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# ASAP Economic Impact Study

## Wheat Seed and Fertilizer Distribution in Balkh A. year 2008/2009



The ASAP monitoring team collects wheat samples from a field in Ghanomay Village, Shulgara, Balkh.

**September 15, 2009**

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AFGHANISTAN STANDARD MAP



### ASAP Mission Statement

ASAP's main objective is to accelerate broad-based, market-led agriculture development capable of responding and adapting to market forces in ways that provide new economic opportunities for rural Afghans. To accomplish this objective, ASAP is focused on accelerating sales of high-value commodities and improving the capacity of the Government of Afghanistan, specifically the Ministry of Agriculture, Irrigation and Livestock (MAIL), to formulate agriculture sector policies and strategies, and to carry-out the administrative and financial functions needed to support more competitive, market-led agricultural production.

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## EXECUTIVE SUMMARY

Afghanistan has suffered multiple years of drought from 2005 to 2008. National wheat production was insufficient to meet the needs of the population and wheat seed stock was being consumed by farmers as food. In effect, the price of wheat during this period went up (about twice than this year's price). The country was faced with serious food security problem, malnutrition widespread and the economy was in terrible shape.

To ameliorate farmers' plight caused by successive years of drought, USAID, through ASAP, distributed before winter of 2008 1,000 MT of irrigated and rain-fed certified wheat seeds and 1,600 MT of fertilizer to 20,000 farmers in six selected districts of Balkh province.

The seeds and fertilizer were given at discounted price, with USAID paying 85% of the cost and the beneficiary shouldering the remaining 15%. ASAP with CARE International and International Relief and Development (IRD) distributed wheat seeds and fertilizer. AgDepots also participated in this distribution.

In June 2009, ASAP's Monitoring and Evaluation Unit conducted an impact study on the seed distribution program. The study sought to measure wheat production of farmer-beneficiaries and find out beneficiaries' opinion about the program.

The study involved 247 farmers from 75 villages of Khulm, Marmol, Charkent, Shulgara, Kishindeh and Zari districts in the Balkh province.

To measure the production of wheat at family level, two samples, each measuring 1 m<sup>2</sup> with wheat ready to harvest, were taken from each family-owned farm. The produce in these plots were harvested and measured.

Results of the study show that the wheat seed and fertilizer program in Balk province achieved 100 per cent of the objective, with the intended 20,000 family beneficiaries receiving their pre-determined share of wheat seed and fertilizer. A total land area of 5,200 hectares was planted. This intervention helped to produce 11,753 MT of wheat, generating a total valued of US\$ 4 million (Afs 200 million).

The average gross income per family due to wheat distribution was around US \$ 200 (10,000 Afg). This value was derived by multiplying the total average yield by area cultivated per family, and finally multiplied by the market price of US \$ 340 MT (market price is based on MAIL's agricultural Commodity Price Bulletin, year 5; volume IV).

When interviewed, most farmers said that this wheat harvest will be used primarily for domestic consumption, some for stock seed, and the rest for selling.

## WHEAT SEED AND FERTILIZER DISTRIBUTION IN BALKH PROVINCE

### Introduction

Afghanistan suffered from severe drought in 2008 starting a few years before this. USAID implemented a wheat and fertilizer distribution program to recuperate the wheat production, since wheat is a staple food in Afghanistan.

The program involved distribution of 1,000 MT of irrigated and rain-fed certified wheat seeds and 1,600 MT of fertilizer to 20,000 farmers in six selected districts of Balkh province. The distribution took place before winter of 2008.

