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REBUILDING AGRICULTURAL MARKETS PROGRAM NANGARHAR EMERGENCY WHEAT PACKAGE REPORT

JUNE 2006

REBUILDING AGRICULTURAL MARKETS PROGRAM (RAMP)

RAMP Impact Assessment # 6
Nangarhar Emergency Wheat Package

Submitted by:

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Nangarhar Emergency Wheat Package

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1. Background to the Assessment

Nangarhar has a total rural population of 1,243,000, of which 45% consumed less than 2,100 kcal/capita/day in 2005 – up by 24% compared to 2004. Most farmers are food deficit for 1.9 months in a year (FAO, 2004).[1] The drought that persisted for long has reduced the water table with detrimental effects on food security and economic development. In recent months, there has been a concerted effort by the Government and donor agencies to eradicate poppy cultivation and processing from the province. UNODC estimates a "significant" reduction in poppy area in Nangarhar province in 2005.

Responding to a request by the Governor of Nangarhar Province for assistance to encourage farmers to cultivate licit crops in lieu of illicit crops (opium poppy), the US Mission to Afghanistan launched an emergency wheat seed and fertilizer distribution campaign in December 2004. As part of this effort, the U.S. Department of Agriculture (USDA) organized the purchase and delivery of approximately 450 metric tons of Inqilab 91 wheat seed variety from Pakistan and a further 40 metric ton Roshan 96, Amu and Mazar varieties from the Northern region of Afghanistan. The smallholder farming sector also received 490 metric tons of DAP, 978 metric tons of urea and related services under the emergency Project for the 2005 cropping season. The Project is expected to increase the productivity of wheat from 19,574 jeribs of land (one jerib = one-fifth of a hectare). It was also expected to enhance food security and self sufficiency ultimately inducing farmers to disengage from cropping illicit crops. Under the Project RAMP was responsible for the procurement of improved seeds and fertilisers, and for transporting these inputs to identified distribution centres throughout the province. To more effectively and efficiently organize and manage the implementation process, RAMP/Chemonics sub-contracted the distribution work to a number of implementing partners (Table 1). The identification of beneficiaries was left to local shura (traditional leadership). A survey was launched in June to assess the impact of this wheat seed-fertiliser package on agricultural output in Nangarhar province. The project is also assessed for relevance and efficiency.

Table 1: Quantities of Inputs Disbursed in Metric Tons

Implementing Partner	Seed	DAP	Urea
RI	269.8	269.8	539.6
ICARDA	43	43	86
RDRO	42.5	42.5	85
GAA	39	39	78
STAAR	32.2	32.2	64.4
RSSA	21	21	41
IFHOPE	42	42	84
TOTAL (MT)	**489.5**	**489.5**	**978**

2. Assessment Methodology

To assess the extent and impact of the inputs on wheat productivity, and the effects of the Project on technological adoption evaluation data be collected from all the 23 target districts. But this would be too expensive and time consuming. The physical diversity enabled the assessment to classify the target districts into two major categories: those with "high" poppy density and those with 'low" poppy density. Based on UNODC census survey, high density poppy district accounts for 5% or more of the total provincial poppy area in 2004; a low density has less than 4% share.

[1] FAO/WFP "Crop and Food Supply Assessment Mission to Afghanistan", Special Report, 8 September.

From the high density category, 4 districts and from the low density 5 districts were selected randomly (roughly about 39% of the total number of districts). The major reason for this spatial focus is to capture the geographic variations, peculiarities and problems. The technique was necessary because it permits to cover all the communities that benefited from the project.

The potential target population of the package Project beneficiaries is estimated to be some 19,574 farmers. However, available resources could not permit to contact the whole target population. A numerically manageable spatial domain, covering only nine (9) districts with a total sample size of some 157 smallholder farmers, was chosen. Table 2 shows the distribution of the evaluation sample by district and by the density of poppy. Depending on the size of the district, a minimum of 6 and a maximum of 36 farmers were interviewed. This was also done to generate a proportionate numerical representation of the districts.

Table 2: Sample Size by District (N = 157)

High Density Districts	**Sample Size**	**Low Density Districts**	**Sample Size**
Bati Kot	12	Lalpur	17
Surkh Rod	36	Hisrak	9
Khogyani	17	Dih Bala	35
Rodat	6	Achin	11
		Spinghar	14
Total	**71**		**86**

Simple random sampling technique was used to select the 157 farmers interviewed. This technique was used to allow each individual member of the selected districts' farming population an equal (non-zero) chance of being included in the final sample. This made the sample fairly representative of the parent population, thus permitting the making of reasonably valid and reliable generalisations with a measurable amount of confidence.

