

**An Evaluation of Historical and Recent
Government Programs to Promote Off-Season
Vegetable Cultivation in FATA**

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Governance Support Program
Post-Crisis Needs Assessment Programs
FATA Secretariat and Government of Khyber-Pukhtunkhwa



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Introduction

Vegetables are rich source of vitamins, carbohydrates, and proteins. Increased health awareness, high population growth rates, changing dietary patterns of an increasingly affluent middle class has generated a year-round demand for vegetables in Pakistan in general and in major city centres in particular. Due to the scarcity of off-season vegetables (OSV), they command a high price in the market.¹ In the absence of storage infrastructure and vegetable processing industry in the country, OSV farming is a major opportunity for increasing farm income. However, farmers in the Federally Administered Tribal Area (FATA) of Pakistan are still using traditional farming methods and have not benefited from the opportunity to grow off-season vegetables.

The PCNA-ISU FATA and Agriculture Extension Department (AED) of the Khyber Agency offered registered and non-registered farmers in FATA the opportunity to receive a free OSV package, including a tunnel, seeds, fertilizer, and training for OSV cultivation.² To promote awareness of this program, PCNA-ISU FATA and AED held four one-day sessions on awareness/mobilization of farmers for OSV cultivation. These sessions were held at the University of Peshawar on November 6, November 7, and November 12, and November 13, 2014. The speakers highlighted the importance of OSV and discussed the types of vegetable grown in tunnel farming, e.g., chillies, cucumbers squash, and tomatoes. The speakers highlighted that the climate of FATA is suitable for OSV cultivation and that farmers can fetch high prices from these vegetables. PCNA-ISU FATA and AED targeted two tehsils in particular,

¹ “Off-season vegetable” are vegetables that are grown in unfavorable weather conditions for traditional crops.

² OSV farming in tunnels is gaining popularity because of the low cost and easy usage. Plastic tunnels are transparent which provides required sunshine to the plants, and the plastic also acts as a barrier against the cool air in winter. Tunnels help to gain maximum crop yield, to maintain the fertility of land, and to control the temperature.

namely Jarnrud and Landi Kotal in Khyber Agency. Of the 217 farmers who attended these sessions, 115 were from Jarnrud and 102 were from Landi Kotal. Approximately, 15 percent of the farmers accepted the OSV package. It is noteworthy that there was a windstorm and hailstorm before the harvest of OSV which caused substantial damage to the crop.

The purpose of this report is to evaluate the OSV program. The evaluation consists of three surveys: an historical survey of OSV adopters, an environmental study of historical OSV adopters, and a post-harvest survey of the 33 farmers that adopted the OSV package. There are several interesting findings that come from the analysis of the data from these three surveys. First, the take-up rate by farmers of the OSV program is very low. Second, the rate of return to OSV farming appears to be very high. Third, analysis of the historical data shows that a significant proportion of the sample of farmers in Khyber Agency have not engaged in OSV cultivation for a number of years. Given the high rate of return to OSV cultivation reported by farmers, the low take-up rate and the large fraction that for all practical purposes have stopped OSV cultivation is puzzling and merits further investigation. Finally, as explained in greater detail below, there is some evidence that pesticide use in OSV cultivation is having adverse effects on the taste of water and on livestock. Although the number of farmers reporting such adverse effects from pesticide use are relatively small, the harm from pesticides is so great to both humans and livestock, the Agricultural Extension Office may wish to consider offering training to farmers in the proper use of pesticides.

The remainder of this report is organized as follows. We begin by analysing the results of the post-harvest survey. Then, we analyse the survey responses of OSA adopters from a program designed to eradicate poppy cultivation by offering a substitute crop. Finally, we analyse the results of an environmental survey. The final section concludes.

Results of the Post-Harvest Survey

For the reader's convenience, a copy of the English Language version of the post-harvest survey is provided in Appendix 1 to this report. Figure 1 shows the distribution of cropping patterns in OSV. More specifically, 78 percent of the farmers grew tomatoes, 22 percent grew chilies, 22 percent grew squash, and 4 percent grew cucumber. Figure 2 shows the distribution of land dedicated to OSV cultivation. Approximately, slightly less than 20 percent of the farmers cultivated between 0.5 and 5 Marlas of land; 8 percent cultivated between 5 and 10 Marlas; slightly more than 60 percent cultivated between 10 and 15 Marlas; and the remaining 12 percent cultivated between 15 and 20 Marlas. Figure 3 shows the distribution of net income from OSV cultivation. Approximately 42 percent of the farmers reported earning between 0 and 24,000 PKR (US \$0 and \$240), slightly less than 10 percent reported earning between 24,000 and 58,000 PKR (US \$240 and \$580), approximately 18 percent reported earning between 58,000 and 81,000 PKR (US \$580 and \$810), and the remaining 30 percent of the farmers reported earning between 81,000 and 110,000 PKR (US \$810 and \$110).

Figure 4 shows the distribution of net income per kilogram of tomatoes, which is the most popular OSV crop among the farmers that are the target of the post-harvest survey. The range of net income from tomatoes is between 45 and 55 PKR per kilogram (US \$0.45 and \$0.55 per kilogram). Approximately 55 percent of the farmers that cultivated tomatoes report net income between 48 and 52 PKR per kilogram (US \$0.48 and \$0.52 per kilogram). Clearly, OSV cultivation is highly profitable, particularly considering the amount of land being cultivated. This is surprising because the farmers report suffering substantial crop losses due to wind and hailstorms preceding the harvest. Given the earnings potential of OSV cultivation, it is surprising that so few farmers adopted the free OSV package.

Table 1 reports the comments of the farmers on improving OSV cultivation. These comments are easily summarized because there are a few common themes. To mitigate post-harvest losses, the farmers recommend harvesting at the right time, good transportation, and proper packing. The farmers recommend that AED provide certified seed, provide stronger plastic sheeting, provide transportation to more distant markets, and provide solar powered pumps for tube wells which is needed for irrigation. Finally, nearly every farmer reported suffering heavy crop losses due to a wind and hail storm that preceded the harvest.

Results of the Historical Survey

For the reader's convenience, we provide a copy of the Urdu Language version of the historical survey. In addition to post-harvest survey of recent OSV adopters, we also conducted a survey of farmers who adopted OSV cultivation beginning in 1995 in Khyber Agency and Mahmood as part of a poppy eradication program. Figures 5 through 7 summarize the highlights of the historical analysis of a survey of OSV farmers in Khyber Agency. The farmers were randomly selected from a list of OSV farmers maintained by the AED. The findings are very interesting. Figure 5 shows the distribution of the number of years in which the farmers have been engaged in OSV cultivation. The distribution is bimodal. There are a small number of farmers that report being engaged in OSV cultivation for 11 to 17 years; there is a much larger number of farmers who report being engaged in OSV cultivation for 1 to 8 years. Figure 8 shows the distribution of the rate of return (in percent) among the sample of OSV farmers. Approximately 35 percent of the farmers in the sample that report losses between 0 and 100 percent, 65 percent report rate of return between 0 and 160 percent. Although no farmer reports having quite OSV farming, Figure 7 shows that a sizable proportion of the sample of OSV

farmers have not cultivated OSV for a number of years. Unfortunately, we do not know the reason why they haven't planted in a number of years.

