ANNEX-J

Workshop

THE STUDY ON DIVERSIFIED AGRICULTURE FOR ENHANCED FARM INCOME IN THE STATE OF HIMACHAL PRADESH

FINAL REPORT

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WORKSHOP

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J-1 Objectives and General Flow of Workshops

Workshops were organized during February-September 2008 in the second and third field works in the Study. The participants in the workshops were agricultural development officers (ADOs) and agriculture extension officer (AEOs) of block offices, soil conservation officers and district officers of Agricultural Department, officers of Marketing Board and officers from other agriculture-allied line departments (Department of Horticulture, Department of Animal Husbandry, and Department of Fishery) in all twelve (12) districts of the State.

The objectives of the workshops are to:

i) Absorb the needs of respective 75 blocks for agricultural diversification, especially for crop diversification to vegetables in order to reflect block needs in formulation of the Master Plan and Action Plan, and
ii) Provide capacity development in agricultural planning to block and district officers of Agricultural Department, Marketing Board and other line departments.

The implementation time and agenda of the Workshops are summarized in the following Table J-1.1.

Table J-1.1 Schedule and Brief Agenda of the Workshops

Workshop	Implementation Period/Date	Implementation Place	Agenda
First Workshop	February 25 to March 5, 2008	11 Districts (except Lahaul & Spiti)	✓ Requesting each block officers for collecting information/needs on block basis for crop diversification, and ✓ Explanation of required information/needs
Second Workshop	April 11, 2008	Shimla at SAMETI office	✓ Explanation of M/P and draft Program Components to district officers, and ✓ Re-explanation of required information/needs
Third Workshop	June 12 to 24, 2008	All 12 Districts	✓ Re-explanation of M/P, draft Program Components and target small & marginal farmers, ✓ Re-explanation of required information/needs, and ✓ Check of data collection by blocks and Discussion on the collected data
Final/Fourth Workshop	August 23 to September 6, 2008	All 12 Districts	✓ Re-explanation of M/P, draft Program Components and target small & marginal farmers, ✓ Confirmation of submitted data/information on block basis, and ✓ Discussion on priority Program Components of respective blocks in workshop among participants

Source: JICA Study Team

In order to achieve the objectives mentioned above, the Study Team requested the block officers in the 12 districts of the State to grasp development needs of farmers and panchayats for crop diversification in each block through the four workshops.

The Study Team provided a detailed explanation of needs-survey forms for plan formulation in the first workshop to the block officers aiming at capacity building for the diversification planning. The second and third workshops were held to explain the programs of draft Master Plan to district or block officers and assist them in planning of realization of the block needs. Between the first and fourth workshops, the Study Team reviewed the block needs and candidate plans for the diversification. The

candidate plans prepared by each block and block's priority of the program components in draft Master Plan were confirmed in the final workshop the needs.

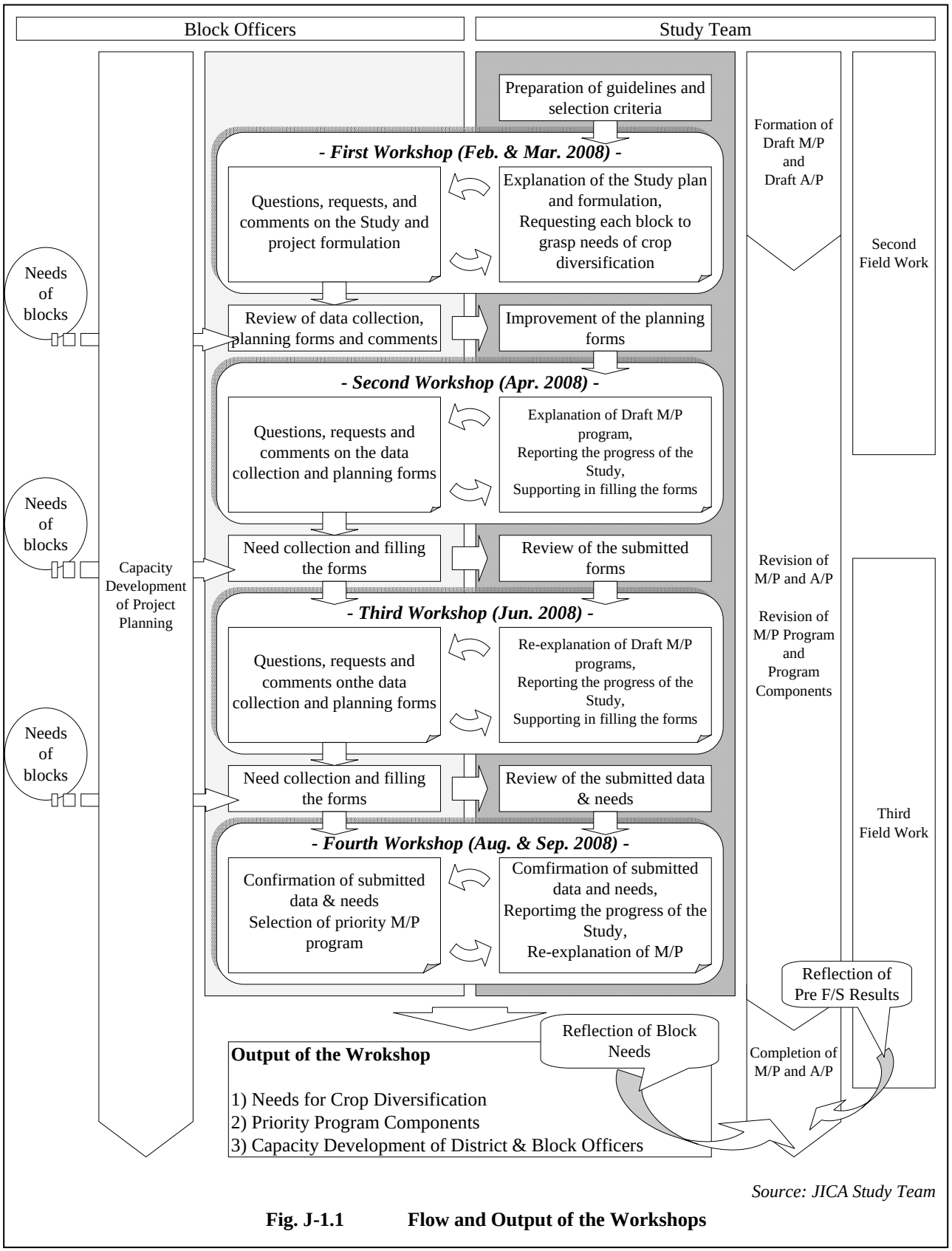
In each workshop the Study Team and the block officers discussed on crop diversification potentials and priorities in the blocks. The information gathered through the four workshops was reflected to the Master Plan and the Study. Details of the activities of each workshop are described in the next section. The flow and output of the workshops, and the relationship with the Study are summarized following Fig. J-1.1.

As for Lahaul & Spiti District, only the third and the forth workshops were held in the district, since it had no access to the district due to landlocked by snow during the time of the first and the second workshops. The workshop materials were sent by post. The Study Team gave a detailed explanation so far in the third workshop in Lahaul & Spiti district.

The main outputs of the workshops are block-basis needs to promote crop diversification and development of planning capacities of district and block officers on the basis of panchayat's and farmer's needs. Needs on agricultural extensions, farmers' supports and infrastructure development are reflected in master and action plans in the Study.

In agriculture, the potential crop diversification area and the major vegetable crops to be introduced/promoted in the blocks were obtained. Besides, the requirements for implementing the activities of the program components of the draft Master Plan were also obtained and are incorporated in the Master Plan after their assessments. The priority program components which were selected by each block through discussion among participants in the final workshop were obtained as well.

As for infrastructure needs, mainly for irrigation and access farm road, their site-specific needs are given in the lists attached herewith. The lists are divided in two lists, i) short lists for relatively matured infrastructure needs and ii) long lists for the needs from the blocks.



Source: JICA Study Team

Fig. J-1.1 Flow and Output of the Workshops

J-2 Activities of the Workshops

J-2.1 Activities of the First Workshop

(1) General

The first workshops were held from 25th February to 5th March in 11 districts of the State. In Lahaul & Spiti district which is located in a high mountainous area, the workshop was not held due to no access to the district in the period as explained in the above. The Study Team was divided into 3 groups, visited to respective 11 districts and conducted the workshops. Logistics of the workshop were sublet to a local consultant named ERA (Society for Environmental and Rural Awakening) based in Kangra district, Himachal Pradesh, in line with the rules and procedure of JICA. In the first workshops, totally 265 participants including block officers of Agricultural Department, APMC staffs of Marketing Board and other line department officers attended the workshops. Breakdown of the participants is shown in following Table J-2.1.

Table J-2.1 Schedule and Attendants of the First Workshop

District	Date	Block	Number of Attendants
Bilaspur	Mar. 4, 2008	3	15
Chamba	Feb. 25, 2008	5	22
Hamirpur	Feb. 28, 2008	6	28
Kangra	Feb. 27, 2008	14	35
Kinnaur	Mar. 3, 2008	3	14
Kullu	Mar.1, 2008	5	28
Mandi	Mar.1, 2008	10	41
Shimla	Mar.1, 2008	9	20
Sirmaur	Feb. 25, 2008	6	17
Solan	Mar. 5, 2008	5	25
Una	Feb. 29, 2008	5	20
Total		75	265

Source: JICA Study Team

(2) Purpose of the First Workshop

The purpose of the first workshop is to build up the capacity of the block officers through explanation of the Study and discussion on planning of crop diversification and collection of the block officer's ideas and opinions on the agricultural diversification of the respective districts and blocks. The Study team requested the block officers to collect block-wise needs for the diversification.

(3) Program of the First workshop

Program of the workshop is shown in the Table J-2.2.

Table J-2.2 Program of the First Workshop

09:00 to 10:00	- Registration
10:00 to 10:45	- Opening and introduction - Explanation of outline of the workshop and overall schedule
10:45 to 11:30	- Explanation of the Study and plan formulation based on the Guidelines
11:30 to 12:30	- Lunch
12:30 to 14:30	- Discussion on planning forms
14:30 to 14:45	- Tea Break
14:45 to 16:00	- Discussion on crop diversification potentials of each block
16:00	- Closing workshop

Source: JICA Study Team

(4) Activities of the First Workshop

Activities carried out in the first workshop are summarized as follows:

- Explanation of the study and project formulation

  The Study Team explained to block officers a brief summary of the Study and the approach to project formulation for crop diversification in Himachal Pradesh. Each block was requested to

prepare the diversification needs. The detail explanation of need survey forms for data collection was also explained to the block officers. The deadline of submission of the form filled up was set on May 15, 2008.

- Discussion of the Need forms and crop diversification potential

After the explanation, the Study Team and the participants of the workshop discussed about the need survey forms and crop diversification potentials of each block. The results of discussion were reflected in the revision of the forms.

(5) Photos of the First Workshop

Date: February 25, 2008
Place: Chamba
Subject: First Workshop in Chamba District

Date: February 27, 2008
Place: Kangra
Subject: First Workshop in Kangra District

Date: March 1, 2008
Place: Mandi
Subject: First Workshop in Mandi District

J-2.2 Activities of the Second Workshop

(1) General

The second workshop was held on 11th April at the SAMETI's meeting room in Shimla, gathering 11 districts officers of the State except Lahaul Spiti District. Totally 41 participants attended the workshops. Breakdown of the participants is shown in following Table J-2.3.

Table J-2.3 Schedule and Attendants of the Second Workshop

District	Date	Block	Number of Attendants
Bilaspur	April 11, 2008	3	3
Chamba		5	4
Hamirpur		6	4
Kangra		14	4
Kinnaur		3	5
Kullu		5	3
Mandi		10	3
Shimla		9	4
Sirmaur		6	3
Solan		5	4
Una		5	4
Total		75	41

Source: JICA Study Team

(2) Purpose of the Second Workshop

Based on results of the first workshop, the Study Team revised the need survey forms. The main purpose of the workshop was to explain programs of the draft Master Plan and the revised need survey forms. The support to district officers in planning for the agricultural diversification is also targeted for their capacity buildings.

(3) Program of the Second workshop

Program of the workshop is shown in the Table J-2.4.

Table J-2.4 Program of the Second Workshop

10:00 to 11:00	- Registration
11:00 to 12:00	- Opening and introduction - Explanation of Draft Master Plan and revised planning forms
12:00 to 13:00	- Lunch
13:00 to 14:30	- Discussion on revised Draft Master Plan
14:30 to 14:45	- Tea Break
14:45 to 16:00	- Discussion on revised planning forms
16:00	- Closing workshop

Source: JICA Study Team

(4) Activities of the Second Workshop

The Study team made a presentation on Draft Master Plan program and its components, which consisted of 3 programs (I. Institutional Development Program, II Farmers' Support Program, and III Infrastructure Development Program) and 19 program components, and explained the revised forms. Detailed explanation of the forms was given to the district officers. The Study team and the participants discussed about the proposed 19 program components and the revised forms, and the Study team clarified the questions presented by participants in the workshop. The deadline of submission of the filled-up form was extended until June 15, 2008.

(5) Photos of the Second workshop

Date: April 11, 2008
Place: Shimla
Subject: Second Workshop in Shimla

Date: April 11, 2008
Place: Shimla
Subject: Second Workshop in Shimla

Date: April 11, 2008
Place: Shimla
Subject: Second Workshop in Shimla

J-2.3 Activities of the Third Workshop

(1) General

The third workshop was held from 12th June to 24th June in all 12 districts. The Study team was divided into 3 groups, visited every district and conducted the workshops. In the third workshops, totally 246 participants consisting of block officers of Agricultural Department, APMC staffs of Marketing Board and other line department officers attended the workshops. Breakdown of the participants is given in following Table J-2.5.

