

PROMOTING SWI IN MOUNTAIN FARMS OF HIMACHAL PRADESH

-Final Report-

I. INTRODUCTION

I.1 Background: In 2006, PSI introduced the SRI system in seven mountain watersheds of Himachal Pradesh and Uttarakhand to study its potential. The trials covered 40 farmers in 25 villages. The results showed an average increase of about 66 per cent in paddy yields from the SRI plots compared to the conventional plots. Inspired by the results obtained for the paddy crop, in Rabi 2006, PSI carried out crop intensification trials on wheat (SWI) at its Niranjapur farm in 2006. Two varieties of wheat - HD-2329 and PBW-396 were grown at different row-to-row and plant-to-plant spacing (20cm x 20cm and 15cm x 15cm). In the field trials, the average productivity of HD2329 wheat went up from 17 Q/ha to 21 Q/ha, a jump of about 25 per cent. In PBW 396 the average yield increased about 57 per cent from 14.5 Q/ha to 23 Q/ha! Thus field trials on research farm of PSI of crop intensification technique on wheat showed an average increase of about 25-55 per cent in grain yields from the SWI plots compared to the conventional method.

Encouraged by the above results, during 2007 Rabi season, PSI conducted further trials of SWI on farmlands of 35 farmers in Uttarakhand and 15 farmers in Himachal Pradesh, both under irrigated and unirrigated conditions. The average productivity of irrigated wheat went up from 22 Q/ha to 43 Q/ha, showing about 95 percent increase in grain yields. Similarly, under unirrigated conditions, the average yield increased by about 63 per cent from 16 Q/ha to 26 Q/ha! The straw yields from SWI crop under irrigated and unirrigated conditions increased by about 87 and 48 per cent respectively. On the basis of the results of the previous two years, PSI further decided to popularize the SWI technique in the two mountain states.

I.2 PSI's Initiative: In 2008 Rabi season, PSI formulated a practical strategy for promoting SWI technique and its extension in the state of Himachal Pradesh (H.P.). PSI made a commitment to cover about 500 farmers under SWI in three districts (Bilaspur, Kangra, and Sirmour) of H.P. The financial assistance for the proposed expansion of the SWI experiment in H.P. was sought from WWF-ICRISAT, Hyderabad.

PSI has successfully undertaken the SWI programme from November 2008 to May 2009. It has been able to introduce about 470 farmers to the SWI technique in the three selected districts of HP. In all the areas, the farmers have expressed immense satisfaction with the results. The perceived benefits are (i) less seed requirement, (ii) saving in water and (iii) high grain and straw yields. Other farmers in the selected and neighboring villages also expressed a desire to adopt the SWI method in the coming year.

Of the estimated total cost of Rs. 6,69,500 received from WWF-ICRISAT for the programme, an expense of Rs. 6,77,034 has been incurred. Apart from the above, PSI and its partner organizations also made a contribution of Rs. 2,57,050 towards the programme.

II. OBJECTIVES & OUTCOMES

PSI functioned as a support institution for popularizing the SWI technique and promoting its extension in the selected villages of HP. Its proposed activities included training of master trainers and conducting trials in a systematic manner in different agro-climatic conditions of the state.

II.1 Goal and Objectives: The goal of the programme was to enable mountain farmers in selected districts of HP to enhance food and livelihood security through adoption of the SWI technique. The major objectives of the proposed programme were to:

1. Undertake capacity building of farmers in Himachal Pradesh to adopt the SWI technique for wheat cultivation.

2. Build the capacities of voluntary organizations in Himachal Pradesh by creating a talent pool of master trainers for promoting SWI.
3. Influence state agricultural policy for promoting the extension of the SWI technique.

II.2 Outcomes: PSI proposed the following important outcomes.

1. Adoption of the SWI method of wheat cultivation by 500 farmers in HP.
2. Creation of a talent pool of 5 master trainers from among 5 VOs and progressive farmers who will continue to promote SWI in the future.
3. Increased production of organic wheat with a minimum average grain yield of 2.5 T/ha.
4. Advocacy with agricultural extension officers and state government to promote in the state and increase the project's impact.

III. PROGRAMME DETAILS

PSI conceptualized a two-pronged approach. The first step was to enroll 500 farmers of about 64 villages of HP in training workshops on the SWI technique for wheat cultivation. The second major activity was its advocacy with farmers and the state so that the application takes off all across the region.