Results of the Environmental Survey

For the reader's convenience, we provide a copy of English Language version of the environmental survey in Appendix 3 to this report. The survey was conducted on a random sample of 135 historical OSV adopters in Mohammed Agency. The purpose of this survey is to identify potential externalities or spillover effects from the adoption of OSV through the use of fertilizer and pesticides. Unfortunately, we were unable to obtain responses for the questions in Section B of the survey concerning fertilizer use.

Questions 5, 6, and 7 of Section C of the survey concern the cost of pesticides during during the Rabi growing season, the Kharif growing season, and the total annual costs of pesticide use. One observation has missing values for all three questions, and 10 farmers apparently do not use pesticides during the Kharif growing season. It is unclear from the survey whether this reflects the fact that they do not cultivate off-season vegetables during this season. Based on the answers of the respondents, farmers on average use approximately PRs. 7,144 (standard deviation = PRs. 9,307) of pesticides during the Rabi growing season, and a nearly equal amount during the Kharif growing season. The correlation coefficient between the values during the two growing seasons is 0.97. The maximum cost of pesticides used during the Rabi growing season is PRs 80,000, and during the Kharif growing season the minimum cost is PRs. 500.

Questions 8 and 9 of Section B of the survey concern the approximate percentage of the pesticide applied that is left in the soil and water, respectively. Assuming that farmers in Mohammed Agency are not taking careful measurements of pesticides in the soil and water,

these estimates are likely highly speculative. In any event, 129 farmers out of 135 farmers (or 95 percent) in the sample report that the amount of the total pesticide used remaining in the soil is less than 10 percent. The remaining 6 farmers apparently did not respond to this question.

Regarding the percent of total pesticides used leeching in the water, only 5 farmers responded to this question. These 5 farmers report that the amount is less than 10 percent. These responses should be taken with a grain of salt because OSV farmers likely do not know the answers to these questions with any degree of reasonable accuracy because they likely do not take the necessary measurements required to provide an accurate answer.

Questions 10 and 11 of Section B of the survey concerns whether irrigation runoff is used for human and livestock consumption, respectively. All 135 farmers in the survey report that is not the case to both questions. Question 12 of Section B of the survey concerns residual effects from pesticide use, such as water tastes bad, fish kill, and adverse effect on livestock. Twenty-seven farmers report that the water tastes bad. No farmer reports evidence of fish kill due to pesticide use; however, 24 farmers report that there is an adverse effect on livestock from pesticide use. Curiously, there is very little correlation between those farmers reporting the water tastes bad as a result of pesticide use and those who report that there is an adverse effect on cattle. In fact, only four farmers respond that pesticide use effects the taste of the water and effects livestock. This may reflect the fact that the water for human consumption has a different source than water used for livestock.

Question 1 of Section D concerns whether the respondent believes that pesticides are more effective in OSV cultivation than in the cultivation of normal crops. Interestingly, 108 of the 132 respondents to this question report that pesticides are more effective in OSV cultivation. Finally, question 3 of Section D of the survey asks the respondent whether other farmers in the

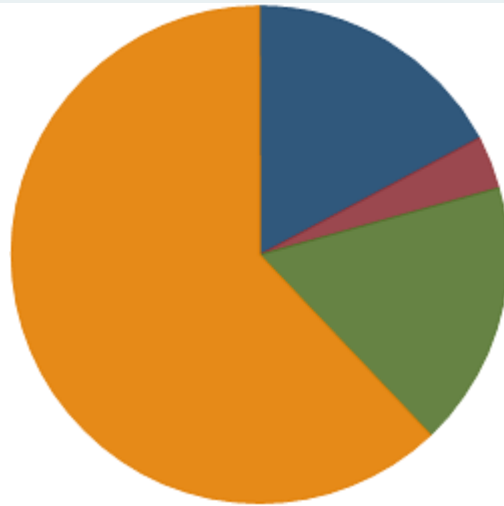
village are able to use pesticides without harming the environment. The overwhelming majority of the sample respond affirmatively to this question. However, 266 farmers report that other villagers are not able to use pesticides without causing harm to the environment.





Although the reliability of some of these responses is highly question, the responses regarding adverse effects on the taste of water and adverse effects on livestock are likely reliable. Although the numbers reporting adverse effects from pesticide use are relatively small, the harm from pesticides is so great that the Agricultural Extension Office may wish to consider providing training to farmers in the proper use of pesticides.

Conclusion

There are a several interesting findings from the analysis of the three surveys. First, the take-up rate among farmers of the OSV program is very low. Second, the rate of return to OSV farming appears to be very high. Third, analysis of the historical data shows that a significant proportion of the sample of farmers in Khyber Agency have not engaged in OSV cultivation for a number of years. Given the high rate of return to OSV cultivation reported by farmers, the low take-up rate and the large fraction of adopters in the historical survey that for all practical purposes have stopped OSV cultivation is puzzling and merits further investigation. Finally, the reliability of some of the responses to the environmental survey is highly questionable, the responses regarding adverse effects on the taste of water and on livestock are likely to be reliable. Although the numbers reporting adverse effects are relatively small, the harm from pesticides is so great to humans and livestock that the Agricultural Extension Office may wish to consider providing training to farmers in the proper use of pesticides.