Table J-2.5 Schedule and Attendants of the Third Workshop

District	Date	Block	Number of Attendants
Bilaspur	Jun. 13, 2008	3	15
Chamba	Jun. 20, 2008	5	26
Hamirpur	Jun. 12, 2008	6	19
Kangra	Jun. 19, 2008	14	39
Kinnaur	Jun. 12. 2008	3	13
Kullu	Jun. 19, 2008	5	25
Lahaul Spiti	Jun. 21, 2008	10	8
Mandi	Jun. 23, 24, 2008	9	33
Shimla	Jun. 25, 2008	6	14
Sirmaur	Jun. 23, 2008	5	15
Solan	Jun. 12, 2008	5	18
Una	Jun. 20, 2008	3	21
Total		75	246

Source: JICA Study Team

(2) Purpose of the Third Workshop

The purpose of the third workshop is to accelerate progress of filling-up of the need survey forms for crop diversification and to provide necessary support to the block officers in filling the form and to re-explained the program components of the draft Master Plan to district and block officers for their better understanding of the Study.

(3) Program of the Third workshop

Program of the workshop is given in the Table J-2.6.

Table J-2.6 Program of the Third Workshop

10:00 to 11:00	- Registration
11:00 to 12:00	- Opening and introduction - Explanation of Draft Master Plan program components
12:00 to 13:00	- Lunch
13:00 to 14:00	- Confirmation of the progress of planning
14:30 to 14:45	- Tea Break
14:45 to 16:00	- Discussion on planning for crop diversification
16:00	- Closing workshop

Source: JICA Study Team

(4) Activities of the Third Workshop

Activities carried out in the third workshop are summarized as follows:

- Re-explanation of Program Components of draft Master Plan

  The Study Team re-explained respective 19 program components in the draft plan for the agricultural diversification in the State and explained to the district and block officers that

  a. Target beneficiaries are small and marginal farmers in the plan,
  b. Priority is crop diversification, especially conversion from food grain crops to vegetables,
  c. Fish culture will be made within irrigation systems by willing diversified farmers under support of Fishery Department, and
  d. Fodder cultivation will be promoted in order to increase its production.

  After various discussions on the plan, participants understood the draft plan in the workshop. It was requested by the Study team that the draft plan would be effectively used in filling the need survey forms.

- Acceleration of the filling-up progress of the Need Survey Form

  Respective blocks reported the progress and the Study team requested to accelerate the progress. Participants were also informed of the schedule to complete the draft Master Plan in the Study and to submit the filled-up forms by end of June 2008 for processing of the collected data from the form and explanation of analyzed data in the next final workshop in mid of August. In the workshop, technical support to respective block offices was also provided as a part of the capacity building.

(5) Photos of the Third workshop

Date: June 12, 2008
Place: Kinnaur
Subject: Third workshop in Kinnaur District

Date: June 12, 2008
Place: Solan
Subject: Third workshop in Solan District

Date: June 23, 2008
Place: Sirmaur
Subject: Third workshop in Sirmaur District

J-2.4 Activities of the Final Workshop

(1) General

The final/fourth workshop was held from 23rd August to 6th September behind the original schedule in the 12 districts of the State. The Study team was divided into 3 groups and conducted the workshops. Organizing the workshop was sublet to a local NGO, PRAGATI based in Hoshiarpur, State of Punjab for logistic support to the Study team in line with the rules and procedure of JICA. Totally 286 participants including block officers of Agricultural Department, APMC staffs of Marketing Board and other line department officers attended in the workshops and discussed on block-basis crop diversification and necessary government assistances for its realization. Breakdown of the participants is shown in the following Table J-2.7.

Table J-2.7 Schedule and Attendants of the Final Workshop

District	Date	Block	Number of Attendants
Bilaspur	Aug. 23, 2008	3	20
Chamba	Aug. 28, 29, 2008	5	22
Hamirpur	Aug. 25, 26, 2008	6	19
Kangra	Aug. 26, 27, 2008	14	43
Kinnaur	Sep. 2, 2008	3	15
Kullu	Sep. 5, 6, 2008	5	25
Lahaul Spiti	Sep. 3, 2008	10	9
Mandi	Aug. 29, 30, 2008	9	46
Shimla	Sep. 5, 6, 2008	6	24
Sirmaur	Sep. 1, 2, 2008	5	21
Solan	Aug. 25, 26, 2008	5	18
Una	Aug 27, 28, 2008	3	24
Total		75	286

Source: JICA Study Team

(2) Purpose of the Final Workshop

The main purposes of the final workshop were to confirm data in the form submitted by respective block offices and to assist the block offices to fill incomplete forms which had some shortages of information and misunderstandings as capacity building of the block officers.

(3) Program of the Final Workshop

The workshops were conducted for two days where number of the blocks is many in the district and for one day where the number is few. Program of the two-day workshop is given in the Table J-2.8.

Table J-2.8 Program of the Final Workshop

1st Day	
10:00 to 11:00	- Registration
11:00 to 12:00	- Opening and introduction - Explanation of Master Plan program components for crop diversification - Explanation of relationships between planning and Master Plan programs
12:00 to 13:00	- Lunch
13:00 to 14:30	- Selection of four priority program components by each block
14:30 to 14:45	- Tea Break
14:45 to 16:00	- Presentations of priority program components by each block
16:00	- Closing 1st day

2nd Day	
11:00 to 13:30	- Confirmation of data in the filled forms with questionnaire form
13:30 to 14:30	- Lunch
14:30 to 16:00	- Confirmation of data in the filled forms with questionnaire form
16:00	- Closing workshop

Source: JICA Study Team

(4) Activities of the Final Workshop

Activities carried out in the final workshop are summarized as follows.

- Re-explanation of Program Components of revised Master Plan

  The Study Team re-explained target farmers, emphasis on crop diversification to vegetables, 14 program components, etc in the revised Master Plan to block officers and reviewed the results of previous third workshops for reminding of the participants.

- Selection of Priority Program Components and Activities of revised Master Plan

  In order to reflect the block needs in finalization of the revised Master Plan, each block was requested to select four priority program components and activities for crop diversification through group discussion among the block officers. After the group discussion, the block officers made presentation of priority components with general block conditions and the reason so as to share the information and way of thinking for crop diversification among the participants in the workshops. The selected priority program components are explained in the next section.

- Confirmation of data in the filled Need Survey Form

  Supplementary data collection from the block officers was conducted on block basis. The data covers agricultures, irrigation, access farm road, and marketing & processing. The environmental and social negative impacts in crop diversification were also discussed in the workshop. The results are shown in the next section.

(5) Photos of the Final Workshop

Date: August 26, 2008
Place: Hamirpur
Subject: Final Workshop in Hamirpur District

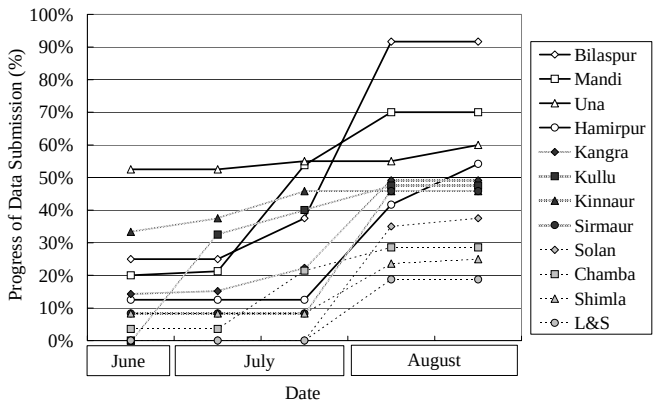
Date: September 2, 2008
Place: Kinnaur
Subject: Final Workshop in Kinnaur District

Date: September 3, 2008
Place: Lahaul Spiti
Subject: Final Workshop in Lahaul Spiti District

J-3 Analysis of Results of the Workshops

J-3.1 Collection Progress of Needs on Block Basis

Fig. J-3.1 shows the collection progress of the requested data by each district, regarding needs in agriculture, marketing & processing, irrigation, and access farm road. Although the deadline to submit the proposals had been extended 2 times, firstly May 15th to June 15th and then June 15th to the end of June, the collection progress of the proposals of most of the districts were still low and less than 30% at the end of June, the final deadline. Department of Agriculture urged the data submission several time. After the final workshop, all the blocks submitted the data, however, some blocks submitted minimum data. Block officers delayed in the submission explained that delay of the submission was caused by shortage of officers and another busy routine works.

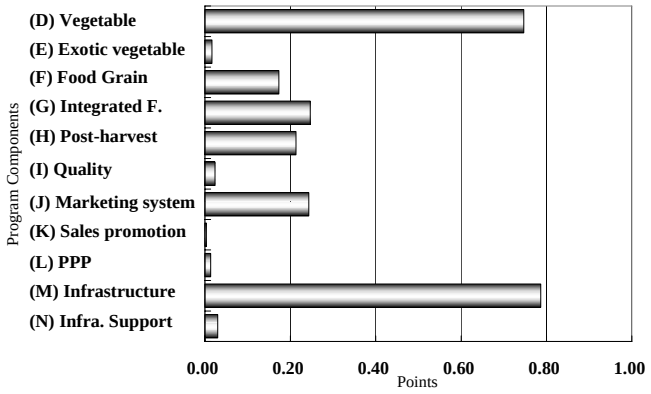


Source: JICA Study Team

Fig. J-3.1 Progress of Data Submission

This fact reveals that capacity of present block officers varies widely and it is necessary to posting vacant sanctioned position of officers and to review their routine works.

J-3.2 Needs of Priority Program Components in Farmers' Support and Infrastructure Development Program



Source: JICA Study Team

Fig. J-3.2 Averaged Scouring of Program Components

Fig. J-3.2 and Table J-3.1 present the priority program components selected by all 75 blocks in the State. Respective blocks selected first, second, third, and forth priority components on the basis of present situations of respective blocks, while Fig. J-3.2 shows the priority by scouring (given first priority 1 points, second 0.75 points, third 0.5 points, and forth 0.25 points and averaged) .

Table J-3.1 Number of Selected Priority Program Components

Program Component	First Priority	Second Priority	Third Priority	Forth Priority
(D) Vegetable Promotion	25	29	17	3
(E) Exotic Vegetable Promotion	0	0	2	1
(F) Food Grain Crop Productivity Improvement	6	5	5	3
(G) Integrated Farm Management	5	5	15	9
(H) Post Harvest Processing Promotion	1	5	7	31
(I) Market-oriented Quality Improvement	0	0	2	3
(J) Marketing System Improvement	2	4	20	13
(K) Sales Promotion	0	0	0	1
(L) Public Private Partnership (PPP) Promotion	0	0	1	2
(M) Infrastructure Development / Improvement	35	26	6	6
(N) Infrastructure Development Support	1	1	0	2
Total	75	75	75	74

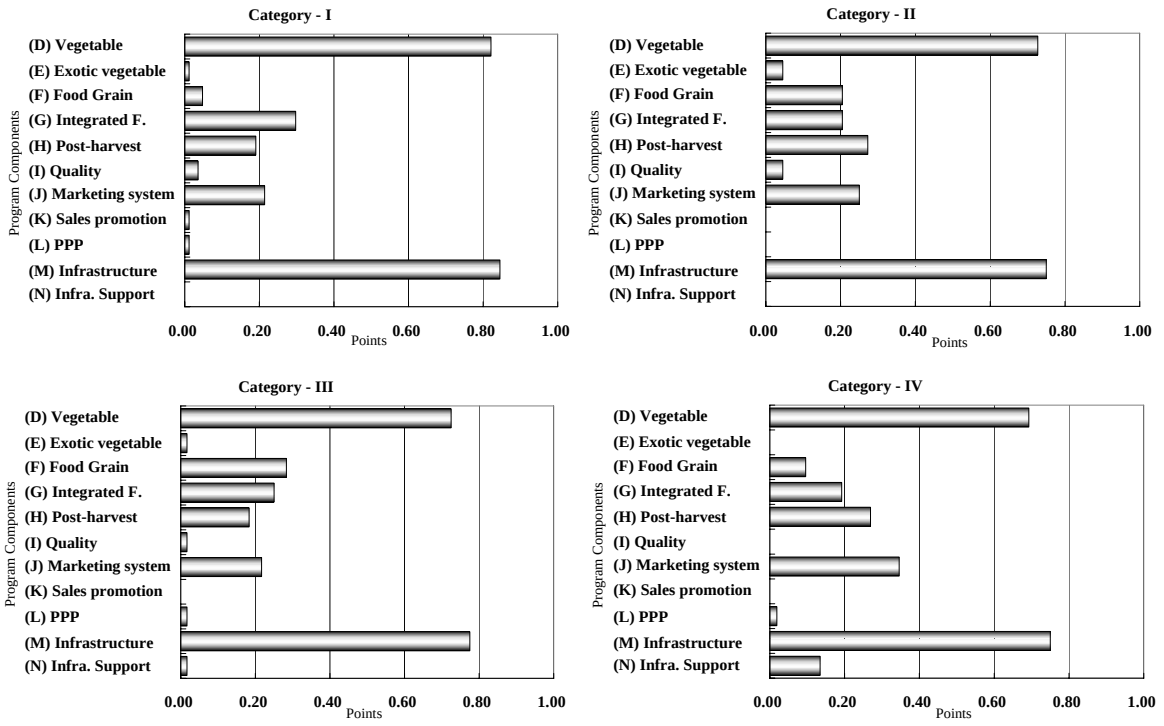
Source: JICA Study Team

As the results shown in the above table and graph, program component (M) Infrastructure Development / Improvement and (D) vegetable promotion were given highest priority. (F) Food Grain Crop Productivity Improvement, (G) Integrated Farm Management (Horticulture, Animal Husbandry and Fishery), (H) Post Harvest Processing Promotion, and (J) Marketing System Improvement had higher priority compared to the other program components, while the remaining components were selected for priority by only few blocks.