III.1 Selection of Partner Organizations (POs): PSI commenced the programme activities by selecting **5 partner organizations (POs) in 3 districts** of HP (See Appendix I). These included ERA, CORD, GSA in Kangra district; SATHI in Sirmour district and MVS in Bilaspur district. Out of these 5 partners three had earlier worked with PSI to promote SWI in their operational areas.

III.2 Selection of Master Trainers: Each PO deputed one person as Master Trainer who was exclusively dedicated to the SWI promotion programme. Preference was given to workers who have experience of promoting SWI/SRI. These persons functioned as master trainers and supported the farmers in their areas.

III.3 Orientation Workshops for Farmers: A total of 32 one day farmers' orientation workshops were organized by PSI and its partners with the help of master trainers, covering about 768 farmers (against a target of 500 farmers). At each of these workshops, an average of about 20-25 farmers from a cluster of 5-6 villages registered their participation (See Appendix II). The presentations focused on informing and educating the farmers in the procedures of the SWI method. The training methodology included lectures, discussions, demonstration and field exercises. Specially prepared curricular materials in Hindi and teaching aids were used. A set of weeder was provided amongst a group of 10 farmers.



Farmers' Orientation Programme on SWI



Seed Treatment during Farmers' Orientation Programme



Field preparation during Farmers' Orientation Programme on SWI



Seed Sowing during Farmers' Orientation Programme on SWI

III.4 Field Support Activities: Beginning in mid-November 2008, field support was launched by PSI staff along with its partners, for providing support to the SWI farming communities during land preparation, seed selection, seed treatment, sowing, irrigation, weeding, manuring and subsequent growing stage. These follow-up activities along with its partners also included preparation of liquid organic manures such as Panch Gavya, Amrit Ghol and Matka Khad. PSI staff along with Master Trainers extended field support to the SWI farmers of the selected villages, right upto the harvesting stage in April-May 2009. To a large extent, the field support activities ensured a proper follow-up by the trained farmers in the farms and also in trouble-shooting.



Field support during Field Preparation



Field support during Seed Sowing



Farmers using Mandva weeder



Water management in SWI field

A total of 468 farmers finally adopted SWI in 8.64 ha of farmlands. (See Appendix III for district wise details of SWI farmers and area covered).

Table 1: Programme Coverage of SWI in Himachal Pradesh (2008-2009):

Districts covered	Number of villages covered	Farmers trained	Farmers who adopted SWI	Area under SWI (ha)
3	64	768	468	8.64

To a large extent, the field support activities have helped in ensuring a proper follow-up by the trained farmers in the farms and also in trouble-shooting. During the field visits, efforts were also made to encourage farmers to further improve upon the existing SWI practices.

III.5 Information Dissemination: Information regarding the SWI technique was provided in the six-monthly newsletters produced by PSI, to reach out to the farming communities in the state. PSI is presently preparing a manual on SWI (in Hindi) based on the demonstrations and experiences of SWI farmers.

III.6 Extension & Policy Advocacy:

(a) **Linkage with other Institutes:** Throughout the course of the programme, PSI has ensured the involvement of the district & block level government officials, agricultural extension officers, scientists & trainers of KVKs, CSKHP Agriculture University, Palampur; Rice and Wheat Research Centre, Malan etc. PSI and its partners also invited representatives of above offices and institutions in the crop cutting exercises. Selected representatives from the above institutions were also included as members of the Programme Advisory Committee.

(b) **Experience-sharing Workshops:** During the harvesting phase of the wheat crop, PSI encouraged its partners to organize field visits of other farmers to SWI farms to get direct feedback from the SWI farmers. Five one day experience sharing workshops were

conducted in the months of April-May 2009, covering all the three districts. During these workshops, crop cuttings were conducted and SWI farmers shared their experiences with officials and other farmers.

Table 2: Details of SWI Experience Sharing Workshops held in H.P.

PO	District	Date of Workshop	Farmers	NGO Personnel	Agr.Dept. & KVK	Others	Total
MVS	Bilaspur	21.04.09	62	7	3	5	77
SAATHI	Sirmour	25.04.09	56	5	8	2	71
ERA	Kangra	27.04.09	70	3	7	2	82
GSA	Kangra	08.05.09	40	6	7	2	55
CORD	Kangra	18.05.09	11	2	0	1	14
TOTAL	3		239	23	25	12	299



Field visit during experience sharing workshop.