The timing of information gathering was planned to cover the period immediately after the harvesting season when farmers' memories on the crop output are still vivid. Hence the data collection was implemented in early July. The major data collection method used was the 'questionnaire'. The questionnaire was translated to Dari and implemented by a pool of surveyors from the IPs and the MOAF in the province. The data were entered in spreadsheet, cleaned and some basic descriptive statistics were calculated.

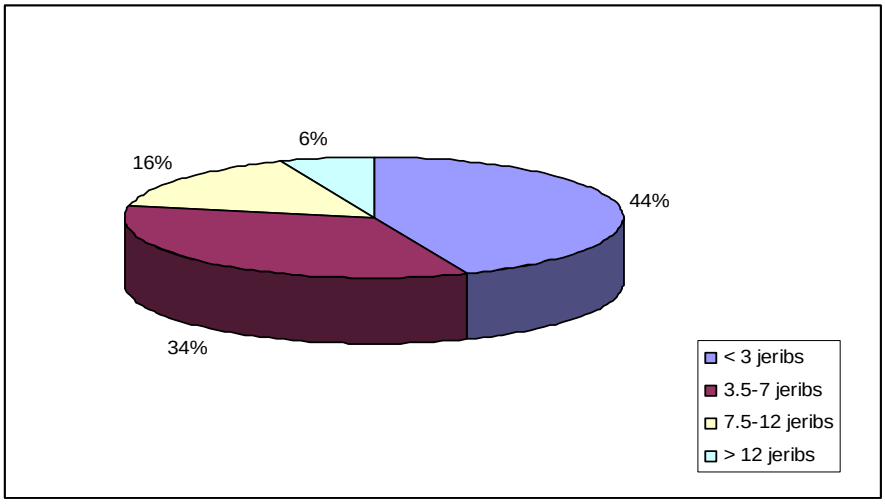
3. Findings of the Assessment

3.1 A General Profile of Project Beneficiaries

Implicit in the wheat package Project is the objective of assisting smallholder farmers to gain a degree of self-sufficiency in wheat production. This made all the estimated 1,2 million smallholder farmers eligible for the inputs under the Project. The distribution of the inputs therefore covered the whole spectrum of the smallholder farmers. In a workshop in Nangarhar, some IPs felt that the Project should have been directed to resource poor smallholder farmers only and not to everybody. A second view held that the Project is rightly open to resource rich farmers as well, because they can make optimal use of the donated inputs. Needless to say the package Project was open to every farmer, irrespective of his status in the smallholder sector. A frequency distribution of the farmers who have taken the package (Table 3) and Figure 1 reveal that about 75% of the smallholder farmers till between 1 and 7 jeribs, with an overwhelming majority (44%) operating under 3 jeribs

of wheat area; 34% cultivated 3.5 to 7 jeribs. It is also noted that only four farmers in the sample operated over 21 jeribs, of which 1 farmer operated 60 jeribs.

Figure 1. Proportion of Framers Operating Wheat Area



If this is a reflection of the structure of the whole smallholder agricultural sector in Nangarhar, it has certain implications for technology adoption. The size of operated land among farmers is often regarded as important in the adoption of new farming technologies. The small arable lands constrain them from enterprise diversification because they cannot afford to experiment with new

Table 3: Wheat Land Distribution in Nangarhar

Arable land ownership range (Jeribs)	No of farmers	Percentage
Less than 1	24	16.0
Between 1.5 and 2	18	12.0
Between 2.5 and 3	24	16.0
Between 3.5 and 4	14	9.3
Between 4.5 and 5	21	14.0
Between 5.5 and 7	16	10.7
Between 7.5 and 9	12	8.0
Between 9.5 and 12	12	8.0
Between 12.5 and 20	5	3.3
Between 21 and 35	3	2.0
Above 35.5	1	0.7
Total	**150**	**100**

innovations lest they fail. As a result, the impact of a package Project cannot be easily assessed as one of the factors of production is in short supply. The discussion in section 6 reveals that one of the reasons that farmers have given for not sowing the seed they received was that their operational holding was too small and that they had already planted the tiny plots they cultivate before the package was distributed to them.