Figure 1:
Off-season vegetable cropping patterns



Chilli  Cucumber 
Squash  Tomato 

number of observations = 23

Figure 2:
Distribution of land area in Marlas used for off-season vegetables

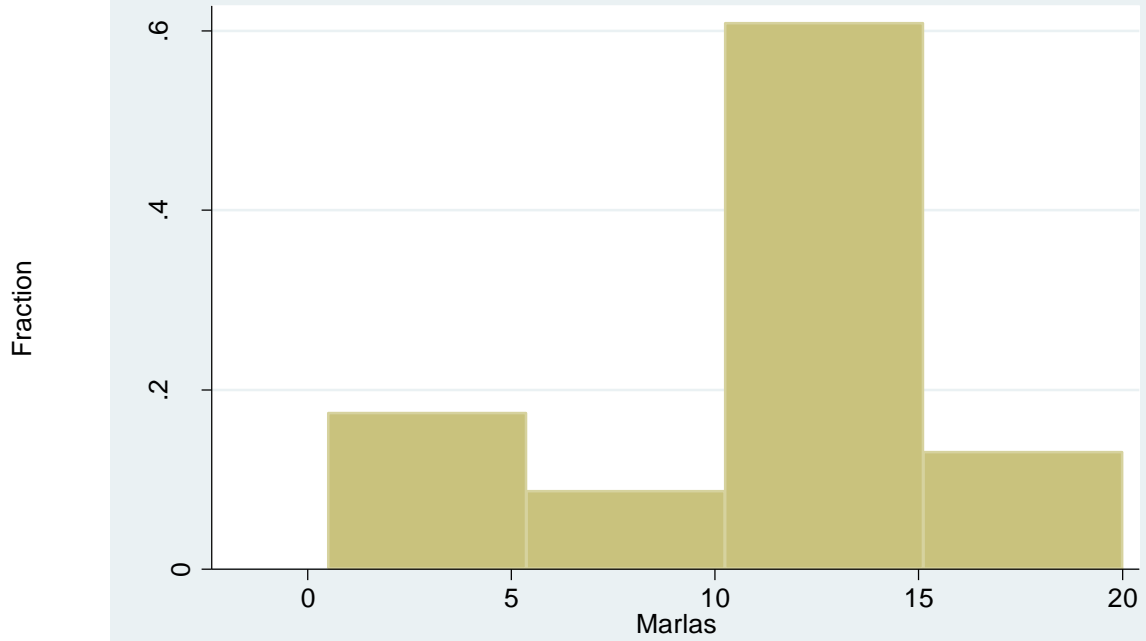


Figure 3:
Distribution of net income from off-season vegetables

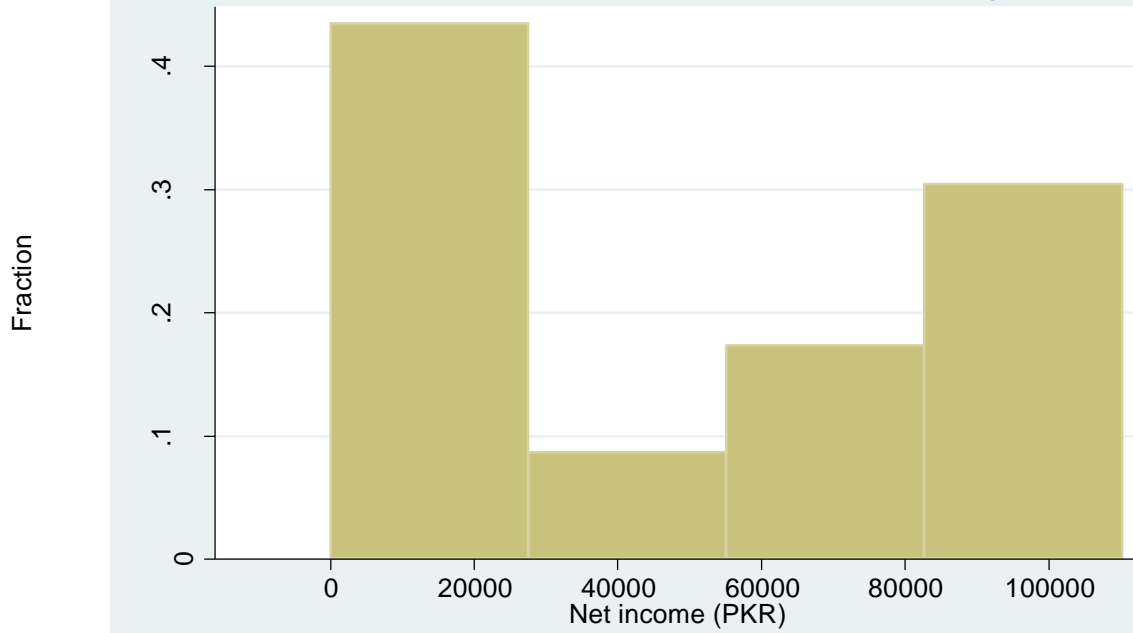


Figure 4:
Distribution of net income per kilogram of tomatoes

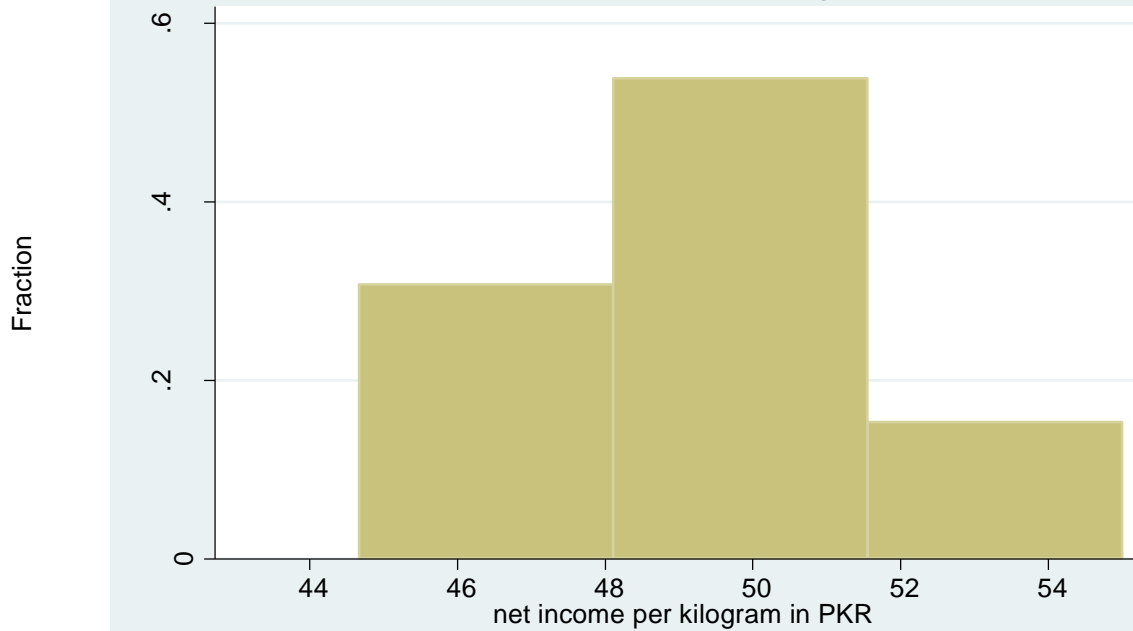


Figure 5: Historical Analysis, Villages of Khyber Agency
Total number of years engaged in OSV cultivation.

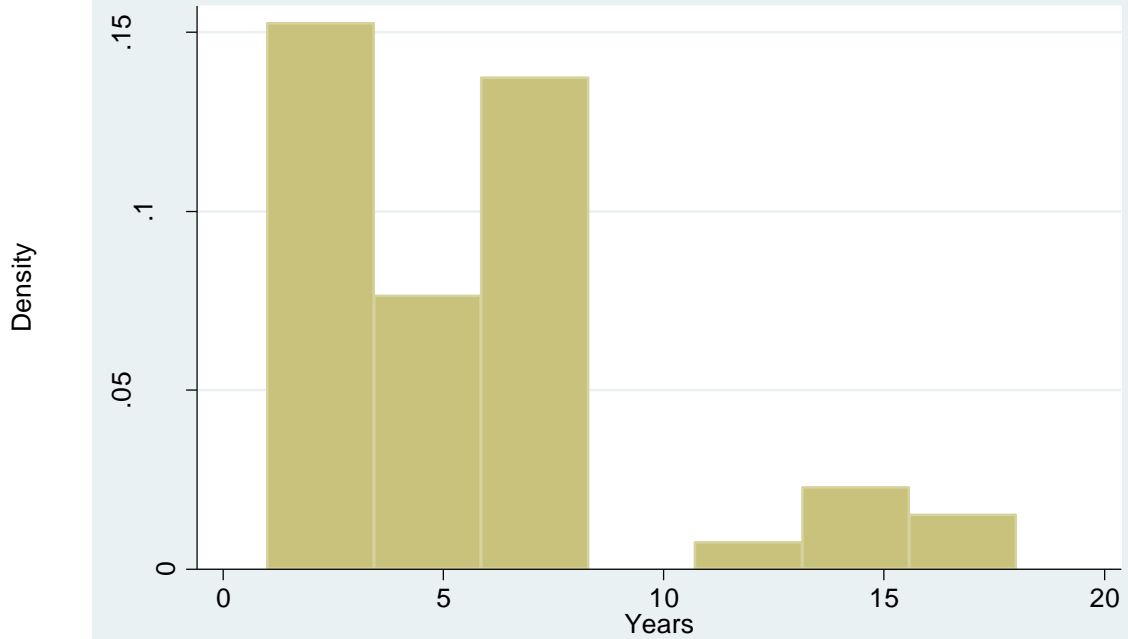


Figure 6: Historical Analysis, Villages in Khyber Agency
Distribution of the rate of return to OSV cultivation last year.