Experience Sharing Workshop at Thakurdwara, Sirmour, H.P.

PSI's and POs' staff briefed the workshop participants about the SWI technique and participating local farmers also shared their experiences. Field trips to SWI fields were also organized on the occasion for conducting crop-cutting exercises for data gathering and comparing the yields by the SWI and conventional methods.



SWI Crop ready for Harvesting



Non SWI crop affected by lodging

Overall analysis of results of crop-cutting exercises showed that under unirrigated conditions, while the non-SWI yields stood close to 17 quintals per ha, the SWI yields were around 33 quintals per ha (average increase of 90 %). Similarly, under irrigated conditions, the SWI yield was about 50 quintals per ha as compared to non-SWI yield of around 28 quintals per ha (average increase of about 82 %) (See Table 3).

Table 3: Crop cutting results of wheat crop in Himacahal Pradesh (2008-09)

S. No.	Particulars	Unirrigated		Irrigated	
		Conv.	SWI	Conv.	SWI
1	No. of Farmers	317		151	
2	Area (ha)	-	2.94	-	5.70
3	Average no. of productive tillers/Plant	2	11	2	11
4	Average Plant Height (cm)	69.6	98.6	81.8	90.2
5	Average Panicle Length (cm)	5.9	13.2	8.5	12.3
6	Average No. of Grains/Panicle	31	61	35	71
7	Grain Yield (Q/ha)	17.4	33.2	27.7	50.4
8	Straw Yield (Q/ha)	21.6	44.0	36.6	69.5
9	% Increase in Grain Yield	-	91		82
10	% Increase in Straw Yield	-	104		90



Non SWI and SWI fields



SWI Farmers sharing experiences



Women farmers displaying SWI harvest



Non SWI and SWI Panicles

During the harvesting phase of the SWI wheat crop, most farmers expressed happiness and satisfaction at the results. Some of the other benefits perceived by the SWI farmers include: seed saving, less lodging and high grain quality.

At the end of each experience sharing workshop, discussions were organized for evolving future strategies for effective extension of this method to other areas.

III.7 Crop Yields: Appendix IV gives details of crop cutting results of SWI crops undertaken through different methods (direct seed sowing, line sowing and transplanting

at different spacings) under irrigated and unirrigated conditions. Both under unirrigated and irrigated conditions, SWI seed sowing (2 seeds per hill) was done in two ways: 8" x 8" (375 farmers) and 6" x 6" (58 farmers). Under unirrigated conditions, results showed 84 per cent increase in grain yields with 8" x 8" spacing and more than 100 per cent increase in grain yield with 6" x 6" spacing. Under irrigated conditions, results showed 71 per cent increase in grain yields with 8" x 8" spacing and 60 per cent increase in grain yield with 6" x 6" spacing. One farmer in Kangra district of HP tried out a spacing of 8" x 6" and obtained 67 per cent increase in grain yield under irrigated conditions.

PSI also carried out trials with transplanting of single wheat saplings with 6" x 6" (9 farmers) and 8" x 8" spacing (5 farmers) under irrigated conditions. The results are very encouraging, showing 110 per cent and 71 per cent increase in grain yields for 6" x 6" spacing and 8" x 8" spacing respectively. One farmer from Kangra district carried out transplanting of two saplings at 8" x 6" spacing and obtained more than 150 per cent increase in grain yield.

About 19 farmers undertook line sowing of seeds at 6" spacing (without maintaining plant to plant spacing) under irrigated conditions. The results from their farms showed 68 per cent increase in grain yield (the SWI crop yield was about 47 quintals per ha as compared to conventional yield of 28 quintals per ha).

Based on the results, farmers can be suggested to adopt line sowing of wheat seed in the first year. Thereafter, they can be motivated to adopt 6" x 6" spacing under un irrigated conditions and 8" x 8" spacing under irrigated conditions. Under irrigated conditions, transplanting of wheat saplings can also be done to obtain higher yields.