The total subsidy package included:

- 300 MT of certified Irrigated Wheat Seed
- 700 MT of certified Rain-fed Wheat Seed
- 1,000 MT of DAP 18-46-0 (Di-Ammonium Phosphate (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>) and
- 600 MT of Urea 46-0-0 (H<sub>2</sub>N-CO-NH<sub>2</sub>)

ASAP's MFI team partnered with CARE International and International Relief & Development (IRD) for distribution. Through a *voucher* program, beneficiaries availed of wheat seed and fertilizer at 85% discount. USAID shouldered 85% of the cost and beneficiaries paid the remaining 15%. This system involved distribution of vouchers to predetermined families, which entitled them to purchase the abovementioned inputs at AgDepots, or agricultural stores promoted by ASAP.

Farmers with irrigated lands (30% of the voucher recipients) received a package of inputs sufficient to cultivate 0.4 ha of land. This includes 50 Kg of different varieties of Wheat Seeds (Amu-99, Mazar-99, Herat-99, PBW-154 and/or MH-97), 50Kg of DAP and 100 Kg of Urea. The estimated cost of this package was \$181 of which farmers paid \$27 or Afs 1,360 (15% of the cost).

Farmers tilling rain-fed land (70% of the voucher recipients) received a package of inputs that included 50Kg wheat seed from one of these varieties: Ghorri 96, Lalmi 1, Lalmi 2 and Lalmi 3, and 50Kg of DAP 18-46-0 (Di-Ammonium Phosphate (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>). This package, designed to cultivate 0.4 ha of land, cost approximately \$138. Recipients paid \$20 per package (Afs 1,050), or 15% of the cost.

The MFI team was faced with the challenge of distributing the inputs as quickly as possible because the shipment arrived late and winter was soon approaching.

### Objective of the study

The study aimed to measure the production, incremental yield, gross income and number of families benefited from the seeds and fertilizer distribution in Balkh province.

## Methodology of study

ASAP conducted an Economic Impact Study through a survey of 247 families that received wheat seed and fertilizer.

**Table 1: Sample size by district**

| Serial # | District  | Families benefited |            | Sample collected |        |
|----------|-----------|--------------------|------------|------------------|--------|
|          |           | Total families     | % families | samples          | %age   |
| 1        | Shulgara  | 4,861              | 24.3%      | 97               | 39.3%  |
| 2        | Kishindeh | 3,284              | 16.4%      | 6                | 2.4%   |
| 3        | Khulm     | 3,685              | 18.4%      | 17               | 6.9%   |
| 4        | Marmol    | 1,066              | 5.3%       | 2                | 0.8%   |
| 5        | Zari      | 4,350              | 21.8%      | 123              | 49.8%  |
| 6        | Charkent  | 2,754              | 13.8%      | 2                | 0.8%   |
| Total    | 6         | 20,000             | 100.0%     | 247              | 100.0% |

The methodology involved actual measurement of yield of 494 samples, each sample measuring 1 m<sup>2</sup>, and extrapolated to one hectare of a farmer's wheat field in order to get the average yield of the total 5,200 hectares planted. Farmer-beneficiaries were also interviewed about the benefits and challenges of the program. Details of sampling and interviews are presented in appendix A.

The sample areas covered 75 villages spread around six districts in Balkh province: Khulm, Marmol, Charkent, Shulgara, Kishindeh and Zari. Data were collected from 247 farms, taking at least two samples from each farm.

In this study participated several institutions in coordinating and providing information such as:

Mazar Food Initiatives of ASAP, provincial manager of CARE International in Balkh province. CARE provided ASAP with the complete list of beneficiaries. However, the list did not specify the varieties of wheat distributed to farmers.

The National Solidarity Program (NSP) and Community Development Council (CDC) Executive Committee Members provided valuable help in locating the beneficiary-farmers and in identifying the kind of soil planted with the certified seeds.

## **Main results**

The details of calculation are in annex B. The results of this study are:

### **In terms of Yield, production and gross income**

- Average yield per ha (measured with project) = 2.26 MT/ha
- Average yield per ha Balkh 2008 (source FAO) = 0.84 MT/ha
- Average incremental yield per ha (2.26 – 0.84 ) = 1.42 MT/ha
- Total area benefited = 5,200 ha
- Total production = 11,752 MT
- Average market Price\* = 340 US\$/MT
- Gross value of wheat production = 3,995,680 US\$.