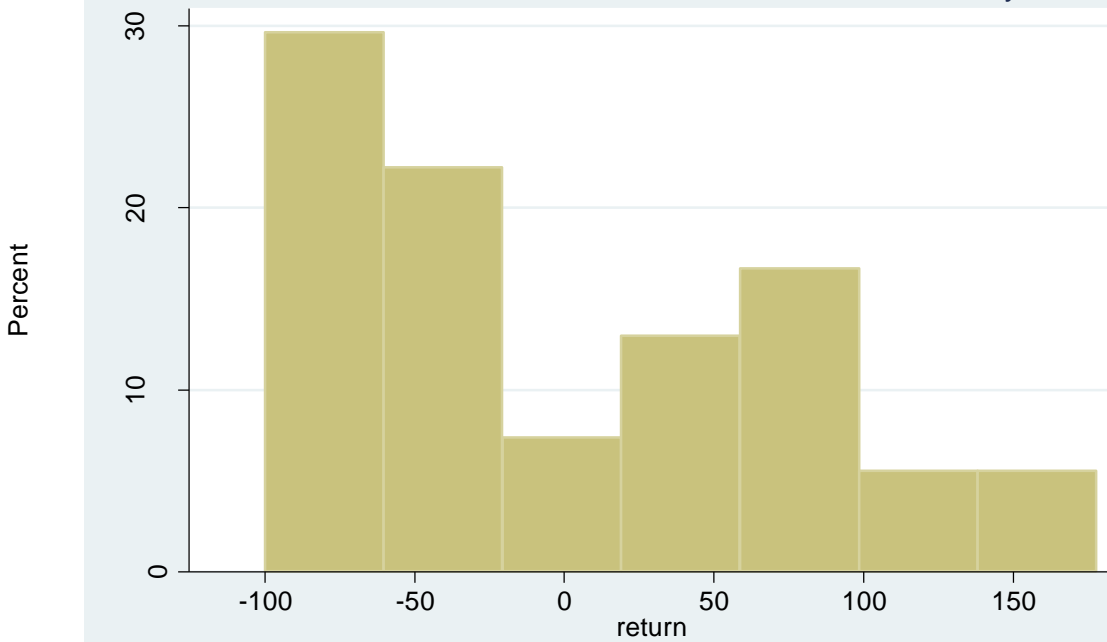


Figure 7: Historical Analysis, Villages in Khyber Agency
Most recent year engaged in OSV cultivation.

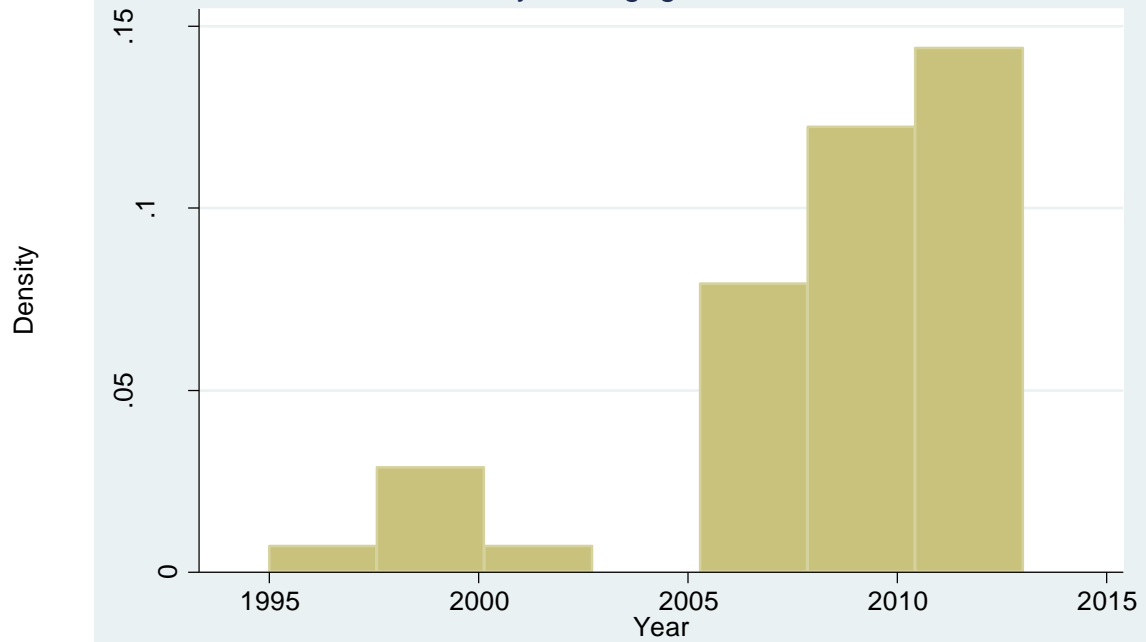


Table 1: Comments of farmers to improve the Off-Season Vegetable Program

Controlling post-harvest losses	Suggestions of farmers to improve OSV production
By means of proper packing and good transportation	We appreciate the initiative (OSV package) of Agriculture Extension Department and request them to provide us with good quality plastic sheet for next year crop and seed and other inputs on time as the delay of inputs decreases the total yield of the crop.
Harvesting at proper time and packaging in proper materials	The OSV is one of the best means of livelihood, but the current year crop is completely damaged by a windstorm followed by a heavy hailstorm before harvesting of crop, and he requested that the Government provide him with compensation.
By proper packing	He requested Agriculture Extension Department continue and expand this program by mobilizing other farmers. He also requested agriculture department to provide transportation for transporting the commodity to distant market for more earning, proper water management system for other crop also as provided with this package. He also requested support for the farmers in controlling diseases by providing them with insecticides and pesticides.
Harvesting at proper time and transportation can eliminate post-harvest losses	The OSV is the best program and good source of income. He requested that the Agriculture Extension Department provide them with good quality plastic sheet for next year to protect their crop from storm and other natural hazards. He also insisted that they provide them with seed and other inputs on time for better production and more profit.
Harvesting at proper time	I am thankful to Agriculture Extension Department for providing us with the OSV package, but unfortunately our standing crop was completely destroyed by a hailstorm before harvesting and requested Government to provide compensation for the heavy losses.
Harvesting at proper time	OSV is a profitable business, but we request that the Agriculture Department provide us with certified seeds and other inputs for next year's crop.
Proper packing	My OSV crop is damaged by wind followed by hail storm before harvesting. We again cultivated the seasonal vegetables on the same land, but it is pertinent to mention that the profit of OSV is two to three time greater than normal season crop.
Harvesting at proper time and good transportation	My OSV crop is completely damaged by wind followed by hail storm before harvesting. I request Agriculture Extension Department to compensate us by providing us seed and other inputs for the next OSV crop.
By proper packaging	The OSV is best program and good source of income but my current year's crop is affected by hailstorm and requested Agriculture Extension Department to provide us good quality of plastic sheet to prevent our crop from storm and other natural hazards.
Timely picking of the commodity	My OSV crop is completely smashed by wind followed by heavy hailstorm before harvesting. I request that the Agriculture Extension Department compensate me by providing high tunnels and other inputs along with solar system for next year's OSV crop.
Good quality material for packing	We need solar based tube wells for irrigation to overcome energy crises in the area and timely watering of crops for greater yield.
Harvesting at proper time	My crop is completely smashed by a hail storm before harvesting. I am requesting compensation in terms of inputs for next year's OSV crop.
Proper packaging	OSV is best for earnings; but my current year crop is affected by a hail storm.
Harvesting at proper time	OSV is a very good activity as it creates job and good earnings from fewer units of land.
Harvesting at proper time	The farmer requested a solar system for tube well and certified inputs for next year.
Proper packaging	We appreciate the Agricultural Extension Department for their support and requested the provision of good plastic sheet to protect the crops from natural hazards. Also requested that the government compensate the farmers which were affected by hailstorm.
Good transportation	He said that his standing crop was damaged by a hailstorm before harvesting and requested the Agriculture Extension Department compensate him by providing inputs for next year's crop.
Harvesting at proper time	He requested that the Agriculture Extension Department provide tunnel package and inputs to extend OSV to more land.
Harvesting at proper time	The farmers said that his OSV crop was damaged by hailstorm before harvesting and requested compensation for the lost income.