Priority in respective categories of the diversified patterns was analyzed by using the same data. Fig. J-3.3 shows category-wise priority program components evaluated by the point calculated by same scouring method.

As the results, all category blocks have needs for and (D) Vegetable Promotion as the highest priority, but other higher priority components are (F), (G), (H), and (J).

i) Highest priority is given to (D) Vegetable Promotion and (M) Infrastructure Development/ Improvement in general,
ii) Higher priority is given to (F) Food Grain Crop Productivity Improvement, (G) Integrated Farm Management (Horticulture, Animal Husbandry and Fishery), (H) Post Harvest Processing Promotion, and (J) Marketing System Improvement in general.
iii) Need for (F) Food Grain Crop Productivity Improvement is highest in Category-III among Category-I to III, followed by Category-II and Category-I.
iv) Need for Marketing System Improvement is given relatively high in all three categories.
v) Need for (N) Infrastructure Development Support is given to relatively higher in Category-IV.



Source: JICA Study Team

Fig. J-3.3 Category-wise Priority Program Components by Scoring

From the above category-wise priority, Vegetable Promotion and Infrastructure Development component are given to highest priority among all of the four categories. In addition, it can be understood for other components as follows:

Category-I: It is advanced block in crop diversification such as vegetable and fruit cultivation. Integrated Farm Management has relatively higher need, since fruit cultivation promotion is included in the component. Need for food grain productivity improvement component is low, since all the farmers in the area do not pay attention to food grain production for family food security and some farmers buy grain/cereal in the area.

Category-II: It is crop diversification starting block and in transition to Category I. Crop conversion from food grain to vegetables is going on but the conversion can be made after keeping family food grain for food security, accordingly, the need for food grain productivity improvement is much higher than the farmers in Category-I have. Farmers in the area feel necessity of post harvest probably from observation of the activities in advanced area, since the need is also relatively higher.

Category-III: It is the block where the diversification has not started and major crops are food grain crops such as wheat in Rabi season and maize or rice in Kharif season. Need for food grain productivity improvement is highest among four categories. Farmers in the area want to diversify crops to vegetables with infrastructure support especially in irrigation, however, the farmers consider that the grain productivity increase is essential as an initial step for family food security.

Category-IV: It is the block not covered by the above Category I–III in diversified patterns and the block does not have much potential for expansion of crop diversification. Farmers want to promote vegetable cultivation, however, food grain area, production and irrigation rate are small, but crop yield is not low and reaches district average level in the block. Need for Marketing System improvement is relatively high, that for food grain productivity improvement is relatively low and that for Infrastructure

Development Support is relatively highest among four categories. Crop diversification can be promoted only in limited favourable location in the block.

The priority program components reported by respective blocks are given in Table J-3.2.

Table J-3.2 Priority Program Components Selected by Respective Blocks

				Vegetable Promotion	Exotic Vegetable Promotion	Food Grain Productivity Improvement	Integrated Farm Management	Post Harvest Processing Promotion	Market-oriented Quality Improvement	Marketing System Improvement	Sales Promotion	Public Private Partnership (PPP) Promotion	Infrastructure Development / Improvement	Infrastructure Development Support
Category	No.	Block	District	D	E	F	G	H	I	J	K	L	M	N
I	31	Kalpa	Kinnaur	◎			○		△				▲	
I	32	Nichar	Kinnaur	▲		△	◎						○	
I	33	Pooh	Kinnaur	◎			○			△			▲	
I	35	Banjar	Kullu	○			▲		△				◎	
I	37	Naggar	Kullu	○			▲	△					◎	
I	39	Lahaul	Lahaul-Spiti	◎			▲						○	
I	40	Spiti	Lahaul-Spiti	△			▲			○			◎	
I	52	Chhohara	Shimla	○				▲	△				◎	
I	53	Chopal	Shimla	○				▲				△	◎	
I	56	Narkanda	Shimla	◎			○				△		▲	
I	58	Rohroo	Shimla	○				▲		△			◎	
I	59	Theog	Shimla	◎			△			▲			○	
I	60	Nahan	Sirmaur	◎		▲				△			○	
I	61	Pachhad	Sirmaur	○				△		▲			◎	
I	63	Rajgarh	Sirmaur	○		△		▲					◎	
I	64	Sangrah	Sirmaur	◎			▲	△					○	
I	65	Shillai	Sirmaur	○			△			▲			◎	
I	66	Dharampur	Solan	○				△		▲			◎	
I	67	Kandaghat	Solan	◎				△		▲			○	
I	68	Kunihar	Solan	◎	△			▲					○	
I	70	Solan	Solan	○				△		▲			◎	

Note: ◎ means the program component selected for 1st priority, ○ 2nd priority, ▲ 3rd priority, △ 4th priority

Source: JICA Study Team

continued on the next page

				Vegetable Promotion	Exotic Vegetable Promotion	Food Grain Productivity Improvement	Integrated Farm Management	Post Harvest Processing Promotion	Market-oriented Quality Improvement	Marketing System Improvement	Sales Promotion	Public Private Partnership (PPP) Promotion	Infrastructure Development / Improvement	Infrastructure Development Support
Category	No.	Block	District	D	E	F	G	H	I	J	K	L	M	N
II	17	Baijnath	Kangra	○			△			▲			◎	
II	18	Bhawarna	Kangra	○		◎	▲						△	
II	24	Nagrota Bagwan	Kangra	▲		○		△					◎	
II	36	Kullu	Kullu		▲		△	◎					○	
II	41	Chachyot	Mandi	○				△		▲			◎	
II	44	Drang	Mandi	◎				△		▲			○	
II	47	Mandi Sadar	Mandi	○				△	▲				◎	
II	49	Seraj	Mandi	◎			△			▲			○	
II	50	Sundernagar	Mandi	◎		▲				△			○	
II	55	Mashobra	Shimla	◎				○		▲			△	
II	74	Haroli	Una	▲			◎	△					○	
III	3	Ghumarwin	Bilaspur	○				△		▲			◎	
III	5	Bhatiyat	Chamba	◎				○	▲				△	
III	11	Bamsan	Hamirpur	▲			△			○			◎	
III	12	Bhoranj	Hamirpur	○						▲			◎	△
III	13	Bijhari	Hamirpur	○				△		▲			◎	
III	14	Hamirpur	Hamirpur	○		▲				△			◎	
III	15	Nadaun	Hamirpur	○			▲	△					◎	
III	19	Dehra	Kangra	▲		◎				△			○	
III	20	Fatehpur	Kangra	○			▲	△					◎	
III	21	Indora	Kangra	○			▲	△					◎	
III	22	Kangra	Kangra	◎		○	▲						△	
III	23	Lamba Gaon	Kangra	▲		◎	△						○	
III	25	Nagrota Surian	Kangra	▲		◎	△						○	
III	26	Nurpur	Kangra	○			▲	△					◎	
III	27	Panchrukhi	Kangra	▲		◎				△			○	
III	28	Pragpur	Kangra	▲		◎				△			○	
III	29	Rait	Kangra	▲		○	△						◎	
III	30	Sulah	Kangra	◎			▲						○	△
III	34	Anni	Kullu	◎			○	△					▲	
III	42	Chauntra	Mandi	○				△		▲			◎	
III	43	Dharampur	Mandi	◎				△		▲			○	
III	45	Gopalpur	Mandi	▲				△		◎			○	
III	46	Karsog	Mandi	◎	▲					△			○	
III	48	Rewalsar	Mandi	◎				○		▲			△	
III	62	Paonta Sahib	Sirmaur	▲		○		△					◎	
III	69	Nalagarh	Solan	◎		○		▲		△				
III	71	Amb	Una	▲			◎	△					○	
III	72	Bangana	Una	▲			○			△			◎	
III	73	Gagret	Una	▲			◎	△					○	
III	75	Una	Una	◎				△				▲	○	
IV	1	Bilaspur Sadar	Bilaspur	▲				△		○			◎	
IV	2	Geharwin	Bilaspur	○				△		▲			◎	
IV	4	Bharmour	Chamba	△		▲				○			◎	
IV	6	Chamba	Chamba	○			▲	△					◎	
IV	7	Mehla	Chamba	○			▲			△				◎
IV	8	Pangi	Chamba	◎				△		▲			○	
IV	9	Salooni	Chamba	◎			▲	○					△	
IV	10	Tissa	Chamba	△				○		◎			▲	
IV	16	Sujanpur Tira	Hamirpur	▲						△			◎	○
IV	38	Nirmand	Kullu	○		△	◎						▲	
IV	51	Basantpur	Shimla	○		▲		△					◎	
IV	54	Jubbal	Shimla	○				▲				△	◎	
IV	57	Rampur	Shimla	◎				△		▲			○	

Note: ◎ means the program component selected for 1st priority, ○ 2nd priority, ▲ 3rd priority, △ 4th priority

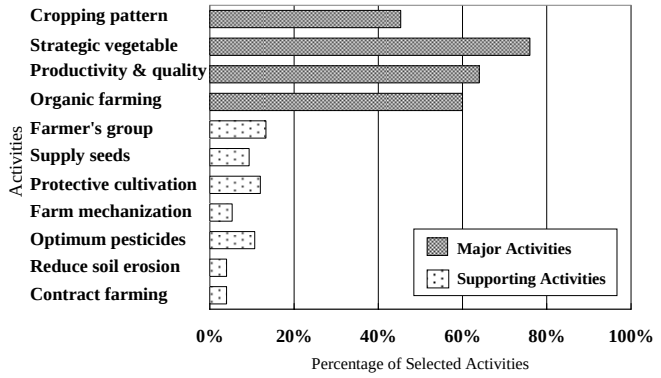
Source: JICA Study Team

J-3.3 Needs for Priority Activities of Priority Program Components

(1) Priority Activities of Vegetable Promotion Program Component

General Needs in the State

Fig. J-3.4 shows the results of priority activities of Vegetable promotion program component (D) selected by each block. This program component consisted of four major activities and eight supporting activities as given in the following figure:



Source: JICA Study Team

Fig. J-3.4 Priority Activities of Vegetable Promotion

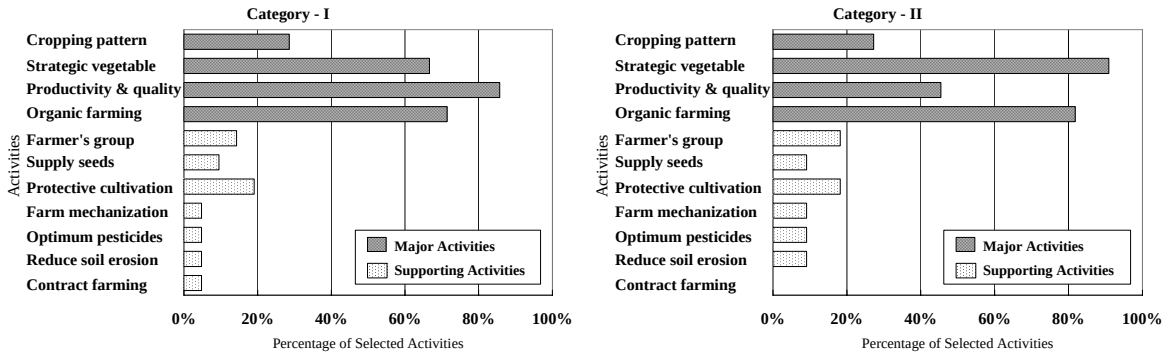
Promotion of strategic vegetables such as pea, potato, cauliflower and tomato has highest priority followed by "improvement of vegetables productivity and quality", "promotion of organic farming". Organic farming is an attractive activity for farmers in general, since it leads to not only saving of costly chemical fertilizer but also environmentally friendly farming. Application of manure and compost such as vermin-composting is becoming popular in the State. Needs for farmer's grouping, protective agriculture (cultivation in green house), seed supply and optimum fertilization are also high among Supporting Activities of the components.

Category-wise Needs in the State

Fig. J-3.5 shows the results of priority activities of Vegetable promotion program component in respective categories.

This figure shows the category-wise results of priority activities of program component. The results show the different needs for vegetable promotion in the each stage of crop diversification. Regarding major activities, "improvement productivity and quality" has the highest priority in blocks of Category-I while "promotion of strategic vegetables" has the highest priority in Category-II, since Category-I is advanced area for the diversification and Category-II is in progress.

Regarding supporting activities, "protective cultivation" in Category-I, "farmers' group" and "protective cultivation" in Category-II, "optimum use of pesticides" in Category-III and "seeds supply" in Category-IV have higher priorities respectively. Protective agriculture is advanced farming in cool climate zone and farmer's group is required for joint marketing of vegetables both of which are necessary in the diversified blocks such as Category-I & II. On the other hand, needs for optimum use of pesticides or seed supply is common needs in the Sate.



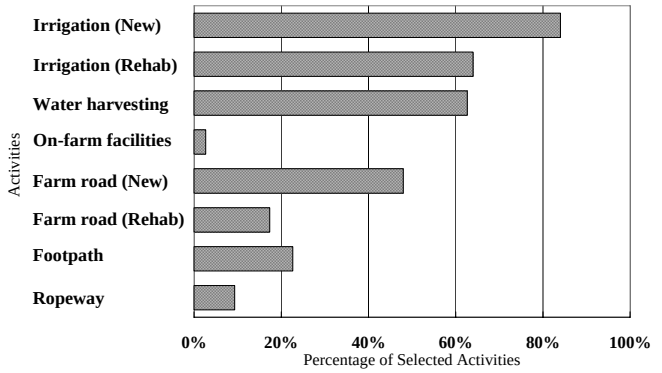
Source: JICA Study Team

Fig. J-3.5 Priority Activities of Vegetable Promotion (Category-wise)

(2) Priority Activities of Infrastructure Development Program Component

General Needs in the State

Fig. J-3.6 shows the results of priority activities of Infrastructure Development program component selected by each block. This program component consisted of eight major activities as given in the following figure:



Source: JICA Study Team

Fig. J-3.6 Priority Activities of Infrastructure Development/Improvement

The above figure shows the results of priority activities among infrastructure development/improvement need selected by each block.