III.8 Research & Process Documentation: PSI undertook a comparative study of inputs required and benefits obtained by conventional and SWI method. For this, master trainers assisted the farmers to record information and data pertaining to various inputs (seed, labor, water, manure, pesticide etc) and output (grain and straw yields) for both conventional and SWI method of wheat cultivation. PSI's resource person later analyzed

the data received from about 266 farmers. The data has generated information regarding seed savings, water savings, labour requirement, and cost-benefit analyses (See Appendix V). The cost-benefit analysis of the SWI crop showed that the SWI crop gave far better returns to the farmer as compared to the conventional wheat crop. The C-B ratio of SWI crop is 1:1.8 as compared to 1:1.2 of conventional broadcasted wheat crop. Analysis of farmers' level data showed 70 per cent saving in seed.

PSI and its partners documented the various processes involved in the implementation of the programme. The documentation and sharing of experiences of the various activities such as training of master trainers, orientation workshops, field support activities, exposure visits, performance of crop at different stages, and experience sharing workshops have led to adequate learning outcomes. The outcomes generated, both positive and negative, would be taken into account for devising suitable strategies, which would serve as useful inputs for extension of the SWI technique in future in the entire state.

III.9 Programme Monitoring

In the beginning of the programme itself, PSI constituted a panel of experts -- including members of its senior staff and experienced persons, and a representative from WWF-ICRISAT into a Programme Advisory Committee (PAC) for regular appraisal of the programme.



Visit of Dr. J. Shekhar, Rice and Wheat Research Centre, Malan to SWI farmlands



Visit of Dr. B. L. Kapoor, CSKHP University of Agriculture, Palampur to SWI farmlands

The role of the PAC was to review the programme through field visits as well as by holding meetings with the programme staff. Teams consisting of two persons - one external PAC member and one internal PSI staff were constituted for field visits to the programme areas of Himachal Pradesh. Members of the PAC also participated in the district-level experience sharing workshops.

IV PROBLEMS ENCOUNTERED AND LESSONS LEARNT

IV.1 Problems Encountered:

(i) Manual sowing of seed: The SWI farmers faced problem in manual sowing of seeds (two per hill) as it is too labour intensive. Analysis of farmers' level data showed that the labour cost (though family labour) was higher by about Rs. 850 per ha in case of SWI. A seed drill is therefore being designed by PSI for reducing the labour input.

(ii) Rainfall Aberration: Non-occurrence of rains under rainfed conditions resulted in problems during field preparation, germination of seed, crop growth and operation of weeder.

(iii) Variation in Adaptability of SWI: There is lot of variation in adoption of SWI by farmers in terms of no. of seed sown per hill, line to line & seed to seed spacing, use of weeder, and application of manure. Farmers have applied SWI to very small plots (200 sq. m. on an average). This is mainly due to the fear of reduced yields in case of adopting SWI principles.

(iv) Use of Equipment: PSI has modified the design of Mandava weeder (by reducing the width) for the wheat crop. According to some farmers, the hand-operated marker and Mandava weeder are difficult to handle in dry conditions. The farmers especially faced problems in operating the weeder during first weeding after 20 days of sowing, as the plant was too small for weeder use and prevailing dry soil conditions. Use of rake is recommended for weeding under rainfed conditions.

(v) **Problem of animals and pests:** Farmers reported damage to wheat crops due to animals such as monkeys, pigs, rats and birds as well as pests. This also resulted in low crop yields.

IV.2 Lessons Learnt: Certain specific actions need to be undertaken for effective promotional activities on SWI in the state.

- **Flexibility in Adaptation:** While adopting SWI, the farmers are reluctant to adopt the two basic principles of early seed sowing and distant spacing of seed. Early seed sowing is possible where irrigation facilities are available. Initially, the farmers should be encouraged to adopt line sowing instead of broadcasting method and reduce the seed rate. Thereafter, they can be motivated to adopt 6” x 6” spacing under unirrigated conditions and 8” x 8” spacing under irrigated conditions. Under irrigated conditions, transplanting of wheat saplings can also be done to obtain higher yields.
- **Quality Equipments:** There is a need to develop a seed drill and weeder as per the requirement of SWI. The seed drill designed by PSI needs to be further modified and field tested. Farmers should be suggested to use rake instead of Mandava weeder for weeding under rainfed conditions. SWI farmers ignored the regular use of Mandava weeder, even under irrigated conditions. This is because some farmers preferred manual weeding and others found three weedings too labour intensive at least in the first year. The cost of these equipments should be affordable to the farmers and adequate outlets of seed drill and weeders are also required. Local fabricators need to be trained for manufacture of equipments in adequate numbers.
- **Cadre of Master Trainers:** A cadre of master trainers at the village level needs to be created for mobilizing farmers to adopt SWI and provide timely support to the farmers. Experienced SWI farmers can take on the role of village level resource persons in the future. This would also meet the unavailability of adequate master trainers with the partner organizers.