By means of good transportation and harvesting at proper time	OSV is a good program, but the current year crop was affected by a hailstorm.
By means of good transportation	He requested that the Agricultural Extension Department provide solar system to him for running tube well to overcome the energy crisis in the area because his crop was weak due to the non-availability of water at proper time. He also said that his crop was affected by a hailstorm which affected his total yield.
Harvesting at proper time and proper packing material	He requested that the Agriculture Extension Department provide him with a solar based irrigation system to water the crop on time as there is frequent load shedding in the area.
By means of good transportation.	He was very happy with his crop and said that natural hazards like windstorms can damage the crop which occurred this year.

Appendix 1
Post-Harvest OSV Survey Instrument
(English Language Version)

Post-Harvest Survey of OSV at Khyber Agency (PHS)

A. Background information:

1. Name of village: _____
2. Name of subdivision: _____
3. Name of OSV grower: _____
4. Total Area (Marla's) sown on OSV during current year _____

B. Specific information about OSV production business during current year.

5. Crops grown by you as a grower of OSV during this year (circle all that apply)?
 - a) Chilli
 - b) Cucumber
 - c) Squash
 - d) Tomatoes
 - e) Other (specify crops) _____

6. Expenditure statement per unit area for each crop?

S.#	Expenditure break up	Chilli	Cucumber	Squash	Tomato	Other (specify crop) _____
1	Land Preparation					
2	Seed					
3	Fertilizers					
4	Management practices					
5	Pesticides					
6	Watering charges					
7	Picking					
8	Packing					
9	Transportation					
	Total Expenditure (TE) in PKR					

7. Production of the above mentioned crop?

S.#	Crops	# of Picking/Cutting of marketable produce	Total Produce per crop in Kg
1	Chilies		
2	Cucumber		
3	Squash		
4	Tomato		
5	Others (Please specify)		

8. Income detail of OSV Crops?

S.#	Production	Chilli	Cucumber	Squash	Tomato	Other (Specify crop)_____
1	Gross income in PKR					
Net income *(GI - TE)						

9. Estimated post harvest losses & its potential contribution to real income?

S.No	Crops	Estimated post-harvest losses in Kg	Value in PKR
1	Chilies		
2	Cucumber		
3	Squash		
4	Tomato		
5	Others		
Total			

10. Views/suggestions of farmers to control post-harvest losses:

- I. _____
- II. _____
- III. _____

11. Views/Suggestions of farmers regarding Off-Season Vegetable Production?

_____.

Thank you for taking the time to complete this questionnaire! We appreciate your cooperation.

Signature of the researcher/UoP student: _____

Print name: _____

Date of interview: _____

*(TE): Total Expenditure

*(GI): Gross Income

Appendix 2
Historical OSV Survey Khyber Agency
(Urdu Language Version)

NON-ADOPTERS

مک عول یک یرتعب یک ت عارز مک حم شورپوٹوکوس لٹف بی روا روی ہر اج یک یھٹکا عول یک رولویپ لہ صرف تا حول عم بی **بٹون** -
 روروی ن صراقم و ضارغ ایوؤک روا یک سا مولاع یک سا یک رواج یو لاروم

(A) تام ول عم یرظنم سپ :

م ن ک و ل گ 1
 [A010A]-----:
 مان کلوصحت / قولاع ولیون 2
 [A020A]-----:
 [A030I] رولویپ ریبی ٹوک لہ تشریب روسنہ پچاپ ہنک رامش) ریبی ٹوک لک بگج صوصم 3 (:-----:
 [A040A] مان کلرکتشلک طلاو سناکاروئیس یحسوم ریغ 4 :-----:
 [A050I] :-----: عیوہ کلوسنم هتلس یک تشلک یک رولویپس یحسوم ریغ پآ روم س ج مان کل لاس مولاح 5

؟ ے لویک لایخ کلوسنم هتلس یک ملگورپ یک تشلک یک رولویپس یحسوم ریغ وک پآ سناپاہیک س پآ لویک 6 [A06C2]
 i) ----- سا۔ ii) ----- سین۔
 روم ملگورپ یک رولویپ یک رولویپس یحسوم ریغ پآ ک عیوہ روبجمرب سزک لہ صرف بی پآ رولویپ یک تا مورچو نک 7۔
 (رورویپوٹوکوس لٹف یک لہ صرف یک پآ و ج رولویپ مریلا درگندرا یک ریبی یک تلن ملت نا)؟ یک سہ رورویپ کورش
 (i)۔ سس ہجو یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C01] ریغ 27
 (ii)۔ سس ہجو یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C02] ریغ 15
 (iii)۔ سس ہجو یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C03] ریغ

4

(iv)۔ سس ہجو یک تاجارخ اھایز یک مریغو تایدو رام نژیک ناھک ، چیب [A07C04] 64
 (v)۔ سس ہجو یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C05] 63 ناھک ، چیب
 (vi)۔ سس ہجو یک عیوہ بن یک عیوہ ملت ع لہبق روا بس نام عول یک مریغو تایدو رام نژیک ، ناھک ، چیب
 [A07C06] 59
 (vii)۔ سس ہجو یک نژیپ یک رولویپ سس نیجز۔ [A07C07] 13
 (viii)۔ رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C08] 5
 (ix)۔ سس ہجو یک سزوہ دنم ہف ہایز یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C09] 20
 (x)۔ لہت نیوئی رواسوہٹ ہایز ع لہبق لاسوہٹ لہبق روا بس نام عول یک مریغو تایدو رام نژیک ، ناھک ، چیب [A07C10] 3
 (xi)۔ سس ہجو یک تالاح یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C11] 55
 (xii)۔ سس ہجو یک سزوہ راکورد یک تنجم ہایز لہبق سس رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C12] 4
 (xiii)۔ سس ہجو یک لاحتروص نیوئی ریغ یک تنجم راکورد عول یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C13]
 (xiv)۔ لٹل کھلگ روم تروص یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C14] 4
 (xv)۔ سس ہجو یک سزوہ دنم ہف ہایز یک رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C15] 4
 (xvi)۔ سس ہجو یک سزوہ کلوسنم سس ملگورپ سا عول عیوہ عورش قول عتم سس رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C16] 36
 (xvii)۔ سس ہجو یک سزوہ کلوسنم سس ملگورپ سا عول عیوہ عورش قول عتم سس رولویپس یحسوم ریغ پآ روم سناپاہیک س پآ لویک 6 [A07C17] 9