Construction of "new minor irrigation systems" has the highest priority. Rehabilitation/improvement of "existing minor irrigation and traditional irrigation systems" and construction of "water harvesting facilities" has the second highest priority among irrigation needs.

Regarding access farm road, construction of "new farm road not be covered by PWD" has been put relatively higher priority, while repair or rehabilitation of damaged existing farm road has not. Some blocks selected construction/improvement of footpath and mule track as priority needs, especially in Chamba district where farmers want to keep minimum farm access.

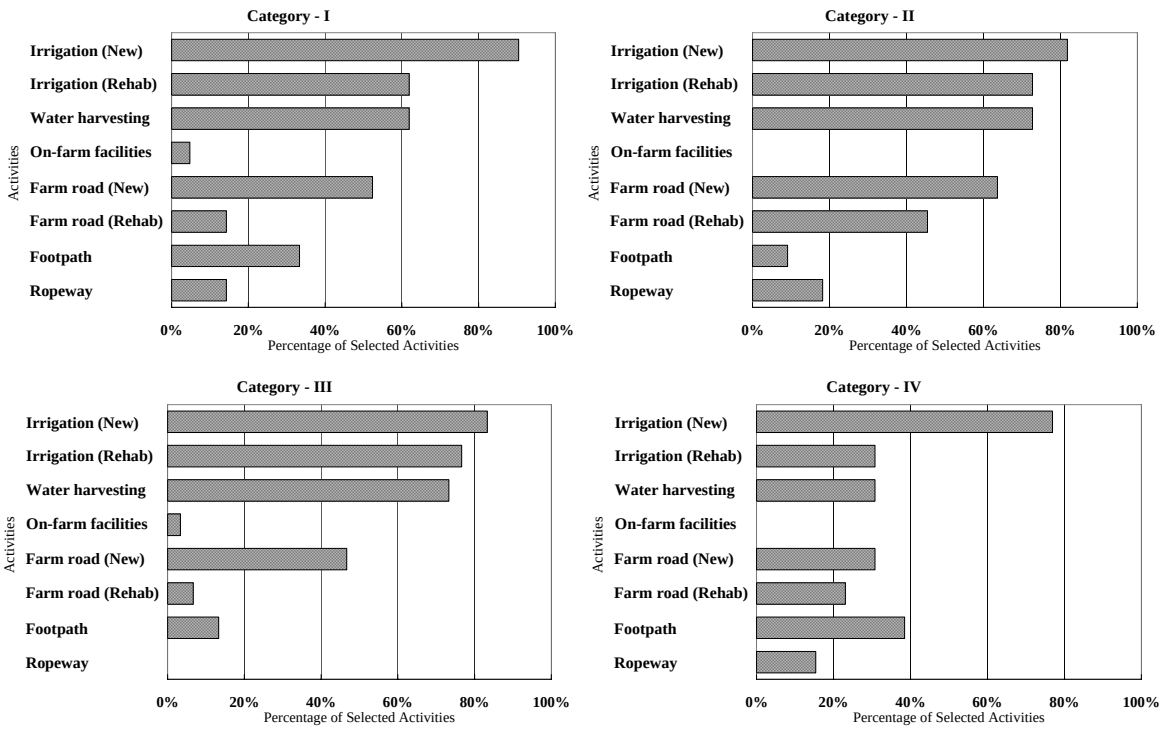
Most of the blocks put higher priority on irrigation than access farm road; however, opinions on importance of access farm road for vegetable cultivation are explained by some participants in the

workshop. It means that some advanced or diversified farmers know the importance through their daily vegetable cultivation.

Most of the blocks reported only needs of infrastructure development, however, some blocks reported needs of combination of infrastructure development and infrastructure development support such as strengthening of water user's group or O&M organization. From a view-point of sustainability, the infrastructure development support is indispensable.

Category-wise Needs in the State

Fig. J-3.7 shows the results of priority activities of Vegetable promotion program component in respective categories.



Source: JICA Study Team

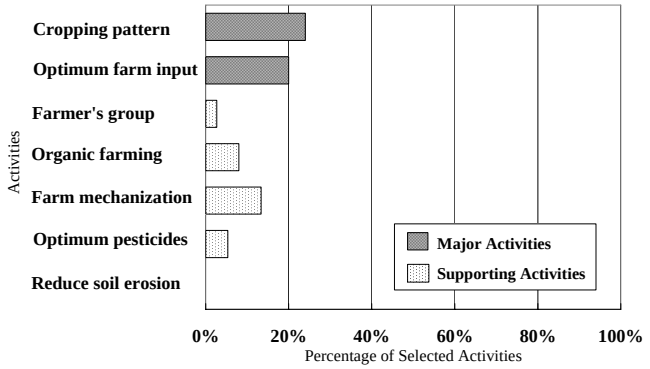
Fig. J-3.7 Priority Activities of Infrastructure Development / Improvement (Category-wise)

(3) Priority Activities of Food Grain Productivity Improvement Program Component

General Needs in the State

Fig. J-3.8 shows the results of priority activities of Food Grain Productivity Improvement program component selected by each block. This program component consisted of two major activities and eight supporting activities as given in the following figure:

This figure shows the results of priority activities of program component selected by each block. This program component consisted of the following two major



Source: JICA Study Team

Fig. J-3.8 Priority Activities of Food Grain Productivity Improvement

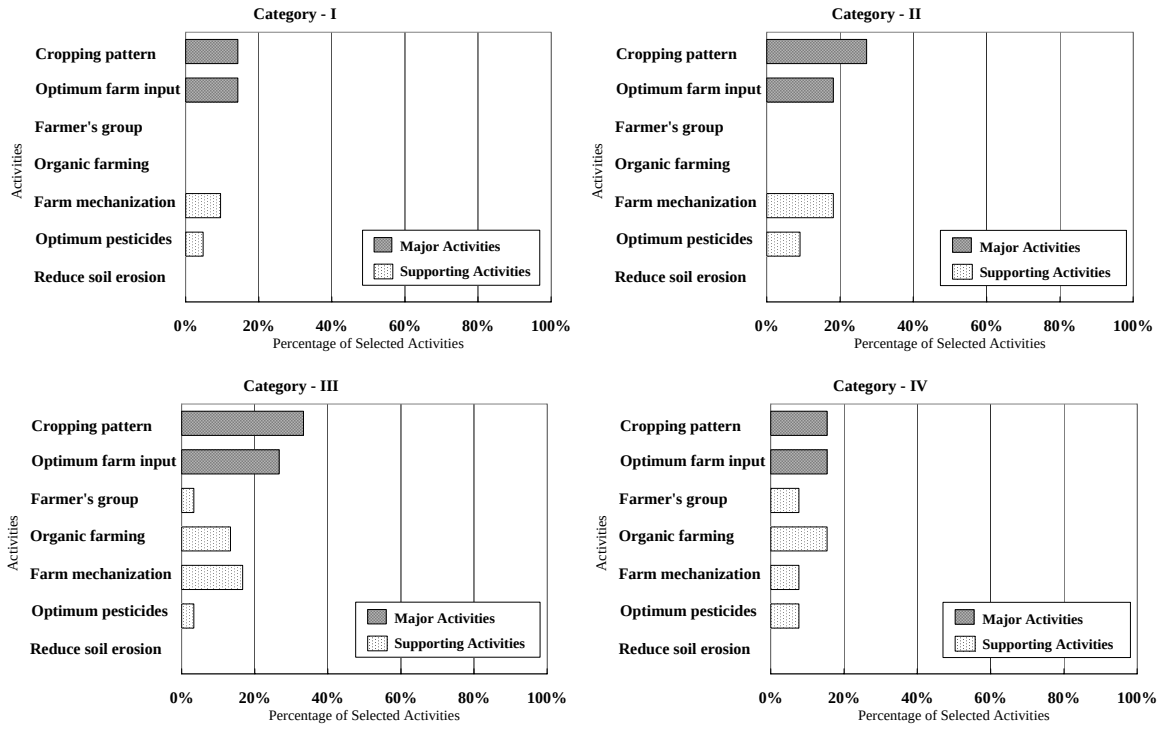
activities and eight supporting activities.

Each block gave the higher priority for two major activities, “promotion of diversified cropping patterns suitable for productivity increase of food grain crops” and “promotion of optimum quantities of farm inputs such as seeds and fertilizers”.

Among the supporting activities, “introduction of farm mechanization through identification of suitable machinery and equipment for hilly area” has relatively highest need. Compared to the supporting activities of Vegetable Promotion, need for this farm mechanization is lower priority among the supporting activities. Accordingly it can be said that farm mechanization is relatively important item for grain cultivation in the State. Introduction of farm mechanization in grain cultivation area would lead to manpower saving and might have possibility for creation of surplus manpower which could be used for cultivation of vegetables.

Category-wise Needs in the State

Fig. J-3.9 shows the category-wise results of priority activities of this program component selected by each block. Need for food grain productivity improvement is higher in Category-II & III, however, there is not much clear difference of needs for respective activities.



Source: JICA Study Team

Fig. J-3.9 Priority Activities of Food Grain Productivity Improvement (Category-wise)

(4) Priority Activities of Integrated Farm Management Program Component

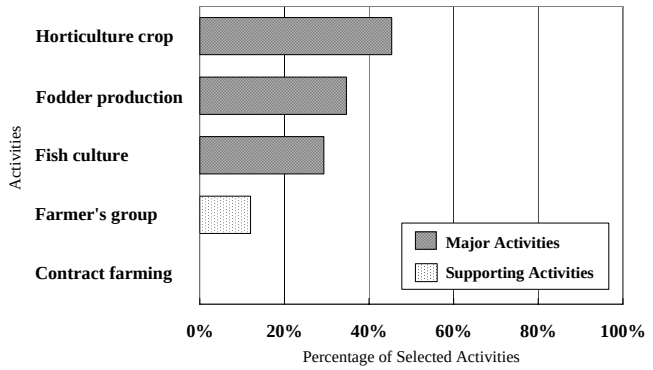
General Needs in the State

Fig. J-3.10 shows the results of priority activities of “Integrated Farm Management” program component selected by each block. This program component consisted of three major activities as given in the following figure:

Fruits are widely cultivated in the State and contribute small and marginal farmers for their income

generation. Animal husbandry is popular in the State, most of farmers are keeping one or two cattle for milking for their domestic consumption or selling surplus milk. Fish culture for carp, cat fish or trout is not widely popular in the State but is done in some specific district.

The above figure shows that "improvement of productivity and quality of horticulture crops" has the highest priority, followed by "promotion of fodder production and reuse of vegetable residue" for cattle, and "promotion of warm water fish culture or cold water fish culture under in irrigation system". This priority order shows farmer's priority in agriculture-allied sector.



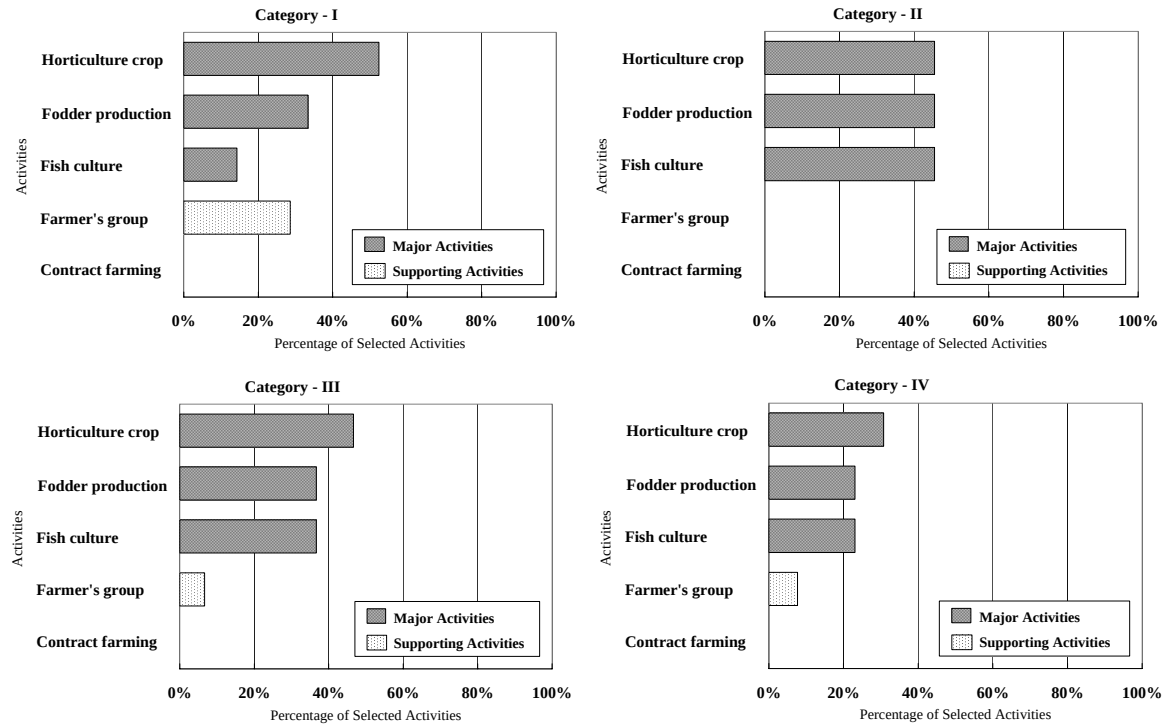
Source: JICA Study Team

Fig. J-3.10 Priority Activities of Integrated Farm Management

Category-wise Needs in the State

Fig. J-3.11 shows the category-wise results of priority activities of this program component selected by each block. The blocks of category-I selected "improvement of productivity and quality of horticulture crops" as highest priority, while the blocks category-II and III gave almost same priority to these three major activities.