- **Expansion of Area:** The total area under SWI is only 8.64 ha for 468 farmers. In the first year of adoption, the farmers are reluctant to adopt SWI. Further extension within the SWI villages is required to increase the area coverage. There is ample scope and need for covering more fields under SWI, especially to meet the food requirements of the small and marginal farmers. Each farmer should be motivated to bring at least 0.1 ha of land under SWI. Expansion in other non-SWI districts in Himachal Pradesh also needs to be considered.
- **Package of Practices:** There is a need to come up with a package of recommendations for the farmers for different agro-climatic zones of mountains. CSKHP Agricultural University and RWRC, Malan should conduct active research on application of SWI and SCI method on wheat and other crops at their farms and on farmers' lands. Performance of transplanted wheat saplings need to be further tried under SWI. Similarly, applications of SWI on different disease resistant and high tillering varieties also need to be tried.
- **Exposure Visits:** Non SWI farmers need to be exposed to the SWI wheat fields prior to the harvesting of crops as well as during harvesting. This would help in expansion of area coverage. Officers and scientists from Agriculture Departments and KVKs also need to be exposed to the SWI technique for policy advocacy. This would also help in strengthening partnership with Government machinery.
- **Training Material:** There is a need to prepare training materials in the form of manual and poster set on SWI, which would help the Master Trainers in explaining the technique to the farmers.
- **Policy Advocacy:** There is a need to formulate a practical strategy to make the technique popular in the mountain state. The government should develop a policy for promotion of SWI in the state. Incentive for growing SWI wheat in the form of equipments, manure, organic pesticide, etc. will help in the promotion of SWI.

APPENDIX I

List of Partner Organisations selected for the programme

S. No.	Name of the Agency	Operating District
1.	Manav Vikas Sansthan (MVS)	Bilaspur
2.	Chinmaya Organisation for Rural Development (CORD)	Kangra
3.	Society for Environment and Rural Awakening (ERA)	Kangra
4.	Gramin Sewa Ashram (GSA)	Kangra
5.	Social Awareness Through Human Involvement (SATHI)	Sirmour

APPENDIX II

Training Programmes conducted for SWI

S. No.	Name of PO	Venue	Date	District	Farmers Trained	
					Target	Achieved
1	Chinmaya Organisation for Rural Development (CORD)	Ladwara	08-11-08	Knagra	150	70
		Rapper	10-11-08	,,		14
		Barhoon	10-11-08	,,		14
		Buther	13-11-08	,,		11
		Bakulja	13-11-08	,,		6
		Jikali Kothi	18-11-08	,,		7
		Andretta	18-11-08	,,		15
		Hatwaas Bhuner	18-11-08	,,		19
		Jadrangal	18-11-08	,,		8
		Rajiyana	20-11-08	,,		9
		Mallan	20-11-08	,,		7
		Dhaloon	22-11-08	,,		9
		Jogipur	23-11-08	,,		6
		Gharla	26-11-08	,,		7
		Jamanabad	26-11-08	,,		4
		Kund	27-11-08	,,		9
Tung Narwana	29-11-08	,,	7			
	Sub Total		17		150	222
2	Gramin Seva Ashram (GSA)	Panaper	20-11-08	Kangra	100	47
		Mansimbal	02-12-08	,,		30
		Khadoth Balla	04-12-08	,,		40
		Guna Shaloh	06-12-08	,,		60
		Khadoth	08-12-08	,,		60
	Sub Total		05		100	237
3	Society for Environment & Rural Awakening (ERA)	Thati	07.11.08	Kangra	100	20
		Salihar	15.11.08	,,		31
		Kukriyana	08.11.08	,,		13
		Tikker	08.11.08	,,		09
		Thalakan	17.11.08	,,		20
		Lihis/Chadambu	18.11.08	,,		25
	Sub Total		06		100	118