[A070A]-----

[A070A]-----

اعت یک پآ مہ ہورکش لک عیوہ لہت سس سس روا سزوہ تقوہت لس یک یگھوچ سس عول یک سزوکرب وک سناپاہیک س پآ لویک 6 [A070A]
 رورویپس وک نو

بطختسد یک ملع بلط طلاو سناپاہیک س پآ لویک 6 [A070A]

[C010A]-----

- (iii) چرخ لاو سنا ہایز پسررکت رازاب [B15C3] 16
 (iv) طوہر مک تگلا ہایز لاو سنا پلنٹ یتظفح عول یک سز ہکر ظوفحموک رویزیس سئوہ سگ روم رونوپ [B15C4]

- (v) یک یک (ترامہ) طع یکونکت [B15C5] 34
 (vi) ازوہ نرسوم کک کنگلی یرلیویب بس نام روم رازب عول یک رویزیس یحسوم ریغ [B15C6] 3
 (vii) ریتھوق یک روم رازب یک رویزیس یحسوم ریغ [B15C7] 6
 (viii) لاح تروص ینوئی ریغ یک تخورف تھوق روم رازب یک رویزیس یحسوم ریغ [B15C8] 12
 (ix) 4 ----- (رورک تاحاضو ینا برہم سز ب)؟ طیس مروایوؤک مولاع یک سا ۔

[B15C9] -----

[B150A] -----

زواعت یک پآ مہ ہورکش ک سزول یپس پڑ روم سا روا سزود تقوہتس یک یگہوچ ہس عول یک سز کوپوک سمان لوس سا
 ۔ یہ سزکوؤ سس لگن یک ربقوک

طختسدک طع بلاط سلاو سزکوؤقحت یکیشروینوی روترب

م ان [C010A] -----

خیرات یک ویورٹن [C020A] -----

نشکیس: (B) ت ام ول عم صا خ سے مل اوح یک رابورک یک راولیپ یک وویزیس یس وم ری غ:

.....؟ رلقم ی عوم جم یک نیخ ی عرز هوجوم [B010I]1

.....یک لویپ لوصرف وج سن پآ سے تیئج یک رکمتشک 2 [B02C5]

(i) چرم یرہ۔ 125

(ii) لاری هک۔ 18

(iii) ورام لقتی ش۔ 18

(iv) ٹوٹ اٹھ۔ 74

(v) یک تشک سے اچ یک رویزیس یس وم ری غ روطب سن پآ وج رویک یمنشن یک رولصرف نا) مولاع یک سا۔

.....(س ی)

79 [B020A].....

قل عتم سول یک یمنشن یک هعرد بقول عتم؟ هت ٹوک عیژڈ یک سزک لصاح چیب یک پآ سول یک رویزیس یس وم ری غ 3

س ی امهگ مریڈ درگنرا یک ربین [B03C4]

(i) ر ازابد۔ 117 (ii) س ی۔ ا۔ نیالی سٹکی چرپ۔ 77 (iii) لطف ت عارزی عیسوت، همک حم، یس س ی۔ فی۔

14

(iv).....(س یھل سے ت حاضو) روالی ٹوک مولاع یک سا ی۔

25 [B030A].....

یک زربین طمت نا)؟ هت ٹوک عیژڈ یک سزک بلریس سے یزپ وک لوصرف سول یک رولویپ یک رویزیس یس وم ری غ 4
ری غک هعرد سا ره روا (س ی توه لمتش رپ عیژڈ یک سزک لظرف یزپ یک پآ سول یک لوصرف وج روی امهگ مریڈ درگنرا
مریڈ سن پآ درگنرا یک ربین یک س ج رویک رهاظ یه یصرف ک یزپ لک سوگ سول لصاح سول یک لوصرف یک رویزیس یس وم
۔ ه لولگی

لوریس ربین	عیژڈ یک لوصح یک یزپ	یرویت یک لوصرف ک یزپ سوگ سول لصاح سے هعرد قلع تم یصرف ک یزپ هش لم عتس لک کت	ربین ٹوک ری غ تم
1	لوی بویٹ		[BO4P1]
2	رلوزک		[BO4P2]
3	عم ج ک شرلب لی ژوج لی بلات یزپ ٹوک ٹوک		[BO4P3]
4	رک ژوم خرک س وین لی روالی یزپ ٹوک لوصح		[BO4P4]
5	ٹوک عیژڈ سول یک یزپ مظن یرن		[BO4P5]
6	لوصح یک یزپ مولاع یک نا عیژڈ روا یک		[BO4P6]
7	وک ہوزک راحش) یصرف ی عوم جم یک نا یک سول یزک قوصت ۔ وصرف وس عم ج)		[BO4P7]

سیم س وپور) نگلا ی عوم جم لواو سناج یواھٹا ایم رابورک یک رولویپ یک رویزیس یس وم ری غ لاس س لھچید 5)

(i)۔ س پور۔ : [B05C1] چیب

(ii)۔ س پور۔ : هچر خک لوی بویٹ یزپ [B05C2]

(iii)۔ داھک : [B05C3]۔ س پور۔

(iv)۔ ت ایودا رام سٹکی : [B05C4]۔ س پور۔

(v)۔ تگلا ی مظن۔ : [B05C5]۔ س پور۔

(vi)۔ تگلا یک سناچ یزبس : [B05C6]۔ س پور۔

(vii)۔ تگلا یک سناچ یزبس : [B05C7]۔ س پور۔

(viii)۔ تگلا یک لیسرت : [B05C8]۔ س پور۔

(ix)۔ (س یھل سے ت حاضو یزبرم سول) هچر خ روالی ٹوک مولاع یک سا [B05C9]

----- (روم و وپور) یندم ایلو عنوه لصاح لاس متشرنگ روم دم یک رویزیس یجسوم ریغ [B060I]

یرسود رواروئزیس، تسروپ سروج لصریف یرسود پآ بج طرپ سس تشک یک رولویپ یک رویزیس یجسوم ریغ 7
عن لگا یک رویزیس یجسوم ریغ وک پآ عن هظنتنا یرسوس وت هت یتوک تشک (ریغوی ج روانچ، هنگ لثم) جان ا یندروخ -
روہ یتوک هت یک ستر یک پآ و جروہی لمگ وئ اد درگندرا یک ملت نا)؟ لت وک ادار لک وک روم سترک ینا دھوہی وک

(i) وک روعن ادار لک یھ یو وک عن هظنتنا یرسوس [B07C1] 21
(ii) وک شروک یک ینا کم هدیوم سس عیژدی زونق عن رونا نول یک هت اخ یک تشک یک لصریف یک تسروپ

[B07C2] - 43

(iii) عنوه مخرپ روط یک لصلتم یک عنلم طلو عنوه لصاح روا عنوه کورح یک سترک کوک تشک یک تس وپ

وک مدعوک [B07C3] 42

(iv) روم یدتغم (ریغوی تاویدا رام سترک روا، داک، جب سناج ی عرز عن هظنتنا یرسوس [B07C4] 93

(v) وک مطرف نواع تیک عنک نول یک رولویپ یک رویزیس یجسوم ریغ عن هظنتنا یرسوس [B07C5] 52

(vi) وک رویزیس یجسوم ریغ وک رورلنجز روم قلاع یک پآ مو یک تیلو وک طریق یک پآ عن هظنتنا یرسوس