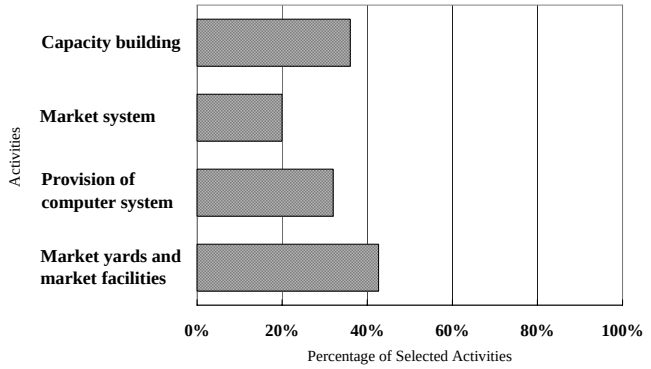
Need for horticulture promotion is generally higher in all four categories, and there is less need for fish culture in Category-I. Farmers in Category-I has income source and has less need for fish culture.



Source: JICA Study Team

Fig. J-3.11 Priority Activities of Integrated Farm Management (Category-wise)

(5) Priority Activities of Marketing System Improvement Program Component



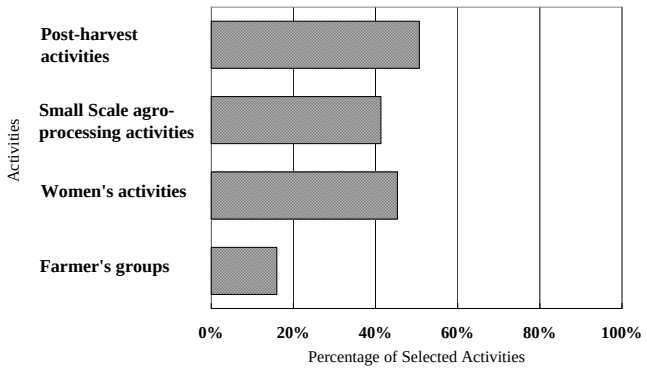
Source: JICA Study Team

Fig. J-3.12 Priority Activities of Marketing System Improvement

Fig. J-3.12 shows the category-wise results of priority activities of Marketing System Improvement program component selected by each block and does that the priority need is construction of market yard and other market facilities, followed by capacity building of staffs of Marketing Board.

(6) Priority Activities of Post-Harvest Processing Promotion Program Component

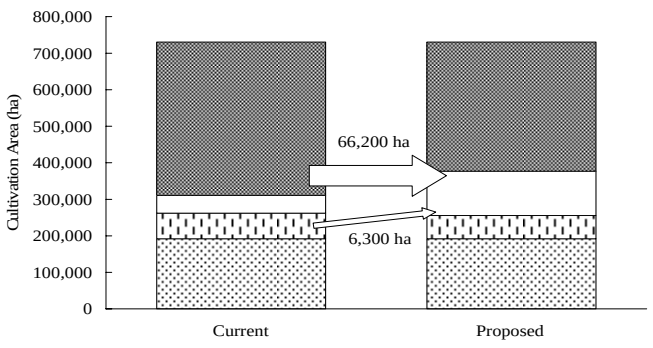
Fig. J-3.13 shows the results of priority activities of Post-Harvest Processing Promotion program component selected by each block. The three main activities given in the figure are i) post-harvest activities such as grading, sorting and packing etc. in accordance with the quality standard, ii) introduction or promotion of small scale agro-processing activities, and iii) introduction or promotion of women's activities for agro-processing. All three have the almost same priority, while organizing or strengthening of farmers' group has lower priority. Group working is necessary for women's activities and small scale agro-processing in general, however, need for farmer's group is not high, which is contradiction in reply of block officers.



Source: JICA Study Team

Fig. J-3.13 Priority Activities of Post-Harvest Processing Promotion

J-3.4 Crop Conversion Area Proposed by All of 75 Blocks

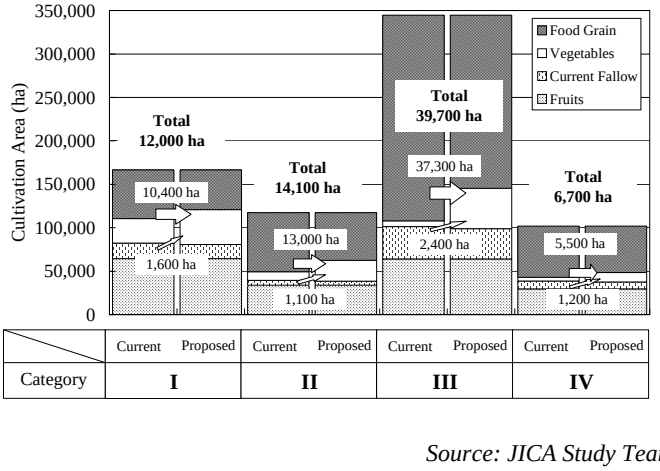


Source: JICA Study Team

Fig. J-3.14 Possible Crop Conversion Area (Whole State)

Fig. J-3.14 shows the total conversion area to vegetables planned by each block up to 15 years on the basis of the data obtained and confirmed in the fourth workshop. The possible area for conversion to vegetables submitted by all of the 75 blocks is 72,500 ha in total out of current agricultural land of 730,000 ha consisting of 66,200 ha from food grain and 6,300 ha from current fallow land. Possible conversion area is in the whole of State.

Fig. J-3.15 shows the category-wise possible conversion area to vegetables by blocks up to 15 years. The figure shows the possible conversion area from food grains to vegetables in category-III is largest among four categories. Category-II area also has a certain possible area to convert to vegetables. While in advanced area in crop diversification, category-I, possible conversion area is relatively smaller but still it has the room to covert to vegetable. Possible conversion area in Category-IV is the least among four categories.



Source: JICA Study Team

Fig. J-3.15 Possible Crop Conversion Area (Category-wise)

Possible block-based crop conversion area to vegetables is given in Table J-3.3 together with the promising vegetables to be promoted for the crop diversification in respective 75 blocks reported by block officers.

Table J-3.3 Possible Crop Conversion Area and Promising Vegetables Reported by Respective Blocks

No.	Block	District	Category	Food Grains Area *1 (ha)	Possible Crop Conversion from Food Grains to Vegetables *2 (ha)	Possible Conversion from Current Fallow to Vegetables *2 (ha)	Strategic Vegetables				Other Common Vegetables										Exotic Vegetables		
							Tomato	Peas	Cauliflower	Potato	Cabbage	Capsicum/Chillies	Okra	Freanch Beans	Cucurbits	Ginger	Onion	Garlic	Egg plant	Radish/Turnip/Carrot	Broccoli	Red Cabbage	Lettuce
31	Kalpa	Kinnaur	I	1,595	312	0	◎	◎	◎		◎	◎											
32	Nichar	Kinnaur	I	1,304	258	0	◎	◎		○	◎	◎									○	○	
33	Pooh	Kinnaur	I	1,333	387	0	◎	◎	◎		◎												
35	Banjar	Kullu	I	4,050	639	0	◎	◎	◎	○	◎	◎						○	○	○	○	○	
37	Naggar	Kullu	I	2,500	176	0	◎	◎	◎	○	◎	◎						○			○		○
39	Lahaul	Lahaul-Spit	I	142	30	97		◎	◎		◎	◎								○			
40	Spiti	Lahaul-Spit	I	100	60	75																	
52	Chhohara	Shimla	I	1,832	487	150	◎	◎	◎		◎		○										
53	Chopal	Shimla	I	3,271	2,157	286	◎	◎	◎		◎	◎		○				○					
56	Narkanda	Shimla	I	1,246	200	79	◎	◎	◎	○	◎	◎		○							○	○	
58	Rohroo	Shimla	I	1,257	450	50		◎	◎	○	◎												
59	Theog	Shimla	I	2,259	716	169		◎	◎	○	◎	◎		○									
60	Nahan	Sirmaur	I	5,440	595	118	◎					◎		○		○							
61	Pachhad	Sirmaur	I	4,150	145	94	◎	◎	◎	○	◎	◎				○		○					
63	Rajgarh	Sirmaur	I	3,240	718	81	◎	◎	◎	○	◎	◎		○		○	○	○			○		○
64	Sangrah	Sirmaur	I	4,500	201	91	◎	◎		○		◎		○		○							○
65	Shillai	Sirmaur	I	3,130	227	122	◎	◎	◎		◎	◎		○									
66	Dharampur	Solan	I	4,136	827	115	◎	◎			◎	◎		○			○	○					
67	Kandaghat	Solan	I	1,234	250	0	◎	◎	◎		◎	◎		○			○	○			○		
68	Kunihar	Solan	I	7,560	1,005	100	◎		◎	○	◎	◎		○	○				○		○		
70	Solan	Solan	I	1,782	580	0	◎	◎			◎	◎		○			○	○					
Category - I Total				**56,061**	**10,419**	**1,627**	**17**	**18**	**15**	**10**	**18**	**17**	**1**	**11**	**1**	**4**	**4**	**8**	**2**	**2**	**7**	**3**	**3**
17	Baijnath	Kangra	II	7,285	2,575	100	◎		◎		◎	◎	○	○	○				○	○	○		○
18	Bhawarna	Kangra	II	3,689	660	60	◎	◎		◎			○		○							○	○
24	Nagrota Bagwan	Kangra	II	7,970	240	15	◎	◎	◎	◎	◎		○		○	○	○	○	○	○	○		
36	Kullu	Kullu	II	6,490	404	0	◎	◎	◎	◎	◎	◎			○			○			○	○	
41	Chachyot	Mandi	II	5,152	1,110	100	◎	◎	◎	◎	◎												
44	Drang	Mandi	II	5,552	2,400	530	◎		◎	◎	◎	◎		○		○	○			○	○		
47	Mandi Sadar	Mandi	II	8,762	1,698	100	◎	◎		◎			○		○								
49	Seraj	Mandi	II	3,661	1,100	68	◎	◎	◎		◎	◎		○				○	○				
50	Sundernagar	Mandi	II	9,023	1,446	34	◎	◎	◎			◎		○				○	○				
55	Mashobra	Shimla	II	3,190	800	80	◎	◎	◎		◎	◎	○	○	○	○				○		○	
74	Haroli	Una	II	6,996	600	60	◎			◎		◎	○						○				
Category - II Total				**67,770**	**13,033**	**1,147**	**11**	**8**	**8**	**7**	**7**	**7**	**6**	**5**	**6**	**3**	**2**	**4**	**5**	**4**	**5**	**2**	**2**
3	Ghumarwin	Bilaspur	III	10,572	600	50	◎						◎		○	○							
5	Bhatiyat	Chamba	III	7,090	120	25	◎	◎		○	○	○	◎	○		○	○	○	○	○			
11	Bamsan	Hamirpur	III	6,155	1,850	100	◎		○		○		◎		○					○			
12	Bhoranj	Hamirpur	III	8,100	3,200	200	◎		○				◎										
13	Bijhari	Hamirpur	III	6,918	2,800	150	◎	◎	○	○	○	○	◎		○	○	○	○	○	○	○	○	
14	Hamirpur	Hamirpur	III	5,010	1,350	100	◎		○				◎								○		
15	Nadaun	Hamirpur	III	7,095	2,800	150	◎	◎	○		○	○	◎	○						○	○		
19	Dehra	Kangra	III	8,410	495	29	◎	◎	○				◎		○		○						
20	Fatehpur	Kangra	III	8,186	700	0		◎					◎		○		○						
21	Indora	Kangra	III	7,350	800	0		◎					◎		○		○						
22	Kangra	Kangra	III	7,485	300	15								○	○	○			○		○		
23	Lamba Gaon	Kangra	III	6,630	311	16	◎	◎	○				◎		○		○						
25	Nagrota Surian	Kangra	III	10,098	70	8			○				◎								○		
26	Nurpur	Kangra	III	10,995	600	0																	
27	Panchrukhi	Kangra	III	5,370	234	4	◎	◎		○	○	○			○	○	○	○			○	○	
28	Pragpur	Kangra	III	10,947	587	53						○	◎										
29	Rait	Kangra	III	8,883	188	18	◎	◎	○	○	○	○			○	○	○				○		○
30	Sulah	Kangra	III	4,620	700	80	◎	◎					◎										
34	Anni	Kullu	III	3,395	311	0	◎	◎			○								○				
42	Chauntra	Mandi	III	8,110	1,200	120		◎	○	○	○		◎	○		○		○		○	○		
43	Dharampur	Mandi	III	8,100	1,460	220			○	○	○		◎	○	○	○	○			○	○	○	
45	Gopalpur	Mandi	III	7,768	1,500	140		◎	○	○		○	◎			○							
46	Karsog	Mandi	III	6,582	1,800	180	◎	◎	○	○	○	○	◎	○				○			○	○	
48	Rewalsar	Mandi	III	8,551	4,590	200	◎	◎	○	○		○	◎		○	○	○		○	○	○		
62	Paonta Sahib	Sirmaur	III	12,190	2,400	200	◎	◎	○	○	○	○	◎	○		○	○	○	○	○			
69	Nalagarh	Solan	III	14,681	2,900	100	◎	◎			○	○		○			○	○			○	○	
71	Amb	Una	III	9,595	1,600	100	◎	◎					◎		○								
72	Bangana	Una	III	5,195	400	40	◎						◎		○	○							
73	Gagret	Una	III	5,601	600	25	◎			○			◎		○				○				
75	Una	Una	III	7,006	850	50	◎	◎					◎		○								
Category - III Total				**236,688**	**37,316**	**2,373**	**21**	**19**	**15**	**11**	**12**	**11**	**24**	**8**	**16**	**12**	**12**	**8**	**8**	**6**	**12**	**5**	**1**
1	Bilaspur Sadar	Bilaspur	IV	9,540	585	170	◎			◎		◎	○	◎	○	○				○	◎		○
2	Geharwin	Bilaspur	IV	6,898	500	50	◎	◎				◎	○		○	○					◎		
4	Bharmour	Chamba	IV	2,805	180	65	◎	◎	◎	◎	◎	◎		◎	○						◎		
6	Chamba	Chamba	IV	6,855	260	40	◎	◎		◎			○	◎			○				◎		
7	Mehla	Chamba	IV	5,605	330	50	◎	◎	◎	◎	◎	◎	○	◎	○			○		○		○	○
8	Pangi	Chamba	IV	2,195	130	210		◎		◎							○				◎		○
9	Salooni	Chamba	IV	6,335	450	300	◎	◎	◎	◎	◎	◎		◎							◎		
10	Tissa	Chamba	IV	5,860	622	178	◎	◎	◎	◎	◎	◎	○	◎	○			○	○	○	◎		
16	Sujanpur Tira	Hamirpur	IV	3,280	950	50	◎		◎			◎	○		○				○				
38	Nirmand	Kullu	IV	3,955	146	0	◎	◎	◎		◎	◎			○		○						
51	Basantpur	Shimla	IV	2,797	600	100	◎	◎	◎	◎	◎		○	◎		○					◎		
54	Jubbal	Shimla	IV	470	100	5	◎	◎	◎	◎	◎	◎		◎	○								
57	Rampur	Shimla	IV	2,455	600	27	◎	◎	◎		◎	◎	○	◎		○	○						
Category - IV Total				**59,050**	**5,453**	**1,245**	**12**	**11**	**9**	**9**	**8**	**10**	**8**	**9**	**8**	**4**	**4**	**2**	**2**	**3**	**8**	**1**	**3**
75 Blocks Total				**419,568**	**66,221**	**6,392**	**61**	**56**	**47**	**37**	**45**	**45**	**39**	**33**	**31**	**23**	**22**	**22**	**17**	**15**	**32**	**11**	**9**