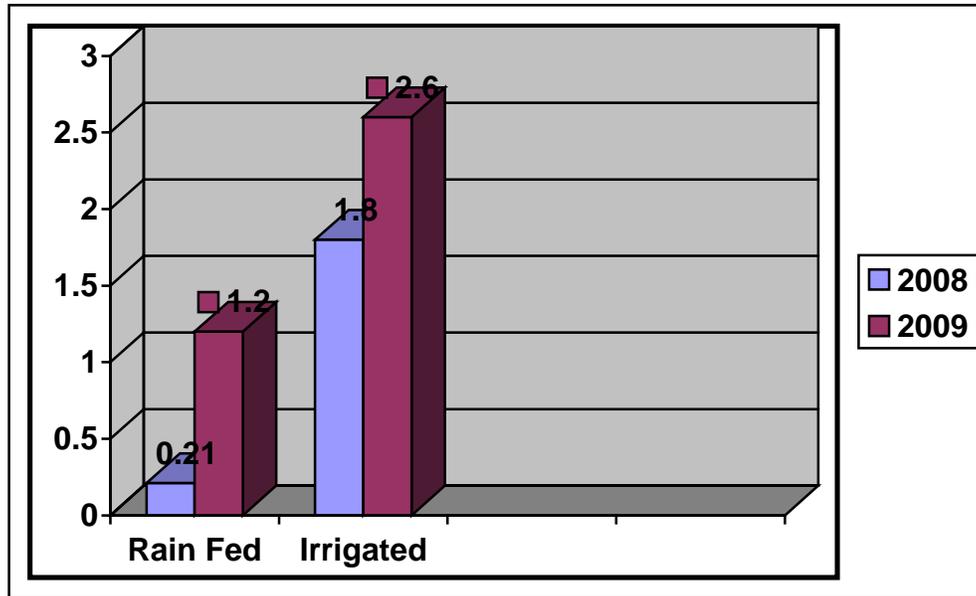
### **At family level:**

- Average farm size = 0.26 ha/family
- Average farm production = 2.26 MT/ha
- Average gross income per family (with wheat project) = 199.8 US\$  
 $199.8 \text{ US\$} = 2.26 \text{ MT/ha} \times 0.26 \text{ ha/family} \times 340 \text{ US\$/MT}$

### **Relative to ASAP indicators the results are as follows:**

- Incremental Value of Harvest (US\$) = 2,510,560
- Employment (full-time equivalent jobs) = 1,020
- Number of families benefited = 20,000
- Hectares cultivated with wheat seed and fertilizer= 5,200

Graph 1: Yield of wheat (MT/ ha) by irrigated and non-irrigated, 2008 vs. 2009



### Some difficulties

A number of farmers have already sown local varieties when they received the certified seeds.

Because the distribution could not cover all farmers and were given only to pre-selected beneficiaries, some communities, especially in Shulgara district, decided to mix the different varieties of certified seeds, or certified seeds with local seeds, to share at community level.

While this allowed the non-identified farmers to get a taste of the certified seeds, the anticipated result did not happen. In mixing the different varieties, the crop did not ripen at the same time and the grains that ripened early dropped off from spikes, diminishing the potential harvest.

Farmers lack knowledge about new varieties (distributed seeds. with fertilizer). They planted seeds for non-irrigated fields in irrigated soils and vice-versa. This resulted in crops with smaller grains than the original seed stock.

The farmers used higher seed density (200kg/ha) versus the recommended 125kg/ha; because the soil makes clods and if seed come under the clod it can not germinate, besides the certified seed was planted in late stage of planting season (as the sowing time goes higher density is recommended).

In some areas distribution was done after the planting season and farmers have already planted local varieties.