4. Impact of the Inputs on Wheat Productivity

The wheat package project was intended to encourage smallholder farmers to increase their agricultural productivity through the adoption of improved seed and fertilizer backed by extension service provided by both the MOAF and IPs. The importance of improving productivity cannot be over-emphasized in the Afghan economy which is agriculturally based. It is therefore crucial for the evaluation to assess the impact of the project inputs on productivity. To do this the evaluation had to investigate productivity per unit land in relation to other best practices and farmers' technology to see if there has been any evidence of real expansion in output. Productivity in this evaluation is understood to refer to discernible increases, in absolute terms, in expansion of yields per unit land.

Table 4: Comparison of Package Yield with Last Year Yield

	Package Yield	Last Year Yield
Mean Yield (Seers/Jerib)	67.7	80.5
Standard Deviation	19.22	22.67
F-Statistics	0.718 (not significant)	
Number of Observations	107	

When asked if the harvest was better this year compared to what they obtained the previous year, some 54 percent of the farmers who answered the question reported that the crop pack inputs have been of immense benefit to them, while the remaining 46 percent responded in the negative (N=144). To critically examine what this benefit actually means in terms of increased productivity, the number of observations was standardized and the package yield compared with the yield from last year. A summary statistics shown in Table 4 indicates that the mean yield from the package was less by 19% compared to the yield that farmers have achieved last year. The yield difference is not statistically significant, but the fact that the package faired less satisfactorily compared to the technology that farmers are aware of raises questions about the suitability of the package introduced.

Table 5: Comparison of Yield for Response Categories

	Package harvest		Last year harvest	
	Better	Not Better	Better	Not Better
Mean Yield (seers/jerib)	71.3	64.6	85.1	70.9
Standard Deviation	12.0	22.9	22.74	19.3
Number of Observations	46	59	71	36
F-statistics	3.64 (significant at 95%)		1.39 (not significant)	

Some interesting results also emerged when the yield of farmers who said the yield from the package was better than the yield they obtained last year (Table 5). First, the mean yield for those farmers who said their harvest from the package was better than last year have obtained essentially the same yield, about 71 seers/jerib (note that the mean yield in Table 5 is different from that in Table 4 because of the number of observations). Second, those who said the package yield was not better have obtained 65 seers/jerib from the package compared to 85 seers/jerib they obtained last year. Statistical test indicates that there was a significant difference (95% probability level) in the mean yield of those farmers who said their yield from the package was better as against those who reported to the contrary. There was no significant difference in the mean yield from last year's crop.

Many factors explain why such a large number of farmers felt that the package yield was not particularly great. Most of these farmers explained that the inputs have been distributed late in the

farming season and others said that the quality of the seed was not good. A few others also explained that the inputs were inappropriate for their requirements and conditions. The inputs did not help those tilling small plots, because they had insufficient arable land for the additional seeds and fertilisers.

Farmers were also asked whether the inputs from the project had increased their wheat yields above the technology that they are familiar with. To assess this, the package yield was compared in Table 6 with yield from local seed varieties and other types of improved varieties that farmers planted in 2005. The result indicates that the package wheat gives better yield than local varieties (significant at 95% probability level) but faired poorly compared to other improved seed varieties that are known to farmers. The package seed gave 80 seers per jerib while other improved varieties gave 89 seers per jerib. Many improved wheat varieties, including Roshan 96, are believed to give higher yields than the package varieties. But because the package seed was adulterated with Inqilab 91, an inferior seed variety, the average yield from the package was depressed to below the farmer technology.

Table 6: Comparison of Wheat Yields

	Package Varieties	Local Varieties	Improved Varieties
Mean Yield (Seers/Jerib)	77.9	72.4	89.1
Variance	298.9	314.2	489.4
Standard Deviation	17.3	17.7	22.1
Number of Observations	151	115	93
F-statistics	Package vs Local = 0.95 (Significant at 95%) Package vs Improved = 0.61 (Not Significant)		

It can be argued that the availability of free inputs to those farmers, who might have been short of income to procure the necessary inputs, can only but improve their capacity in expanding their crop acreage and increasing their yields. The data also show that the package inputs have given better productivity than the local varieties. Unfortunately this can not be said about those farmers growing other “improved” varieties. Although statistically not significant, it would seem that the package did not improve wheat output to those farmers growing other varieties of improved wheat seed. The project in this case subsidised the variable cost components to these farmers rather than improving their output over and above the technology that they knew about. Not withstanding other factors that impinge on productivity - such as irrigation, agronomic practices, timing of the inputs, etc – this low package yield is due to the introduction of poorly adapted and degenerated seed varieties. The package seed was also very much susceptible to rust. Owing to heavy and untimely rains this year, wheat production in Nangarhar has suffered badly from rust.