Note: In the table of proposed vegetables, '◎' means more than 60% of blocks in the category proposed the vegetable, while '○' means less than 60%

*1: JICA Study Team through Department of Agriculture (2005/06 Kharif)

*2: Estimated area by blocks

Source: JICA Study Team

J-3.5 Environmental and Social Consideration

Necessary environmental and social consideration in program implementation was discussed in the workshop. Possibility of excessive agro-chemical use, increase of pests and diseases of diversified crops, environmental damage by infrastructure construction such as road construction and decrease of high value local variety are reported as impact and also countermeasures to mitigate the negative impacts in the workshop, which are given in Table J-3.4. The excessive agro-chemical use is the biggest impacts for the block officers and its countermeasure is to adopt and promote sustainable and eco-friendly technology such as IPM, organic farming, etc.

It can be said that block officers are aware of importance of environmental resources for rural people and the State and consider mitigation measures against the impacts.

Table J-3.4 Environmental and Social Negative Impacts by Crop Diversification answered by each block

Conceivable Negative Impact	Countermeasures to mitigate Impact	Number of Block
➢ Pollution due to excessive use of chemicals	➢ Adopting and promotion of sustainable and eco-friendly technology such as IPM, organic farming etc.	7 Blocks or 9.3 %
➢ Increase of pests and diseases	➢ Adopting of crop rotation	2 Blocks or 2.7 %
➢ Damage for environment due to infrastructure construction such as road	➢ Adopting eco-friendly technology	2 Blocks or 2.7 %
➢ Decrease of local variety such as millet, which has high value	➢ Synchronised promotion of local variety with vegetable.	1 Block or 1.3 %

Source: JICA Study Team

J-4 Short List and Long List of Infrastructure Needs

J-4.1 Long List of Infrastructure Development Projects

The candidate irrigation projects and access farm road projects both of improvement/ rehabilitation and new construction were proposed by each block office in the course of the workshop, including concerned SDSCOs (Sub-divisional Soil Conservation Office). Finally, total proposed candidates is accumulated to 1,637 nos. and 1,853 nos. for irrigation and access farm roads respectively as summarised below.

Table J-4.1 Summary of Long List

(1) Irrigation Projects

District	Improvement of Existing System		Construction of New Irrigation		Total	
	Nos. of Candidates	Irrigation Area (ha)	Nos. of Candidates	Irrigation Area (ha)	Nos. of Candidates	Irrigation Area (ha)
Bilaspur	40	400	90	855	130	1,255
Chamba	21	254	218	1,080	239	1,334
Hamirpur	24	603	85	1,314	109	1,917
Kangra	167	4,648	151	3,970	318	8,618
Kinnaur	3	130	29	1165	32	1,295
Kullu	9	184	10	195	19	379
Lahaul & Spiti	8	141	0	0	8	141
Mandi	46	1,586	46	1,586	92	3,172
Shimla	3	77	100	3,779	103	3,856
Sirmaur	36	676	106	1,717	142	2,393
Solan	30	388	306	6,130	336	6,518
Una	11	151	98	2,174	109	2,325
Total	398	9,238	1,239	23,965	1,637	33,203

Source: JICA Study Team

(2) Access Farm Road Projects

District	Improvement of Existing Access Farm Roads		Construction of New Access Farm Roads		Total	
	Nos. of Candidates	Total Length (km)	Nos. of Candidates	Total Length (km)	Nos. of Candidates	Total Length (km)
Bilaspur	44	130	78	308	122	438
Chamba	79	93	0	0	79	93
Hamirpur	26	28	85	116	111	144
Kangra	64	190	187	309	251	499
Kinnaur	0	0	0	0	0	0
Kullu	7	14	46	143	53	157
Lahaul & Spiti	2	20	0	0	2	20
Mandi	305	826	317	1,213	622	2,039
Shimla	4	12	17	64	21	76
Sirmaur	28	135	149	429	177	564
Solan	53	135	129	174	182	309
Una	12	47	221	229	233	276
Total	624	1,630	1,229	2,985	1,853	4,615

Source: JICA Study Team

J-4.2 Short List of Infrastructure Development Projects

The candidate projects are preliminarily screened for prioritization in order to estimate realistic works quantity for the action plan. The preliminary screening was conducted with the following criteria.

1) Candidate proposal was submitted within the time limit
2) Candidate proposal was prepared with necessary important data, especially for the area oriented data (name of Panchayat, exact location and proposed area for irrigation and proposed length for roads).

Based on the preliminary screening, short list is prepared as summarized below, which will be reviewed and finalized after detailed screening.

Table J-4.2 Summary of Short List

(1) Irrigation Projects

District	Improvement of Existing System		Construction of New Irrigation		Total	
	Nos. of Candidates	Irrigation Area (ha)	Nos. of Candidates	Irrigation Area (ha)	Nos. of Candidates	Irrigation Area (ha)
Bilaspur	12	202	58	635	70	837
Chamba	18	112	125	523	143	635
Hamirpur	3	35	31	556	34	591
Kangra	122	3,400	108	3,020	230	6,420
Kinnaur	3	130	29	1,165	32	1295
Kullu	9	184	10	195	19	379
Lahaul & Spiti	8	141	0	0	8	141
Mandi	28	397	178	3,157	206	3,554
Shimla	2	17	8	142	10	159
Sirmaur	24	415	84	1,336	108	1,751
Solan	15	154	18	638	33	792
Una	9	91	73	1,344	82	1,435
Total	253	5,278	722	12,711	975	17,989

Source: JICA Study Team

(2) Access Farm Road Projects

District	Improvement of Existing Access Farm Roads		Construction of New Access Farm Roads		Total	
	Nos. of Candidates	Total Length (km)	Nos. of Candidates	Total Length (km)	Nos. of Candidates	Total Length (km)
Bilaspur	14	86	21	233	35	309
Chamba	79	93	0	0	79	93
Hamirpur	15	15	5	3	20	18
Kangra	12	85	11	28	23	113
Kinnaur	0	0	0	0	0	0
Kullu	7	14	46	143	53	157
Lahaul & Spiti	2	20	0	0	2	20
Mandi	142	445	119	363	261	808
Shimla	4	12	17	64	21	76
Sirmaur	10	57	48	151	58	208
Solan	12	12	9	44	21	56
Una	0	0	0	0	0	0
Total	297	839	276	1,019	573	1,858

Source: JICA Study Team

ANNEX-K

Environment & Social Consideration

THE STUDY ON DIVERSIFIED AGRICULTURE FOR ENHANCED FARM INCOME IN THE STATE OF HIMACHAL PRADESH

FINAL REPORT

ANNEX-K
ENVIRONMENTAL & SOCIAL CONSIDERATION

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ANNEX-K ENVIRONMENTAL & SOCIAL CONSIDERATION

K-1 Environment Related Laws and Policies in India

K-1.1 Relevant National Laws and Acts

There are rules and regulations of the Government of Himachal Pradesh and Government of India that monitor certain environmental and social considerations in the implementation of certain projects. A preliminary and possible list of rules and regulations that may be relevant to the project has been provided in Table K-1.1.

Table K-1.1 List of National Acts & Policies

Act	Relevance
Environment (Protection) Act, 1986 and EIA Notification, 2006	This Act is umbrella legislation and has been enacted to provide for the protection and improvement of environment by preparation of manuals, codes or guides to prevention, control and abatement of environment pollution. Several of the rules that have been mentioned in this section come from the Act.
Water (Prevention & Control of Pollution) Act, 1974 (Amended in 1988)	This enacted to implement measures for effective prevention and control of water pollution. It empowers the State Pollution Control Board to undertake the measures.
The Water (Prevention and Control of Pollution) Cess Act 1977	This act to provide for the charge and collection of cess on water consumed by persons carrying on certain industries and by local authorities.
Air (Prevention and Control of Pollution) Act, 1981 (Amended in 1987)	This enacted to implement measures for effective prevention of air pollution.
Forest Conservation Act , 1980 (as amended in 1998)	This will become applicable for the diversion of forest areas for non-forest use. If the plan may require the diversion of forest area for road constructions / cabling etc clearance will have to be sought under this act.
Wildlife (Protection) Act, 1972	This act pertains to all operations in protected areas and wildlife. If the plan should undertake any activity in protected areas or areas in the surrounding area of the protected areas, then this act shall apply.
Biodiversity Act 2002	The Biological Diversity Act 2002 reaffirms the sovereign right of the states over their biological resources. It provides for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and matters related to biodiversity.
Bio-Medical Waste Management and Handling Rules, 1998	This applies to all waste generated during treatment or immunization of human beings or animals and production or testing of organism or micro-organism.
Municipal Solid Wastes (Management and Handling) Rules, 2000	These rules include procedures for collection, segregation, storage, transportation, processing and disposal of municipal solid waste.
Insecticide Act 1968	In India the insecticide trade i.e., import, manufacture , sale and transport, stock and distribution of pesticides is governed by the insecticide Act 1968 (Act No. 46 of 1968)
The Fertiliser Control Order 1985, evolved from the Section -3 of the Essential Commodity Act 1955	This is used to regulate the movement, quality assurance and fair distributions of the chemical fertilizers to the public.
Land Acquisition Act 1894	For roads that are the district, state and national level, then land in acquired under this act. The acquisition of land under this act may require rehabilitation and resettlement of the affected families.

K-1.2 National Conservation Strategy & Policy Statement on Environment and Development, 2002

This policy is in response to the need for laying down the guidelines that would help to weave environmental considerations into the fabric of the national life and of its development process. The policy is a statement of commitment by Ministry of Forests & Environment (MoEF), Government of India, for reorienting existing policies and action with an environmental perspective so as to give a new direction towards conservation and sustainable development. The strategies and action point set out for agriculture, horticulture, animal husbandry and irrigation are already reflected in the State Environmental Policy Guidelines.

K-1.3 The National Environment Policy, 2006

The National Environment Policy seeks to extend the coverage, and fill in a gap that still exists, in light of present knowledge and accumulated experience. It does not displace, but builds on the earlier policy. The main concern it has shown is the conversion of wetlands and forest land for agriculture; the adverse impacts from intensive agriculture; the adverse impacts of use of chemical fertilizers and pesticides. The action strategies for agriculture and related sectors have been outlined in the above policy and are meant to be the guidelines for strategies to be developed in this sector. For mountain ecosystems it outlines the following additional action points that may be relevant to this Plan:

- Adopt appropriate land use planning and watershed management practices for sustainable development of mountain ecosystems.
- Adopt “best practices” norms for infrastructure construction in mountain regions to avoid or minimize damage to sensitive ecosystems and despoiling of landscapes
- Encourage cultivation of traditional varieties of crops and horticulture by promotion of organic farming, enabling farmers to realize a price premium.