S. No.	Name of PO	Venue	Date	District	Farmers Trained	
					Target	Achieved
4	Manvav Vikas Sansthan (MVS)	Dehra	10-11-08	Bilaspur	100	65
		Kot	15-11-08	„		50
		Kalol (Kutla)	22-11-08	„		30
	Sub Total		03		100	145
5	Social Awareness Through Human Involvement (SATHI)	Thakurdwara	06-10-08	Sirmour	50	46
	Sub Total		01		50	46
Total	5		32	3	500	768

APPENDIX III

District wise Details of SWI farmers and Area Covered

S. No.	District	Name of PO	No. of Villages/GP	SWI Farmers	Area (Ha)		
					Unirrigated	Irrigated	Total
1.	Kangra	Chinmaya Organisation for Rural Development (CORD)	25	105	0.62	1.46	2.08
		Gramin Seva Ashram (GSA)	10	102	-	1.88	1.88
		Society for Environment & Rural Awakening (ERA)	12	100	1.92	-	1.92
		Sub-Total	47	307	2.54	3.34	5.88
2.	Bilaspur	Manvav Vikas Sansthan (MVS)	5	108	-	2.10	2.10
		Sub-Total	5	108	-	2.10	2.10
3.	Sirmour	Social Awareness Through Human Involvement (SATHI)	12	53	0.40	0.26	0.66
		Sub-Total	12	53	0.40	0.26	0.66
TOTAL			64	468	2.94	5.70	8.64

PSI

APPENDIX IV A Crop Cutting Results of SWI (2009)

Method	No. of Tillers/ plant (Avg.)	Average Plant Height (cm.)	Average Panicle length (cm)	Average no. of grains/panicle	Average grain yield (Q/Ha)	Average straw yield (Q/Ha)
UNIRRIGATED						
Conventional	2	70	6.0	31	17.4	21.6
SWI (8" X 8") 119 Farmers	12	103	13	62	31.9 (84% increase)	42.2 (96% increase)
SWI (6" X 6") 32 Farmers	10	90	14	61	36 (107% increase)	47.7 (121% increase)
IRRIGATED						
Conventional	2	84	8.6	33	27.2	36.1
SWI (8" X 8") 256 Farmers	13	92	11	66	46.4 (71% increase)	52.3 (45% increase)
SWI (6" X 6") 26 Farmers	13	96	13	69	43.4 (60% increase)	57.3 (59% increase)

APPENDIX IV B Crop Cutting Results of SWI (2009)

Method	No. of Tillers/ plant (Avg.)		Average Plant Height (cm.)		Average Panicle length (cm)		Average no. of grains/panicle		Average grain yield (Q/Ha)		Average straw yield (Q/Ha)	
	Con.	SWI	Con.	SWI	Con.	SWI	Con.	SWI	Con.	SWI	Con.	SWI
IRRIGATED												
2 Seed Sowing 8'' x 6'' (1 farmer)	2	14	75	95	8	13	42	88	29.3	48.9 (67% inc)	38.0	63.8 (68% inc)
Single Plant Transplanting 6'' x 6'' (9 farmers)	1	9	88	90	9	13	28	71	26.1	54.8 (110% inc)	35.1	70.1 (100% inc)
Single Plant Transplanting 8'' x 8'' (5 farmers)	2	11	75	82	8	13	42	82	29.3	50.2 (71% inc)	38.0	71.4 (88% inc)
Double Plant Transplanting 8'' x 6'' (1 farmer)	2	19	75	95	8	14	42	86	29.3	75.7 (158% inc)	38.0	125.8 (231% inc)
Line Sowing 6'' (19 farmers)	1-2	2-3	82	89	8	10	35	58	27.7	46.6 (68% inc)	36.6	69.4 (90% inc)

APPENDIX V
Cost Benefit Analysis of SWI and Conventional Wheat Crop

S. No.	Condition	Conventional				SWI			
		Total Expenditure (Rs./ha)	Gross Income (Rs./ha)	Net Profit (Rs./ha)	C-B Ratio	Total Expenditure (Rs./ha)	Gross Income (Rs./ha)	Net Profit (Rs./ha)	C-B Ratio
1	Unirrigated	24,528	24,992	464	1:1.02	35,660	63,241	27,581	1:1.77
2	Irrigated	35,580	46,055	10,475	1:1.29	35,357	65,272	29,915	1:1.85
	Average	29,360	34,173	4,813	1:1.16	35,490	64,093	28,603	1:1.81

Source: Based on Farmers' Level Data collected (Sample Size: 266 farmers)