5. Effects of the Project on Technological Adoption

Another implicit objective of the package Project is that it exposes farmers to new technologies. Before examining the evidence of farmers' adoption, it is important to discuss the scope of the Project, whether it is widespread among selected respondents. Table 7 shows that, a high percentage, 97%, of the seed and fertilizer procured was distributed by the shura.

Table 7: Distribution of Inputs

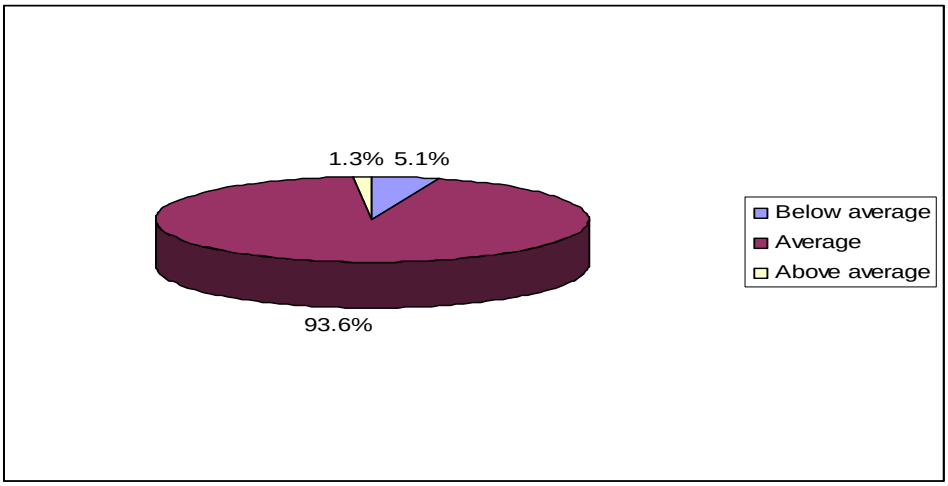
	Distribution (survey)	Extrapolation	Percentage
Seed (Mt)	3.83	477.9	97.5
Urea (Mt)	7.62	950.4	97.1
DAP (Mt)	3.82	475.8	971.

Table 8 and Figure 4 show that on the average each farmer received 3.5 seers of seed, 49 seers of urea and 24 seers of DAP. This is just about the same rate as that initially planned for distribution. However, with a maximum of 7 and a minimum of 0.29 seers per farmer, there was some inequality in the actual amount of inputs distributed. While most farmers received the mean ratio (about 94% of farmers), 5% received less than the average, and just over 1% received twice more than the average. These discrepancies apart, it is reasonable to state that the distribution was fairly flat, benefiting a large number of farmers.

Table 8: Average Quantity of Inputs Received by a Farmer

	Seed	Urea	DAP
Mean (seers)	3.49	48.35	24.31
Standard deviation	0.67	8.64	4.3
Maximum	7	100	50
Minimum	0.29	4	2
Total	547.6	7,623	3,816.5
Number of Beneficiaries	157	157	157

Figure 4: Proportion of Farmers Receiving Inputs



5.1 Evidence of Adoption of the Package

Some 93 percent of the targeted beneficiaries farmers used the seed distributed to them by the shura. A slightly fewer number of farmers, 91%, used the urea and DAP they received (Table 9). About 5% of the farmers interviewed said they have kept the seed for next year planting. Overall, however, a significant number of farmers have used the inputs, even though they were distributed late for the annual planting season.

Table 9. Input Use

	Survey	**Extrapolation**	**Percentage**
Seed (Mt)	3.65	455.17	92.9
Urea (Mt)	7.14	890.43	90.9
DAP (Mt)	3.58	446.77	91.2

5.2 Area Planted and Output

The survey found that the area planted with wheat ranges from 0.05 to 2 jeribs. In total, 141 jeribs of land, about 0.96 jeribs per farmer, were planted with the seed by the sample farmers (Table 10). Extrapolated to the province, the total area planted would be 17,529 jeribs, about 90% of the total planned area. This is slightly less than what was budgeted for. Amongst those who planted the seed, 81% said they have planted it on the same land; 20% said they planted on other plots. This may be regarded as an additional land planted with the seed distributed, and this would roughly be about 2,000 jeribs. Farmers who did not plant the seed have given various reasons, including a) the seed was not known locally (26%); b) had already planted their land – that is, no more land available (30%); c) sharecroppers – that is, landlords decided what to do (22%); d) the planting season had passed (19%); and e) lack of irrigation water (4%).