The varieties of seed distributed to farmers were not recorded making it impossible to determine climatic adaptability of the variety for the area. Therefore, the study was not able to get results of yield by varieties.

## **Conclusions**

Besides the difficulties mentioned, the wheat and fertilizer distribution program showed excellent results and accomplished more beyond the initial objective.

The gross value generated by farmers due to this intervention amounted to US \$ = 3,995,680.

A total area of 5,200 hectares was farmed using certified wheat seed and fertilizer provided by USAID. In average, a typical farmer cultivated 0.26 hectare of wheat field; with a production of 587 kilos; generating a gross income of US \$ 200 (10,000 Afg).

At least 20,000 families in Balk province were benefited with this program.

According to the survey, 64% of the beneficiaries have used AgDepot services particularly buying agricultural production such as: herbicidal, products, spray, animal drug and Veterinary services.

This study further showed that 96 % interviewed are interested in implementing the wheat/urea fodder program in Balkh province. This technology uses urea to break down the cellulose in wheat straw, increasing the protein level to around 9%.

The wheat distribution program could be improved with proper planning, close follow up, and assiduous investigation of known factors and information, such as the baseline survey done by CARE,

To increase yields even more, there are planting methods that will be used, like using the seeders from the AgDepot, they will also need brochures on how to do adequate agriculture practices, that includes taking soil samples, preparing the land, seeding, fertilizer, irrigation, fumigations, good harvest practices and threshing.



*A field monitors interviewing farmers (left) and CDC members in Mula Quli village, Khulm district, Balkh.*



*Laborers hand threshing and cleaning wheat samples. Wheat sample measurement was done in Mazar on June 22, 2009.*

## Annex A

- To Interview farmers an interview schedule was used. Questions were asked on the quantity of seed and fertilizer received, purchase price of inputs, and area farmed with this seed and fertilizer distributed
- Symmetric field measurement: when the field was symmetric, the measurement was done through gauging the field length and the width for exact area, i.e. area = length x width.
- Non-symmetric field measurement: If the field was non-symmetric, it was measured by length and width from 3 different appropriate positions to calculate the area.
- Selection of sample location: To collect two samples from different locations, the field area was divided by two equal portions than the center of each portion was selected for taking the sample.
- Sampling: The targeted area of 1 m<sup>2</sup> was measured by a wooden frame to take the sample of harvested yields from two different locations of the field.
- Threshing: Wheat samples were threshed manually, cleaned with air fan, weighted by digital weighing balance and packed in polythene bags.
- Labeling: after harvesting, the samples were taken and labeled correspondingly i.e. farmer's name, village, and district; collected by, sample number, type of seed as distributed/local, variety, weight and date of collection.
- Storage: The threshed samples were labeled, packed and stored temporarily in MFI for shipment to ASAP Kabul.

## Annex B

### Details of calculation:

#### Given this information about wheat and fertilizer distribution:

Amount of seed distributed = 1,000 MT each family received 50 Kg

Number of families benefited = 20,000 = (1,000,000 kg)/50Kg/family

Average yield of wheat at Balk province 2008 (source FAO) = 0.84MT/ha

#### Results form measurement of production

Average area planted with wheat per family= 0.26 ha, this is a result of this study

Average yield measured (with project) = 2.26 MT/ha, this is a result of this study

Total area benefited = 5,200 ha = (20,000 families X 0.26 ha/family)

Incremental yield (total) = 1.42 MT/ha = (2.26 MT/ha – 0.84 MT/ha last year's yield)

Total production = 11,752 MT = (5,200 ha X 2.26 MT/ha)

Average market Price = 340 US\$/MT = (Afg per kilo 17 X 1,000)/50 Afg

Price 17 Afg for Balk province. Source: MAIL, Agriculture commodity price bulletin year 5: Volume 7 Annex IV. June 2009.

Gross value of wheat production = 3,995,680 US\$.