روہ بیغیت یک رولویپ [B07C6] 7

(vii) ----- (روک تحاضو ینا برم سترک) روای وک مو لاع یک سا۔

[B070A]) 4

یک عورش سس نیرپ یفا دوخ تشک یک رویزیس یجسوم ریغ عن پآ بج ای) سناج وک روبجم روط ینونق 8-
روا تهم یو وک سس ضرغ یک سترک طوبضم روارشوم وک لصریف سا یک پآ روم روتروص روم عن هظنتنا یرسوس
؟ ے وک ادار لک ریشوم [B08C2]

(i) ن اد۔ 74 (ii) س ین۔ 63

یک تشک یک رویزیس یجسوم ریغ یک رولویپ اجرت تام اقا مو یک هظنتنا وت ے روم“ نا ہ ”بواج ک پآ رگا
روم رثا بولح سترک رورک تشک حرطسک عن رونا روم باختنا ۔ ے ولول

(i) ----- [B091A] 71

(ii) ----- [B092A] 37

(iii) ----- [B093A] 9

وگ وک سس فرطیک هظنتنا یرسوس رک تشک یصرف یتک یک رولگ یک پآ قباطم یک رظن متک یک پآ 10-
وئ اد درگندرا یک رجن کوا فرص)؟ هت یک چرک لصریف ک تشک یک رویزیس یجسوم ریغ یطیق سس تام اقا ینونق تسخ
وہ نعت سو زوم و جروہی لمگ [B10C10]

(ھصرف) 106 اک رقص (ii) ھصرف 20 ک 11-10 (iii) ھصرف 30 ک 21-7

(iv) ھصرف 4 ک 31-8 (v) ھصرف 50 ک 41-8 (vi) ھصرف 60 ک 51-1

(vii) ھصرف 70 ک 61-1 (viii) ھصرف 80 ک 71-1 (ix) ھصرف 90 ک 81-0

(x) ھصرف 100 ک 91-5

وگ وک سس فرطیک هظنتنا یرسوس رک تشک یصرف یتک یک رولگ یک پآ قباطم یک رظن متک یک پآ 11-
روا لگ ریڈ درگندرا یک رجن کوا فرص)؟ هت یک چرک لصریف ک تشک یک رویزیس یجسوم ریغ یطیق سس تام اقا ینونق تسخ
وہ نعت سو زوم و ج ([B11C10]

(ھصرف) 10 اک رقص 4 (ii) ھصرف 20 ک 11-4 (iii) ھصرف 30 ک 21-23

(iv) ھصرف 4 ک 31-17 (v) ھصرف 50 ک 41-12 (vi) ھصرف 60 ک 51-2

(vii) ھصرف 70 ک 61-6 (viii) ھصرف 80 ک 71-26 (ix) ھصرف 90 ک 81-4

(x) ھصرف 100 ک 91-41

پ تشک یک رویزیس یجسوم ریغ وک تشک یک تسروپ رک تشک یصرف یتک یک رولگ یک پآ روم لایخ یک پآ 12-
رجن کوا فرص)؟ ے ہرک روم روبجم نونق پ سترک لروا ینا هظنتنا یرسوس ک یک روم حیرت سس هجوس ا فرص
وہ نعت سو زوم و جروا لگ ریڈ درگندرا یک ([B12C10]

(ھصرف) 10 اک رقص 6 (ii) ھصرف 20 ک 11-4 (iii) ھصرف 30 ک 21-3

(iv) ھصرف 4 ک 31-28 (v) ھصرف 50 ک 41-16 (vi) ھصرف 60 ک 51-3

(vii) ھصرف 70 ک 61-7 (viii) ھصرف 80 ک 71-18 (ix) ھصرف 90 ک 81-6

(x) صرف 100 اے 48۔ 91

رویہ لہجہ مریڈ درگنرا یک ریجن کوا فرص)؟ ے اتوہ فلضاریم یندم آیک پآ ےس تشک یک رویزیس یمسوم ریغ 13۔
- وہ نہوت روزوم وج (B13C5)

(i)۔ سوہ لتوک قفتا ےس دم و نش۔ 13

(ii)۔ سوہ لتوک قفتا۔ 82

(iii)۔ سوہ لتوک مک ھیک لکش مہب۔ 28

(iv)۔ لتوک روئی قفتا۔ 9

(v)۔ سوہ لتوک نہوت ےس یتخس۔ 7

تلکن ملت نا)؟ رویہ لہجہ مریڈ ہیچ ہیچ یک سورکت تشک ےلاو ےزک تشک ےزیس یمسوم ریغ یم روگ یک پآ۔ 14۔
- رویہ لتوک نہوت یک فقوم یک پآ و ج رویہ لہجہ مریڈ درگنرا یک ریجن یک)
(i) رویہ مک یم طرف یک تایدو رام ےزیک رواداھک، چیب ےلاو ےزوہ لہجہ مریڈ تشک یک رویزیس یمسوم ریغ۔

[B14C1] 96 -

(ii) رویہ مک رو تھوق ینگنم یک تایدو رام ےزیک رواداھک، چیب ےلاو ےزوہ لہجہ مریڈ تشک یک رویزیس یمسوم ریغ۔

[B14C2] 91 -

(iii)۔ چرخ لاو ےنا ہایز پسرکت رازاب۔ [B14C3] 85

(iv)۔ رویہ مک تگلا ہایز ےلاو ےنا پلنٹ یتطرح ےول یک ےن ہکر ظوفح مک رویزیس ےوہ ےنگ ےم روئوپ۔ [B14C4]

1

(v)۔ یک یک (ترام) لہجہ یکونکت [B14C5] 45

(vi)۔ ازوہ ےن رسوم ک کھگی یرلیویب بسانم یم رازاب ےول یک رویزیس یمسوم ریغ [B14C6] 3

(vii)۔ تھوق یک یم رازاب یک رویزیس یمسوم ریغ [B14C7] 5

(viii)۔ لاحتروص ینوی ریغ یک تخررف تھوق یم رازاب یک رویزیس یمسوم ریغ [B14C8] 24

(ix)۔ (۔ رویہ تاحضرو ینا برم ےزب)؟ رویہ مروای ےوک مولاع یک سا۔

[B14C9] 83

[B140A]

ریجن یک تلکن ملت نا)؟ رویہ لہجہ مریڈ ہیچ ہیچ یک سورکت تشک ےلاو ےزک تشک ےزیس یمسوم ریغ یم ےس نچا دنمہم 15۔)
- رویہ لتوک نہوت یک فقوم یک پآ و ج رویہ لہجہ مریڈ درگنرا یک

(i)۔ رویہ مک یم طرف یک تایدو رام ےزیک رواداھک، چیب ےلاو ےزوہ لہجہ مریڈ تشک یک رویزیس یمسوم ریغ 121

(ii) رویہ مک رو تھوق ینگنم یک تایدو رام ےزیک رواداھک، چیب ےلاو ےزوہ لہجہ مریڈ تشک یک رویزیس یمسوم ریغ۔

[B15C2] 112 -

(iii)۔ چرخ لاو ےنا ہایز پسرکت رازاب۔ [B15C3] 94

(iv)۔ رویہ مک تگلا ہایز ےلاو ےنا پلنٹ یتطرح ےول یک ےن ہکر ظوفح مک رویزیس ےوہ ےنگ ےم روئوپ۔ [B15C4]

6

(v)۔ یک یک (ترام) لہجہ یکونکت [B15C5] 53

(vi)۔ ازوہ ےن رسوم ک کھگی یرلیویب بسانم یم رازاب ےول یک رویزیس یمسوم ریغ [B15C6] 6