The normal planting season in Nangarhar is between mid-October and November. In the colder areas, wheat is planted around mid-October; in the warmer areas, planting takes place in November. The package seed was distributed rather late, so all the planting was done in the third and fourth weeks of December. Consequently, the harvest was collected a month or so delayed than usual, in May (46%), June (53%) and April (1%). This also explains the low yield realized from the package.

The total production of 9,886Mt wheat is 12% less than the expected output target, and this is due to many factors pointed out above, including area which was not planted. On the other hand, the mean yield of 2.8Mt/Ha is slightly above the average of 2.2Mt/Ha for the province as reported by FAO. It is also comparable to the national average but quite low for a package of improved technology. It is quite low compared to 4.4Mt/Ha obtained from RAMP demonstration fields in the province.

Table 10. Area Planted and Output

	Area (Jeribs)	Output (Seers)	Derived Yield (Seers)
Mean	0.96	76.1	78.1
Standard Deviation	0.20	25.8	17.7
Maximum	2.0	230.0	4.5
Minimum	0.05	2.5	40
Total for Survey	140.6	79.26	2.86Mt/Ha
Extrapolation to Province	17,529.3	9,885.8	2.82Mt/Ha

One of the major objectives of the project was to encourage farmers to grow wheat rather than poppy. A comparison of the high and low density poppy districts was made to see for differences in production parameters. As summarized in Table 11, the average wheat yield in the high density districts was 86.19 kg/ jerib compared to 75.16 kg/jerib for the low poppy density districts. A yield gap of 11.03 seers per jerib (386kg/Ha) between the two production areas is quite substantial for a smallholder farmer. Implicitly, it suggests that farmers in the high poppy density districts are able to allocate relatively more wheat growing land to poppy and still meet their food requirement because of better wheat yield per unit land. Provision of free improved seed and fertilizer simply strengthens the hands of poppy growing farmers' vis-à-vis area allocation. This is not to say that access to fertilizer has enabled farmers to shift the input to growing poppy. On technical grounds there is little room for farmers to actually divert fertiliser to poppy, because the ratio of fertiliser to seed is optimal as recommended by specialists with no surplus fertiliser available for poppy. Unless farmers forego planting wheat, the improved seed has to be accompanied by a requisite quantity of fertilizer in order to get the optimum output per unit land. Moreover, illicit drug cultivation is tackled in the province through a combination of measures - crop substitutes, law enforcement, etc.

Table 11. High and Low Poppy Density Districts Compared

	Area (jeribs)	Production (seers)	Average Yield (seers)
Low Density	71.6	5,380.5	75.16
High Density	69.0	5,947.0	86.19

Total impact from the emergency wheat seed distribution can be related to provincial output data. That is, the total wheat grain output of 9,885.8Mt is produced by about 18,000 farm families, and this is equal to 16% of the total wheat produced from Nangarhar province in 2004. It meets the annual per capita wheat requirement of 61,786 persons – that is, about 11% of the provincial population consuming less than 2,100 kcal/capita/day. The Project has managed to enable a large proportion of food deficit households to produce more wheat, possibly circumventing the need for food aid. The total output value is US$ 2M, including the output value of straw (Table 12).

Table 12: Estimated Gross Output Value

	Output	Value US$
Wheat Grain	9,885.8Mt	1,882,952.0 (@0.19$/kg)
Wheat Straw	2,308.4Mt	137,402.2 (@0.059$/kg)
Total	12,194.2 Mt	2,020,354.2

6. The Efficiency of the Project

This section examines the efficiency of the project in input targeting, management and distribution. At the workshop in Jalalabad with representatives from the IPs and extension workers, a number of important issues were raised regarding the efficiency of the package Project. These issues include the following:

i. how timely was the delivery of inputs?
ii. how appropriate were the inputs?
iii. how sufficient were the inputs?
iv. have farmers been consulted with regard to selection of the inputs?

These are all pertinent questions that influence the outcome of any similar project. Matters of input targeting, management and distribution are as important as their availability. If there is poor targeting, if the seeds are inappropriate, if there is poor timing, it is likely that the project will suffer in attaining its objective. What is ideal is that the inputs be appropriate, adequate, well timed and targeted to the needy. Some comments raised at the workshop are highlight below.

