktya
Abdul Wahab	Head of Extension department, Paktya
Abdul Rahman	Extension worker, agriculture department, Paktya

Team 2

Sayed Azizullah Achimi	Head of Agriculture department, Balkh
Ghulam Muhaiuddin Haideri	Head of seeds distribution, Balkh
Mohammad Tayeb	Head of Extension department, Balkh
Abdul Rashid	New Head of Agriculture department, Jawzjan
M. Ussuf Khoramwal	Previous Head of Agriculture department, Jawzjan
Abdul Ghaffar	Head Land management department, Jawzjan
Abed	Extension department, Jawzjan
Sadri	Head of Agriculture department, Sari Pul
Khoja Abdul Ghani	Head of land Management Department, Sari Pul
Sayyed Nassir	W/H Manager, Sari Pul
Abdul Sattar Barez	New Head Agriculture Department, Faryab
Abdul Moqim Rosegh	Head Planning department, Faryab
Eng. Ammanullah	Head extension department, Faryab
Abdul Rahim	Agriculture extension department, Badghis
Abdul Ghaffur	Head district agriculture department, Shindand, Herat
Abdul Bassir	Communication department district administration, Shindand, Herat
Ghulam Nabi Qarie	Head of Agriculture department, Herat
Ziahuddin	Head of Planning Department, Herat
Mohammad Ghulam Daoud	Head of Extension Department, Herat
Tazagul Tali	Head of extension department, Farah

Team 3

Alahuddin	Deputy Head of Agriculture department, Baghlan
Mohammad Qasem	Extension officer, agriculture department, Baghlan
Shah Israel	Head of Agriculture department, Samangan
Sayed Abdul Samad	Extension officer, agriculture department, Samangan
Sayed Azam	Head of Agriculture department, Kunduz
Haji Md. Ibrahim	Deputy Head of Agriculture department, Kunduz
Khan Agha	Extension officer, Agriculture department, Kunduz
Kamardin Khan	Extension officer, Agriculture department, Kunduz
Abdul Shukur	Head of district Agriculture department, Imam Sahib, Kunduz
Ghulam Abas	Deputy Head of Agriculture Department, Imam Sahib, Kunduz
Abdul Khaled	Extension officer, Agriculture Department, Imam Sahib, Kunduz
Faiz Mohammad Khan	Head agriculture department, Takhar
Mohammad Sabir Khan	Fertilizer program, Agriculture department, Takhar

Team 4

Mullawi Sadulla	Head of Agriculture department, Badakhshan
Noor Mohamed	Head of crop protection department, Fayzabad
Tayeb	RRD department, Fayzabad
Mohamad Assaf	Head agriculture department, Parwan
Mohammad Hassib	Extension officer, Agriculture department, Parwan
Sher Mahmoud Wali	Head agriculture department, Logar
Gulakat Alawi	Head agriculture department, Wardak
Mohammad Sharif	Extension officer, Agriculture department, Wardak

ANNEX III – MISSION ITINERARY AND DISTRICTS COVERED BY THE SURVEY

Team 1

Date	Location
11 May	Drive to Jalalabad from Kabul
12 May	Kunar province; Norgal, Chawki, Narang, Assadabad districts
13 May	Kunar province; Pusht Sar Kanai, Khas Kunar districts
14 May	Nangarhar province; Kama, Behsood, Batikoot districts
15 May	Nangarhar province; Shinwar, Dara-e-Noor, Sorkhrood districts
16 May	Nangarhar province; Jalalabad district, drive to Kabul
17 May	Drive to Ghazni Ghazni province; Moqur district
18 May	Ghazni province; Moqur district, drive to Kandahar
19 May	Helmand province; Nad Ali, Marja districts
20 May	Helmand province; Nawa Barakzai, Garmser districts
21 May	Helmand province; Gireshk, Musa Qala districts
22 May	Helmand province; Kajaki, Sangin, Nahri Saraj districts
23 May	Kandahar province; Maiwand, Panwayee, Arghandab districts and Band-e Dahla
24 May	Kandahar province; Arghistan district Zabul province; Tarnak district
25 May	Kandahar province; Daman district
26 May	Zabul province; Arghandab, Mizan districts
27 May	Zabul province; Qalat, Shinkai districts
28 May	Zabul province; Shah Jui district
29 May	Ghazni province; Qara Bagh, Ghazni center districts
30 May	Ghazni province; Andar district and Band Sardeh
31 May	Paktika province; Khaikot, Sharan districts
1 June	Paktika province; Urgoon district
2 June	Paktika province; Zilok district
3 June	Khost province; Khost (Matun), Tani districts
4 June	Khost province; Khost (Matun) district Paktya province; Gardez district
5 June	Paktya province; Gardez, Zormat districts
6 June	Paktya province; Gardez district, drive to Kabul