(Area 5,200 ha X yield 2.26 MT/ha X price 340 US\$/MT)

Incremental sales (US\$) = 2,510,560

= (incremental yield 1.42 MT/ha X price 340 US\$/MT)

Employment (full-time equivalent jobs) = 1,020

Incremental labor days = Incremental yield 1.42 MT/ha x area 5,200 ha X 35.9 labor days) = 265,086 labor days

Full time equivalent jobs = 265,086 labor days/260 days worked = 1,020

**Table 1: Balkh Province Wheat Seed and Fertilizer Voucher Distribution by District**

| S/N          | District  | Irrigated Voucher | Rain fed Voucher | Total Voucher | Irrigated Seed MT | Rain fed Seed MT | Total Seed MT | UREA (MT)  | DAP (MT)    |
|--------------|-----------|-------------------|------------------|---------------|-------------------|------------------|---------------|------------|-------------|
| 1            | SHULGARA  | 1906              | 2955             | 4861          | 95.3              | 147.75           | 243.05        | 190.6      | 243.05      |
| 2            | KISHINDEH | 592               | 2692             | 3284          | 29.6              | 134.6            | 164.2         | 59.2       | 164.2       |
| 3            | KHULM     | 2290              | 1395             | 3685          | 114.5             | 69.75            | 184.25        | 229        | 184.25      |
| 4            | MARMOL    | 104               | 962              | 1066          | 5.2               | 48.1             | 53.3          | 10.4       | 53.3        |
| 5            | ZARI      | 1108              | 3242             | 4350          | 55.4              | 162.1            | 217.5         | 110.8      | 217.5       |
| 6            | CHARKENT  | 0                 | 2754             | 2754          | 0                 | 137.7            | 137.7         | 0          | 137.7       |
| <b>Total</b> |           | <b>6000</b>       | <b>14000</b>     | <b>20000</b>  | <b>300</b>        | <b>700</b>       | <b>1000</b>   | <b>600</b> | <b>1000</b> |

**Table 2: Sample of Survey,by irrigation and Non Irrigation area**

| S/O                            | District  | Type of Wheat    | # of Family-N | % of family-N |
|--------------------------------|-----------|------------------|---------------|---------------|
| 1                              | SHULGARA  | Irrigation       | 80            | 82%           |
|                                |           | Non - Irrigation | 17            | 18%           |
|                                | Sub Total |                  | 97            | 100%          |
| 2                              | KISHINDEH | Irrigation       | 3             | 50%           |
|                                |           | Non - Irrigation | 3             | 50%           |
|                                | Sub Total |                  | 6             | 100%          |
| 3                              | KHULM     | Irrigation       | 15            | 88%           |
|                                |           | Non - Irrigation | 2             | 12%           |
|                                | Sub Total |                  | 17            | 100%          |
| 4                              | MARMOL    | Irrigation       | 1             | 50%           |
|                                |           | Non - Irrigation | 1             | 50%           |
|                                | Sub Total |                  | 2             | 100%          |
| 5                              | ZARI      | Irrigation       | 89            | 72%           |
|                                |           | Non - Irrigation | 34            | 28%           |
|                                | Sub Total |                  | 123           | 100%          |
| 6                              | CHARKENT  | Irrigation       | 0             | 0%            |
|                                |           | Non - Irrigation | 2             | 100%          |
|                                | Sub Total |                  | 2             | 100%          |
| <b>Total</b>                   |           |                  | <b>247</b>    | <b>100%</b>   |
| <b>Total of Irrigation</b>     |           |                  | <b>188</b>    | <b>76%</b>    |
| <b>Total of Non Irrigation</b> |           |                  | <b>59</b>     | <b>24%</b>    |