The extent to which the strategy is viable and sustainable: concern was raised that the package Project has distracted "development organizations" in the province from attending long-term development needs of farmers. Long-term development needs, such as water for irrigation development, rural road infrastructural development, development of marketing facilities, etc., remain critical areas of intervention. It was also noted that farmers have generally come to expect aid agencies to provide them with seed and fertiliser next season, and this dependency attitude can stifle individual initiative among some farmers. It was also noted that a large-scale subsidy on inputs can have a perverse effect on the seed sector by dampening the market and acting as a disincentive to innovative farmers. A healthy seed industry is one in which farmers pay competitive prices for the inputs.

Considering the prevailing situation in Afghanistan, however, agriculture production cannot be increased while a significant proportion of the population is "seed deficit" and lacks the resources to purchase inputs. In this respect, the strategy of subsidising farmers with inputs is appropriate as it can increase licit crop production and probably induce reduce their dependence on illicit crop production. .

Timing of the distribution: Generally the package was not distributed to farmers immediately after it reached distribution points or did not arrive early with negative effects on yields. The inputs were distributed after the planting season was well in progress. Consequently, almost all those planted the seed did so in late December, some two weeks after the normal planting date. If agricultural inputs are to be useful to farmers, it is necessary that these be timely delivered. The inputs should be given to farmers well in advance of the planting season. In areas where the planting season is short, and where rainfall is not predictable, this becomes even more important. When seeds and fertilisers are promptly delivered, it allows farmers to take advantage of the early rainfall.

The effectiveness of input targeting: Comments were also made on the selection of beneficiaries. It was stated that distribution committees (shura) did not in the main target the needy as sole beneficiaries. The distribution committees devised their own selection criteria and broadened the recipient base, probably because of possible conflict in the communities. It was stated that though the inputs were a welcome supplement to all categories of farmers, some of the farmers who received them are well off and in a position to acquire their own requirements on the market, while others had no use for them.

Appropriateness of the Inputs: For any crop project to be beneficial it must be appropriate. The seeds advanced to the farmer must be suited to the environment. The seeds must be high yielding, given the farmer knowledge. Clearly, the choice of Roshan 96 seed from within the country is appropriate as it is the best seed variety adapted to the Afghan environment. But the other variety, Inqilab 91 imported from Pakistan, is 14 years old and overtime it has lost its yield potential. Even under irrigated condition, the average yield from Inqilab 91 is much lower than from Roshan 96. Moreover, both Roshan 96 and Inqilab 91 are susceptible to rust, more so the latter. Consequently, the average yield per jerib from the package was lower than the average yield which farmers were able to get if they were able to plant Roshan 96 alone.

Quantities of Inputs*:* The quantities of inputs given to the farmer are crucial in determining his harvest levels. When a farmer is given small quantities of seeds, his output is generally insignificant. Conversely, where inputs are of a substantial amount, the farmer realizes significant outputs, all things being equal. The assessment found out that while nearly everybody targeted by the project received the inputs, the shares were rather unequal. There were cases where some farmers received twice as much as the average of 25 seers of seed and requisite quantity of fertiliser. But these were the exception rather than the rule. Most farmers have received the average figure.

Impact on Poppy: The package was not meant to be a mechanism through which farmers make comparable gains to poppy. Its main function has been to assist farmers to grow more wheat. The project was also not meant to substitute individual initiative with that of aid. For this reason, the inputs distributed were small and the quantity/farmer was adequate for one jerib only. Considering this it would be unrealistic to expect farmers to switch from poppy to wheat even if the inputs were given free. To encourage farmers grow more licit crops input amounts must exceed the current levels so that productivity of wheat and other crops can match productivity levels achieved from demonstration fields. This means doubling wheat productivity over the current level – a formidable challenge.

7. Conclusion

Notwithstanding the comments, the Project has been effective in increasing wheat production, particularly of those farmers cultivating small fields. Although there is a portion of farmers who regarded their yield low, it is clear that the Project has increased aggregate wheat output from the province, exposed some sections of resource poor farmers to new technologies while enhancing the knowledge of others regarding new technologies. It has assisted a significant number of smallholder farmers to achieve food security and self sufficiency. But it is not readily obvious if the project has induced poppy growing farmers to grow wheat rather than poppy. The dependence on poppy is such that smallholder farmers require continuous assistance to ensure food self sufficiency before they begin to disengage from illicit crop production.