K-2 Environment Protection Regime in Himachal Pradesh

K-2.1 Department of Environment & Scientific Technologies in Himachal Pradesh

Department of Environment & Scientific Technologies (DEST), Himachal Pradesh is the nodal agency for environmental clearance. Pursuant to the stipulations contained in the notification of Ministry of Environment & Forests (MoEF), Government of India, vide No. S.O. 1533 (E) Dated September 14, 2006 on the recommendations of the State Government, The Government of India has notified the State Environment Impact Assessment Authority and the State Expert Appraisal Committee vide No. S.O. 1735 (E) Dated October 11, 2007. It is the mandate of the Department to consider the validity and facts contained in the Environmental Impact Assessment and monitoring of Environment Management Plan prepared by the Project Proponents.

Under environment and pollution control the Department of Environment and Scientific Technology is to exercise all the powers vested under all Act and Rules pertaining to protection of environment & control of pollution, implementation/ enforcement of all environment legislation on behalf of the State Government.

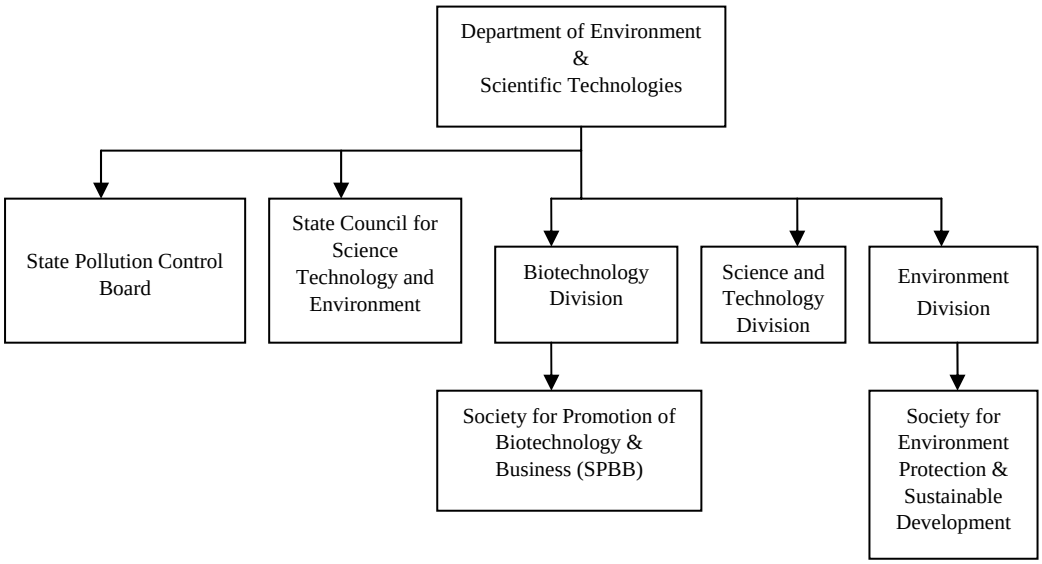

Fig. K-2.1 Organizational Chart of Department of Environment and Scientific Technologies

K-2.2 State Level Laws

All the above national acts apply to the State and are relevant to the implementation of the proposed crop diversification plan. In addition, in order to protect the environment and control all types of pollution, the Environment Protection Act (EPA), 1986 enables the framing of rules to cover specific activities. According to these rules the Deputy Commissioner / District Collectors have been declared as 'Prescribed Authority' for enforcement. The Deputy Commissioners/ District Collectors in the State are empowered to implement above-mentioned rules in their respective territorial jurisdictions. It goes further and stipulates that any lapse in this regard shall render the prescribed authority responsible for negligence of their duties. The rules framed under EPA and their relevance to this plan are given in Table K-2.1.

Table K-2.1 Rules under Environment Protection Act, 1986

Rules	Relevance
Storage and Import of Hazardous Chemical Rules 1989	This rule will not apply to the Plan.
Chemical Accidents (Emergency Planning Preparedness and Response Rules, 1996).	This rule will not apply to the Plan.
Recycled Plastics Manufacture and Usage Rule 1999	This rule will not apply to the Plan.
Noise Pollution (Regulation and Control) Rules 2000	This will not apply to the plan significantly. Any noise pollution emanating from the project activities will be localized and in line with provision of the act.
Municipal Solid Waste (Management and Handling) Rules 2000	This rule will not apply to the plan.
The Himachal Pradesh Town & Country Planning Act, 1977, Rules 1978	The State enforces effectively provisions of act, rules and development plans / Sector plans, so that precious human and animal lives as well as properties are safeguarded from the potential hazards.
Himachal Pradesh Non-Biodegradable Garbage (Control) Act, 1995.	The Government of Himachal Pradesh has prohibited the use of polythene (and other similar material)[1] carry bags by traders, retailers and venders of all kinds of commodities within the State of Himachal Pradesh, if size and

[1] This ban has been imposed by Notification No. STE-A (3)-4/2003 dated 4 June 2004.

Notification No. STE A (3)-4/2003, dated 4-6-2004.	thickness of bags are less than 18" x 12" and 70 microns respectively.
Himachal Pradesh Non-Biodegradable Garbage (Control) Act, 1995 (i.e. Municipal Corporation, Municipal Councils and Nagar Panchayat etc.)	The local authorities are legally responsible for providing receptacle or places for deposit of non-biodegradable garbage. Segregation of the non-biodegradable garbage is expected at the source level.

K-2.3 Environmental Policy

The state of Himachal Pradesh does not have a stand alone environmental policy. The developmental vis-à-vis environmental model followed in the State is generally directed by central policies. However since the National policies and laws do not cover all areas, especially those unique to mountain areas, the Department of Science & Technology (DEST) has established a set of 'Environment Policy Guidelines' (undated). The purpose of the Guidelines is as follows:

- Taking development process pursued its beneficial as well as well adverse impacts
- Identification of remedies and interventions as may be required at institutional, regulatory and ultimately policy and implementation level

The Policy Guidelines cover subjects of land use, Geology, forest, agriculture, horticulture, water resources, industries, energy, tourism, health, biodiversity and pollution.

K-2.4 Himachal Pradesh Forest Sector Policy & Strategy 2005

This policy was framed under the Department of International Development (DfID) funded Himachal Pradesh Forest Sector Reforms Project and introduced the concept of 'Forest Sector', to include stakeholders and institutions directly or indirectly dependent on or responsible for the management of these resources for livelihood security and sustenance and thus include sectors such as agriculture, horticulture, animal husbandry, rural development among others. The policy proposes to develop a hill based strategy will be formulated to reduce direct dependence on forests and will encourage a balanced regional development in the agriculture sector with emphasis on cash economy through diversification to high value crops rather than subsistence economy. It proposes that integrated projects will be formulated in consonance with the hill based strategy taking into account the linkages of cultivated lands, forests and grassland livestock.

K-3 Environmental Clearances

K-3.1 EIA notification 2006

Environmental Clearance of New Projects in India is subject to the Environmental Impact Assessment Notification 2006 that became effective from 14th September, 2006. Given below are the details of projects requiring environmental clearance, designated regulatory bodies and procedure to be followed. The Notification has been issued following section of the Environment Protection Act 1986 and replaces the EIA Notification 1994.

The EIA Notification provides a schedule of industries and activities that will require environmental clearance. The following projects or activities shall require prior environmental clearance from the concerned regulatory authority, before any construction work, or preparation of land except for securing the land, is started on the project or activity:

i) All new projects or activities listed in the schedule to the notification;

ii) Expansion and modernization of existing projects or activities listed in the schedule to the notification with addition of capacity beyond the limits specified for the concerned sector, after expansion or modernization;

iii) Any change in product mix in an existing manufacturing unit included in the schedule beyond the specified range.

K-3.2 Categorization of Projects and Activities

All projects and activities are broadly categorized, based on the spatial extent of potential impacts into two categories.

Category A: All projects that fall in Category A of the schedule are expected to have high potential impacts and will need clearance from the designated Central Government level authorities

Category B: Category B projects of the schedule are expected to have lesser potential impacts than Category A projects and will require clearance from designated state level authorities.

K-3.3 Regulatory Authorities for Environmental Clearance

(1) Central Level Authorities

All projects or activities included as Category 'A' in the Schedule shall require prior environmental clearance from the central government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification

(2) State Level Authorities:

All projects or activities included as Category 'B' in the Schedule will require prior Environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification. In the absence of a duly constituted SEIAA or SEAC, a Category 'B' project shall be treated as a Category 'A' project.

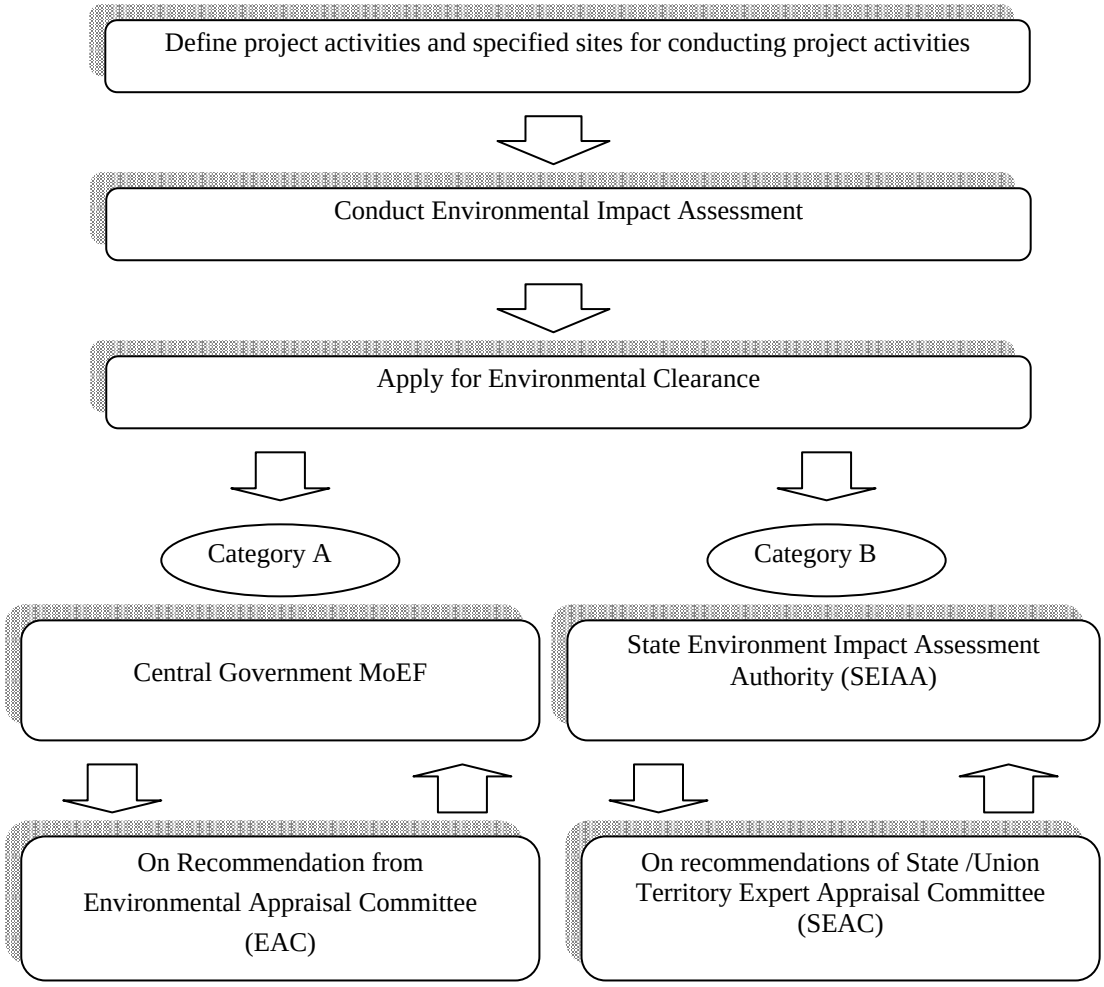

Fig. K-3.1 The Process and the Regulatory Bodies Concerned for Application for Environmental Clearance for New Projects

K-3.4 Environmental Clearance Procedure

The environmental clearance process for new projects will comprise of a maximum of four stages, all of which may not apply to particular cases as set forth below in the notification. These four stages in sequential order are:

Stage I: Screening: This applies only to Category 'B' Projects. This Stage entails the scrutiny of an application seeking prior environmental clearance made in Form 1(given in the notification) by SEAC for determining whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance, depending up on the nature and location specificity of the project.

Through screening the projects are further categorized into B1 and B2 Projects-

- **Category 'B1'**: The projects requiring an Environmental Impact Assessment report shall be termed as B1
- **Category 'B2'**: The projects not requiring any Environment Impact Assessment report are termed as B2. For categorization of projects into B1 or B2 the Ministry of

Environment and Forests shall issue appropriate guidelines from time to time.

Stage II: Scoping: "Scoping" refers to the process by which the EAC in the case of Category 'A' projects or activities, and SEAC in the case of Category 'B1' projects or activities, determine detailed and comprehensive Terms of Reference (TOR) addressing all relevant environmental concerns for the preparation of an Environment Impact Assessment (EIA) Report in respect of the project or activity for which prior environmental clearance is sought. It involves the following stages -

i) The EAC or SEAC shall determine the Terms of Reference on the basis of the information given in the prescribed application Form1/Form 1A including Terms of Reference proposed by the applicant and a site visit.

ii) The Terms of Reference (TOR) shall be conveyed to the applicant by the EAC or SEAC as concerned within sixty days of the receipt of Form 1.The final Terms of Reference approved for the EIA studies shall be displayed on the website of the Ministry of Environment and Forests and the concerned SEIAA.

iii) Applications for prior environmental clearance may be rejected by the regulatory authority concerned on the recommendation of the EAC or SEAC concerned at this stage.

Stage III: Public Consultation: "Public Consultation" refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. All Category 'A' and Category B1 projects or activities shall undertake Public Consultation; with the exemption of few projects. The basic components of the Public Consultation process are outlined below.