**Table 3: Distribution of Sample by district in percentage**

| S. No        | District  | Total families |               | Families benefited |               | Sample collected |               |
|--------------|-----------|----------------|---------------|--------------------|---------------|------------------|---------------|
|              |           | House holds    | % household   | total families     | % families    | samples          | % samples     |
| 1            | SHULGARA  | 34,000         | 43.0%         | 4,861              | 24.3%         | 97               | 39.3%         |
| 2            | KISHINDEH | 12,999         | 16.5%         | 3,284              | 16.4%         | 6                | 2.4%          |
| 3            | KHULM     | 12,000         | 15.2%         | 3,685              | 18.4%         | 17               | 6.9%          |
| 4            | MARMOL    | 4,000          | 5.1%          | 1,066              | 5.3%          | 2                | 0.8%          |
| 5            | ZARI      | 7,422          | 9.4%          | 4,350              | 21.8%         | 123              | 49.8%         |
| 6            | CHARKENT  | 8,600          | 10.9%         | 2,754              | 13.8%         | 2                | 0.8%          |
| <b>Total</b> | <b>6</b>  | <b>7,9021</b>  | <b>100.0%</b> | <b>20000</b>       | <b>100.0%</b> | <b>247</b>       | <b>100.0%</b> |

**Table 4: Results: of wheat Production MT/ ha**

| S/O                            | District  | Type of Wheat    | # of farms Measurement | Total farm Production kg /m <sup>2</sup> | Average Yield production MT/ ha |
|--------------------------------|-----------|------------------|------------------------|--|---------------------------------|
| 1                              | SHULGARA  | Irrigation       | 80                     | 27.2730                                  | 3.40913                         |
|                                |           | Non - Irrigation | 17                     | 4.3610                                   | 2.56529                         |
| 2                              | KISHINDEH | Irrigation       | 3                      | 0.9450                                   | 3.15                            |
|                                |           | Non - Irrigation | 3                      | 0.4670                                   | 1.55667                         |
| 3                              | KHULM     | Irrigation       | 15                     | 3.1910                                   | 2.12733                         |
|                                |           | Non - Irrigation | 2                      | 0.3250                                   | 1.625                           |
| 4                              | MARMOL    | Irrigation       | 1                      | 0.4420                                   | 4.42                            |
|                                |           | Non - Irrigation | 1                      | 0.2370                                   | 2.37                            |
| 5                              | ZARI      | Irrigation       | 89                     | 16.7470                                  | 1.88169                         |
|                                |           | Non - Irrigation | 34                     | 1.3600                                   | 0.4                             |
| 6                              | CHARKENT  | Irrigation       | 0                      | 0  | 0                               |
|                                |           | Non - Irrigation | 2                      | 0.3820                                   | 1.91                            |
| <b>Grand Total</b>             |           |                  | <b>247</b>             | <b>55.7300</b>                           | <b>2.25628</b>                  |
| <b>Total of Irrigation</b>     |           |                  | <b>188</b>             | <b>48.5980</b>                           | <b>2.585</b>                    |
| <b>Total of Non Irrigation</b> |           |                  | <b>59</b>              | <b>7.1320</b>                            | <b>1.20881</b>                  |

**Table 5: Area cultivated of wheat per beneficiary by District**

| S/O                     | District  | Type of Wheat    | # of Family | Sum of Total area of Wheat (ha) | Hectare per Family |
|-------------------------|-----------|------------------|-------------|---------------------------------|--------------------|
| 1                       | SHULGARA  | Irrigation       | 80          | 20.5079                         | 0.26               |
|                         |           | Non - Irrigation | 17          | 4.4179                          | 0.26               |
| 2                       | KISHINDEH | Irrigation       | 3           | 1.4498                          | 0.48               |
|                         |           | Non - Irrigation | 3           | 0.7736                          | 0.26               |
| 3                       | KHULM     | Irrigation       | 15          | 5.7340                          | 0.38               |
|                         |           | Non - Irrigation | 2           | 0.6684                          | 0.33               |
| 4                       | MARMOL    | Irrigation       | 1           | 0.0221                          | 0.02               |
|                         |           | Non - Irrigation | 1           | 0.3916                          | 0.39               |
| 5                       | ZARI      | Irrigation       | 89          | 21.3043                         | 0.24               |
|                         |           | Non - Irrigation | 34          | 8.5054                          | 0.25               |
| 6                       | CHARKENT  | Irrigation       | 0           | 0                               | 0.00               |
|                         |           | Non - Irrigation | 2           | 0.83                            | 0.42               |
| Total                   |           |                  | 247         | 64.605                          | 0.26               |
| Total of Irrigation     |           |                  | 188         | 49.0181                         | 0.26               |
| Total of Non Irrigation |           |                  | 59          | 15.5869                         | 0.26               |