Team 2

Date	Location
11 May	Drive Kabul Pul-i Khumri, night Pul-i Khumri
12 May	Balkh province; Khulm and Deh Dadi districts
13 May	Balkh province; Dawlatabad, Balkh and Deh Dadi (rain-fed area) districts
14 May	Balkh province; Sholgara and Kishindi districts
15 May	Jawzjan province; Sheberghan and Khawaja Du Koh districts
16 May	Jawzjan province; Aqcha, Mingajik and Mordian districts
17 May	Sari Pul province; Sari Pul, Sozma Qala
18 May	Sari Pul province; Sayad district Jawzjan province; Dasht-e Laili Faryab province; Dasth-e Laili, and Dawlatabad districts
19 May	Faryab province; Maimana and Pashtun Kot districts
20 May	Faryab province; Almar and Qaisar districts
21 May	Faryab province; Qaisar district Badghis province; Ghormach district

22 May	Badghis province; Bala Murghab and Qadis districts
23 May	Badghis province; Qala-e Naw, Qadis and Kushk-e Kuna districts
24 May	Badghis province; Kushk-e Kuna district Herat province; Kushk-e Robat Sangi district
25 May	Herat
26 May	Herat province; Adraskan, Shindand districts Farah province; Bala Buluk district
27 May	Farah province; Qalah-e Kah, Pusht Rod districts
28 May	Farah province; Lash wa Juweyn district
29 May	Herat
30 May	Herat province; Injil and Guzara districts
31 May	Herat province; Kohsan, Ghoryan and Zinda Jan districts
1 June	Herat province; Pashun Zarghun, Obey, Cheshti Sharif districts
2 June	Ghor province; Shahrak, Chaghcharan districts
3 June	Ghor province; Chackcharan, Lal wa Sarjangal districts
4 June	Bamyan province; Yakaolang district
5 June	Bamyan province; Bamyan, Shibar districts Arrival to Kabul

Team 3

Date	Location
11 May	Drive Kabul Pul-i Khumri, night Pul-i Khumri
12 May	Baghlan province; Andarab, Khinjan, Doshi, Pul-e Khumri districts (from Andarab up to the end of the Dasht-i-Khelogay
13 May	Baghlan province; Dahaneh Ghori (across the Dasht-i-Gavarghan plain and into the rain-fed Dahaneh Ghori hills), Pul-i-Khumri, Baghlan-e Khona, Baghlani Jadid districts
14 May	Baghlan province; Pul-i-Khumri (Cheshme Shur and Dasht-i-Khwaja Alwand) Samangan province; Khuram was Sarbagh (Dasht Baba Kambar) and Aybak districts
15 May	Samangan province; Aybak and Dara-i Suf (Dasht-e Panj Qaria) districts
16 May	Samangan province; Firouz Naqshar, Hazrat Sultan districts Balkh province: Khulm district
17 May	Samangan province; Aybak, Hazrat Sultan districts Drove across the deserts of Dasht-i-Avdan, Dasht-i-Shorebird, Dasht i Khayrabad to Kunduz via Ergonoq pass Kunduz province; Chahar Dara and Kunduz district
18 May	Kunduz province; Aliabad (incl. Dasht-i-Kandari) and Kunduz districts
19 May	Kunduz province; Imam Sultan district across the Dasht I Alchin
20 May	Kunduz province; Khanabad Takhar province; Bangi and Taluqan districts. Afternoon Fakhar district-visited by Fitzherbert and Khwaja Ghar district visited by Javier Escobedo
21 May	Anthony Fitzherbert; drive to Fayzabad

Between May 22nd to 25th Anthony Fitzherbert worked in Badakhshan under EC contract. Qualitative observations on crops in Badakhshan were made during that period and provided to the NCOA.

Team 4

Date	Location
13 May	Flight to Fayzabad
14 May	Badakhshan province; Fayzabad district
15 May	Badakhshan province; Fayzabad district
16 May	Badakhshan province; Baharak, Jurm districts
17 May	Badakhshan province; Fayzabad, Kishim districts
18 May	Takhar province; Kalafgan district Kunduz province; Khanabad district
19 May	Joint Anthony Fitzherbert team in Kunduz and worked in Imam Sahib district
20 May	Kunduz province; Khanabad Takhar province; Bangi and Taluqan districts. Afternoon Fakhar district-visited by Fitzherbert and Khwaja Ghar district visited by Javier Escobedo
21 May	Takhar province ; Taluqan district
28 May	Parwan province; Bagram, Kohi Safi districts
29 May	Parwan province; Charikar, Jabul Seraj
30 May	Parwan province; Ghorband and Shinwari districts
31 May	Wardak province; Nirkh, Maydan Shahr districts Kabul province; Paghman district
1 June	Logar province; Baraki Barak, Kulangar, Mohammad Agha districts
2 June	
3 June	Laghman province; Metherlam, Alinigar districts
4 June	Laghman province; Metherlam, Alishing districts
5 June	Laghman province; Qarghayee districts