(vii)۔ تھوق یک یم رازاب یک رویزیس یمسوم ریغ [B15C7] 6

(viii)۔ لاحتروص ینوی ریغ یک تخررف تھوق یم رازاب یک رویزیس یمسوم ریغ [B15C8] 19

(ix)۔ (۔ رویہ تاحضرو ینا برم ےزب)؟ رویہ مروای ےوک مولاع یک سا۔

[B15C9] 65

[B150A]

[B150A]

زواعت یک پآ مہ۔ رویہ مک ےول ےس پد یم سا روا ےنڈ تقوہتس یک ےگھی ےس ےول یک ےزک ریپ وک ےملز لوس سا
- رویہ ےتھوق ےس لگن یک رنق وک

بطختسد یک لہجہ بلط ےلاو ےزک قوقحت یک ےسرو ینوی روئوپ

م: [C010A]

خیرات یک ویورٹا [C020A]

Appendix 3
Environmental Survey Mohammad Agency

QUESTIONNAIRE-01
Perceptions of Off-Season Vegetables Growers about the Environmental Impact of
Fertilizers and Pesticides in Mohammad Agency

A. General Information

1. Name of village _____ [A010A]
2. Name of subdivision _____ [A020A]
3. Agency _____ [A030A]
4. Name of community _____ [A040A]
5. Enter 5-digit location code _____ [A05C5]
6. Name of OSV grower _____ [A060A]
7. Total area of OSV plots (Marla)
 - a. CFY (2013-2014 OSV crop) _____ [A07I1]
 - b. LFY (2012-2013 OSV crop) _____ [A07I2]
8. Source of funding for start-up costs of OSV production? [A08C4]
 1. Your own resources
 2. Agriculture extension dept/ FATA ADP projects
 3. NAS projects
 4. Other (please specify source) _____ [A080A]

B. Fertilizers use for OSV production

1. Sources of fertilizer for OSV production? (circle all that apply)
 1. Farm yard manure (FYM) [B01C1]
 2. Chemical fertilizers [B01C2]
 3. Other (please specify sources) _____ [B01C3]

2. Quantity of fertilizer used for OSV production per Marla? [B02C4]
 1. No chemical fertilizer applied to OSV crop.
 2. 1 to 10 kilograms per Marla.
 3. 10 to 20 kilograms per Marla.
 4. 20 to 30 kilograms per Marla.
 5. More than 30 kilograms per Marla.
3. Number of dosing applied per crop? [B03C5]
 1. No fertilizer applied
 2. 1 dosing per OSV crop
 3. 2 dosing per OSV crop
 4. 3 dosing per OSV crop
 5. 4 dosing per OSV crop
 6. More than 4 dosing per OSV Crop

4. Cost of fertilizer in Rabi season? [B04C5]

1. No fertilizer applied
2. Less than 3.000 rupees
3. 3.000 - 6.000rupees
4. 6.000 - 10.000 rupees
5. More than 10.000 rupees

5. Cost of fertilizer in Kharif season? [B05C5]

1. No fertilizer applied
2. Less than 3000 rupees
3. 3000-6000 rupees
4. 6000 – 10000rupees
5. More than 10000 rupees

6. Total cost per OSV growing season?

S. No.	Description	Cost (Rupees)	Code
1	Land preparation cost of unit Marla's OSV plot		[B06I1]
2	Seed cost/Nursery raising for seedling cost		[B06I2]
3	Total fertilizers cost (including all doses crop)		[B06I3]
4	Irrigation watering cost		[B06I4]
5	Total labor cost (including sowing, watering, weeding & hoeing, ridging picking & packaging)		[B06I5]
6	Transportation		[B06I6]
7	Total		[B06I7]

7. What percent of the total fertilizer applied year round is left in the soil? [B07C4]

1. Less than 10 percent
2. 10 to 20 percent
3. 20 to 30 percent

8. What percent of the total fertilizer applied year round is left in the water? [B08C3]

1. Less than 10 percent
2. 10-20 percent
3. 20-30 percent

9. Is the water containing fertilizer runoff /ground water used for human consumption? [B09C2]
1. Yes
 2. No
10. Is the water containing fertilizer runoff/ground water used by livestock? [B10C2]
1. Yes
 2. No
11. Are there any residual effects from fertilizer use? (circle all that apply)
1. Water does tastes different [B11C1]
 2. Fish kill [B12C2]
 3. Effect on livestock [B13C3]
 4. None of the above [B14C4]
 5. All of the above [B15C5]

C. Pesticide use for OSV production

1. Sources of pesticides for OSV production? (circle the one that best applies)
1. Local village market [C01C1]
 2. Agency headquarters' market [C01C2]
 3. Other (please specify sources) _____ [C01C3]
 4. All of the above. [C01C4]
2. Timing of pesticide applications during OSV crop life?
- a. Before sowing [C02aC2]
 - b. During sowing [C02bC2]
 - c. After sowing [C02cC2]
 - d. During flowering [C02dC2]
 - e. Mature crop/fruited stage [C02eC2]

3. Quantity of pesticide used per acre for OSV production? (complete all that apply)
 1. No pesticide is applied to OSV crops. [C03C1]
 2. Number of bottles _____ [C03C2N]
Indicate quantity per bottle in millilitres or litres (please specify unit of measurement) _____ [C03C2Q]
 3. Number of packs _____ [C03C3N]
Indicate quantity per pack in kilograms _____ [C03C3Q]
4. Number of doses applied per OSV crop? _____ [C040I]
5. Cost of pesticide in Rabi season (in rupees)? _____ [C050R]
6. Cost of pesticide in Kharif season? (in rupees) _____ [C060R]
7. Total cost per year (in rupees) _____ [C07C1]
8. What percent of the total pesticide used is left in the soil? [C08C3]
 1. Less than 10 percent
 2. From 10 to 20 percent
 3. From 20 to 30 percent
9. What percent of the total pesticide used is left in the water? [C09C3]
 1. Less than 10 percent
 2. 10-20 percent
 3. 20-30 percent
10. Is the runoff from irrigation used for human consumption? [C10C2]
 1. Yes
 2. No
11. Is the runoff from irrigation used by livestock? [C11C2]
 1. Yes
 2. No
12. Are there any residual effects from pesticide use? (circle all that apply)
 1. Water does not taste good [C12C1]
 2. Fish kill [C12C2]
 3. Effect on livestock [C12C3]
 4. Any other _____ [C12C4]
 5. All of the above [C12C5]
 6. None of the above [C12C6]

D. Perspective planning and use of pesticides

1. Do you think that pesticides are more effective in OSV production than with normal crops? [D01C2]
 1. Yes
 2. No

2. If your answer is YES to the previous question, please give three reasons explaining its effectiveness; otherwise, proceed to question 3.

- 1. _____ [D02A1] 2.
- _____ [D02A2] 3.
- _____ [D02A3]

3. Are other villagers using these pesticides without harming the environment? [D03C2] 1.

- Yes
- 2. No

4. If your answer is YES to question 3, how should people apply pesticides and fertilizers without harming the soil and water? Please provide 3 precautionary recommendations.

- 1. _____ [D03A1] 2.
- _____ [D03A2] 3.
- _____ [D03A3]

Thank you for your time and attention in completing this survey! We appreciate your cooperation.

Signature of the researcher/UoP student: _____

5. Print your name _____ [D050A]

Date of interview _____ [D060A]