**Table 6: National wheat production from 2000 to 2008 (000 MT) FAO record**

| Crop            | 2000  | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Irrigated Wheat | 1,329 | 1,514 | 2,110 | 3,017 | 1,867 | 2,728 | 2,604 | 2,878 | 2,404 |
| Rain Fed Wheat  | 140   | 83    | 576   | 1,345 | 426   | 1,538 | 759   | 1,465 | 217   |
| Total Wheat     | 1,469 | 1,597 | 2,686 | 4,362 | 2,293 | 4,266 | 3,363 | 4,343 | 2,623 |

**Table 7: Wheat production and Yield in Balkh (2008 FAO report 2008)**

| Province | Irrigated Wheat |       |            | Rain Fed Wheat |       |            | Total Wheat |       |            |
|----------|-----------------|-------|------------|----------------|-------|------------|-------------|-------|------------|
|          | Area            | Yield | Production | Area           | Yield | Production | Area        | Yield | Production |
|          | 000 ha          | MT/h  | 000 tons   | 000 ha         | t/ha  | 000 tons   | 000 ha      | MT/h  | 000 tons   |
| Balkh    | 82              | 1.79  | 147        | 125            | 0.21  | 26         | 207         | 0.84  | 173        |

**Table 8: % of families interested in using urea-straw treatment technology**

| S/O          | District  | # of Family=n | No of farmers interested to adopt straw –urea treatment | No of farmers NOT interested to adopt straw – urea treatment | % of interested | % of NOT interested |
|--------------|-----------|---------------|---|--|-----------------|---------------------|
| 1            | SHULGARA  | 97            | 95  | 2  | 97.94%          | 2.06%               |
| 2            | KISHINDEH | 6             | 6   | 0  | 100.00%         | 0.00%               |
| 3            | KHULM     | 17            | 9   | 8  | 52.94%          | 47.06%              |
| 4            | MARMOL    | 2             | 2   | 0  | 100.00%         | 0.00%               |
| 5            | ZARI      | 123           | 122   | 1  | 99.19%          | 0.81%               |
| 6            | CHARKENT  | 2             | 2   | 0  | 100.00%         | 0.00%               |
| <b>Total</b> |           | <b>247</b>    | <b>236</b>  | <b>11</b>  | <b>95.55%</b>   | <b>4.45%</b>        |

**Table 9: % of AgDepot Services used by farmers**

| S/O          | Type of Services from Ag Depot     | Records of Services | % of Services  |
|--------------|------------------------------------|---------------------|----------------|
| 2            | Animal Drug                        | 35                  | 14.17%         |
| 3            | Animal Drug, Insecticide           | 8                   | 3.24%          |
| 4            | Usage of Herbicidal                | 59                  | 23.89%         |
| 5            | Spray                              | 8                   | 3.24%          |
| 7            | Herbicide                          | 20                  | 8.09%          |
| 8            | Insecticide                        | 12                  | 4.86%          |
| 9            | Medicine                           | 11                  | 4.45%          |
| 11           | Vet Services,Pesticide,Insecticide | 6                   | 2.43%          |
| 12           | No Answers                         | 88                  | 35.63%         |
| <b>Total</b> |                                    | <b>247</b>          | <b>100.00%</b> |