(i) The Two Components of Public Consultation are :

(a) **A public hearing:** A public hearing at the site or in its close district wise, to be carried out in the prescribed manner for ascertaining concerns of local affected persons;

(b) **Obtain responses in writing:** Responses in writing are obtained from other concerned persons having a plausible stake in the environmental aspects of the project or activity.

(ii) Concerned Authorities for conducting the public hearing and obtain responses in writing are:

(a) State Pollution Control Board (SPCB) or the Union Territory Pollution Control Committee (UTPCC). They conduct and forward the outcome in the prescribed manner to the regulatory authority concerned within forty five days of a request to the effect from the applicant.

(b) In case the above authorities are unable to conduct Public Consultation within specified time the regulatory authority shall engage another public agency or authority.

(c) For obtaining responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity, the concerned regulatory authority and the State Pollution Control Board (SPCB) or the Union territory Pollution Control Committee (UTPCC) shall invite responses from such concerned persons by placing on their website the Summary EIA report prepared in the prescribed format.

(iii) Outcome of Public Consultation

After completion of the public consultation, the applicant shall address all the material environmental concerns expressed during this process, and make appropriate changes in the

draft EIA and Environmental Management Plan (EMP). The final EIA report, so prepared, shall be submitted by the applicant to the concerned regulatory authority for appraisal.

Stage IV: Appraisal: 'Appraisal' means the detailed study by the EAC or SEAC of the application and other documents like the Final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned for grant of environmental clearance. This appraisal shall be made in a transparent manner in a proceeding to which the applicant shall be invited for giving necessary clarifications in person or through an authorized representative. On conclusion of this proceeding, the EAC or SEAC concerned shall make categorical recommendations to the regulatory authority concerned either for grant of prior environmental clearance on stipulated terms and conditions, or rejection of the application for prior environmental clearance, together with reasons for the same.

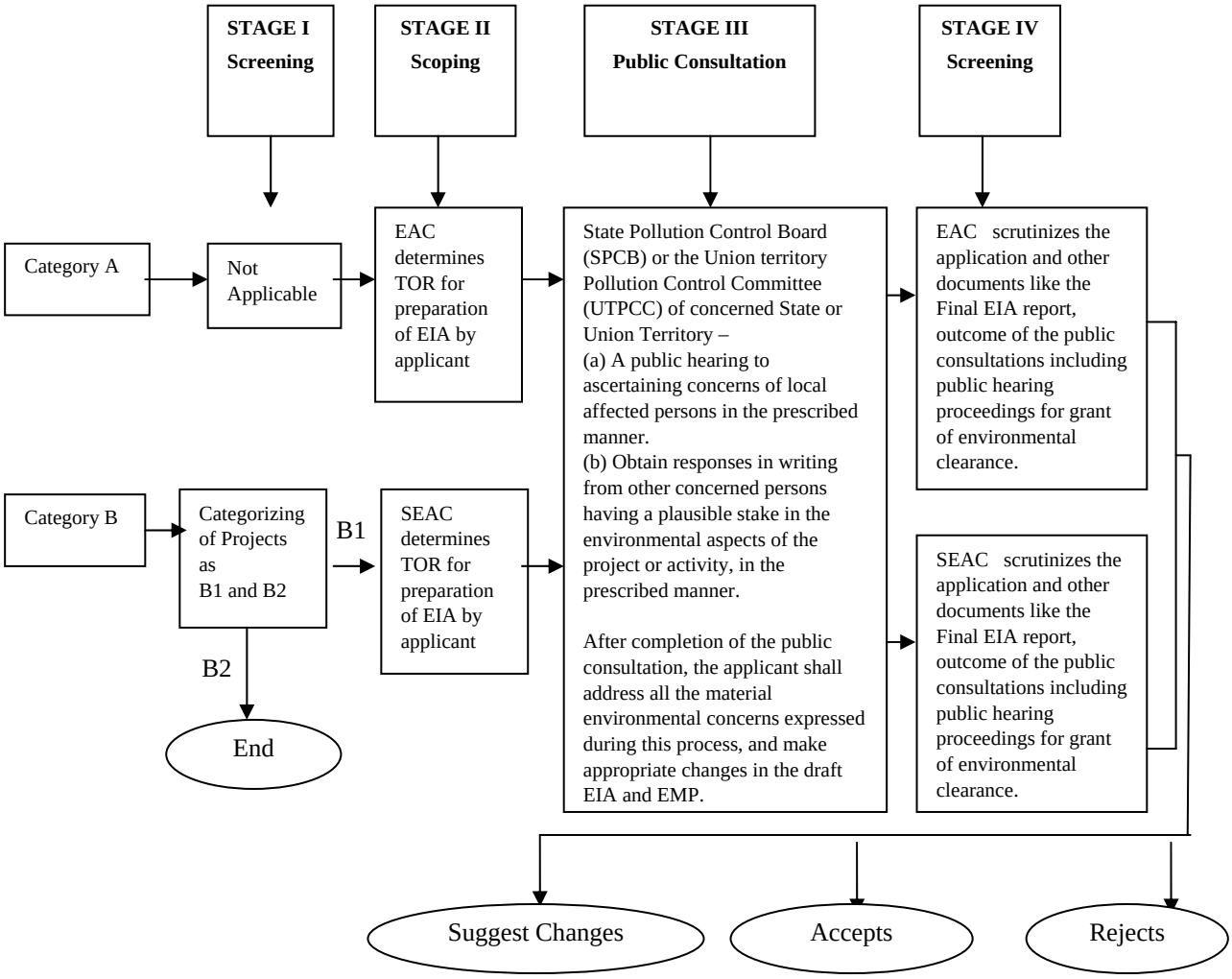

Fig. K-3.2 Diagrammatic Representation of the Procedure Followed for Environmental Clearance under EIA Notification 2006

K-3.5 Application for Environmental Clearance under EIA Notification 2006

The EIA Notification 2006 is the instrument through which environmental clearance is sought for projects in Himachal Pradesh.

Through preliminary discussion with the Environmental Engineer of State Pollution Control Board, it

has been clarified that the proposed plan on Diversified Agriculture for Enhanced Farm Income in Himachal Pradesh will not require to formally apply for Environmental Clearance under the EIA Notification 2006. The planned activities, in terms of the nature of the plan and size of the plan will not fall within either Category A or Category B of the schedule of projects and activities listed in the EIA Notification 2006. The schedule does not include agricultural projects, minor irrigation projects or farm roads.

K-3.6 Agriculture Sector Projects Requiring an EIA in India

The EIA Notification 2006 is a Schedule that provides a 'List of Projects or Activities Requiring Prior Environmental Clearance'. Agriculture is not included in the schedule. The areas related to agriculture are listed as follows:

Table K-3.1 List of Agriculture Related Area Requiring Prior Environmental Clearance

Project Activity		**Category with threshold limit**		**Conditions if any**
		A	**B**	
1. Mining, extraction of natural resources and power generation (for a specified production capacity).				
(1)	(2)	(3)	(4)	(5)
1(c)	River Valley Projects	(i)≥50MW hydroelectric power generation (ii)≥10,000 ha. of culturable command area	(i)<50MW ≥25 MW hydroelectric power generation; (ii) < 10,000 ha. of culturable command area	General conditions shall apply.
5. Manufacturing/Fabrication				
5(a)	Chemical fertilisers	All projects	-	-
5(b)	Pesticide Industry and pesticide specific intermediates (excluding formulations)	All units producing technical grade pesticide	-	-
7. Physical Infrastructure including Environmental Services				
7 (g)	Aerial Ropeways		All projects	General Conditions shall apply
8. Building/Construction projects/ Area Development projects and Townships				
8 (a)	Building and Construction Projects		≥20,000 sq.mtrs and < 150,000 sq.mtrs of built up area*	

*Note: *built up area covered constructions; in the case of facilities open to the sky, it will be the activity area*

K-4 Relevant Pollution Standard

Water (Prevention & Control of Pollution) Act, 1974 (Amended in 1988) is enacted to implement measures for effective prevention and control of water pollution. It empowers the State Pollution Control Board to undertake the measures. The water quality standard for water for irrigation prescribed by the Department of Irrigation and Public Health is given below-

Table K-4.1 Water Quality Standard for Irrigation

S.No	Description	Standard Range	Unit
1	pH	7.0-8.20	-
2	Dissolved Oxygen	6.00-10.0	mg / litter
3	Water Temperature	15-38°C	Deg C
4	Turbidity	100-700	mg / litter
5	Conductivity	0.300-0.998	S/m

Source: IPH, SDO, Hamirpur

Primary water quality criteria are given in following Table K-4.2.

Table K-4.2 Primary Water Quality Criteria (Prescribed by State Pollution Control Board)

Class of Water	Description	Designated Base Use
A	1.Total Coliform organism MPN/100ml. shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6 mg/l or more 4. Biochemical Oxygen Demand 2 mg/l or less.(5 days 20 Deg C)	Drinking water source without conventional treatment but after disinfection
B	1. Total Coliform organism MPN/100 ml. shall be 500 or less. 2. pH between 6.5 and 8.5 3.Dissolved Oxygen Demand 5 mg/l or more 4. Biochemical Oxygen Demand 3 mg/l or less. .(5 days 20 Deg C)	
C	1. Total Coliform organism MPN/100 ml. shall be 5000 or less. 2. pH between 6 and 9 3. Dissolved Oxygen Demand 4 mg/l or more 4. Biochemical Oxygen Demand 3 mg/l or less. .(5 days 20 Deg C)	Drinking water sources after conventional treatment
D	1. pH between 6.5 and 9.5 2. Dissolved Oxygen Demand 4 mg/l or more 3. Free Ammonia (as N) 1.2mg/l or less.	Propagation of Wild Life Fisheries
E	1. pH between 6.5 and 9.5 2. Electrical Conductivity at 25- mg/cm max. 2250 3. Sodium absorption ratio Max. 26. 4. Boron Max 2 mg/l	Irrigation, Industrial Cooling Controlled Waste.

Source: http://hppcb.nic.in/Waterquality/pwqc.htm

K-5 Legal Framework on Land Law, Resettlement, Water and Forest

K-5.1 Land Law

Land Acquisition Act, 1894 (amended in 1984) (LAA) provides a framework for facilitating land acquisition in India. LAA enables the State Government to acquire private land for public purposes. LAA ensures that no person is deprived of land except under LAA and entitles affected parties to a hearing before acquisition. Compensation, mutually agreed upon by the concerned parties and the Government, for land and improvements is paid by cash by the project authorities to the State Government which in turn compensates landowners.

The proposed program components does not plan to acquire any private land. Private land that will be used in infrastructure development like collection centers, minor irrigation structures and access farm roads will be acquired from farmers' community so with the consensus of the farmers concerned and for their benefits and therefore does not attract the LAA. Their approval is got through a no-objection certificate given by them. Besides, the ownership of the land used will not change and only its usufruct rights will change.

K-5.2 Resettlement Policy and Guidelines

The National Rehabilitation and Resettlement Policy 2007 (NRRP, 2007) was adopted by the Government of India 31st October 2007 to address development-induced resettlement issues. The NRRP stipulates the minimum facilities to be ensured for persons displaced due to the acquisition of land for public purposes and to provide for the basic minimum requirements. All projects leading to involuntary displacement of people must address the rehabilitation and resettlement issues comprehensively. The State Governments, public sector undertaking or agencies and other requiring

bodies shall be at liberty to put in place greater benefit levels than those prescribed in the NRRP. The principles of this policy may also apply to the rehabilitation and resettlement of persons involuntarily displaced permanently due to any other reason.

The NRRP is applicable for programs where over 400 families in the plains and 200 families in hilly or tribal or Desert Development Program (DDP) areas are displaced. However, the basic principles can be applied to resettling and rehabilitating regardless of the number affected. The proposed program on crop diversification will not induce any displacement of relocation and therefore will not attract the NRRP 2007.

K-5.3 Water Regulation and Rights Issues

(1) State Ownership and Central Legislation

As per the Constitutional provision of India, water is both a State and a Union Subject. In general however water regulation, use and control have largely been vested with the States. Schedule 7, List II of the Constitution of India gives the States the exclusive power to regulate water supplies, irrigation and canals, drainage and embankments, water storage, hydropower and fisheries[2].

The Union of India however retains the power to legislate on certain interstate river use issues and issues on shipping and navigation on national waterways as well as powers to regulate the use of tidal and territorial waters. The Constitution also provides that the Union can legislate with regard to the adjudication of interstate water disputes. The following legislation is applicable to interstate use of water-Inter-State Water Disputes Act 1956, River Boards Act, 1956 and the Water (Prevention & Control of Pollution) Act, 1974 (Amended in 1988).

(2) State Laws, Regulations and Policies

Ground Water (Regulation and Control of Development and Management) Act 2005:

The Act aims to regulate and control the development and management of ground water and matters connected therewith. Under Section 3 of the Act a Ground Water Authority has been established. It functions under the over all control and supervision of the State Government.

Ground water in this Act has been defined as “the water which exists below the ground surface in the zone of saturation and can be extracted through wells or any other means or emerges as springs and base flow in rivers and streams”. The Authority, if necessary or expedient in the public interest to control and or regulate the extraction of ground water in any form in any area as it may consider fit, may be by notification declare such area or part thereof to be the notify area, with effect from such date as may be specified therein.

The Minor Canals Act 1976:

This Act aims at making better provision for the control and management of minor canals and to provide for the levy of water charges thereon in Himachal Pradesh. This applies mostly to Government owned Canals listed in Schedule I and II of the act. The act becomes applicable if any construction, diversion or any or any other subsidiary activities undertaken in the notified canals in Schedule I and II. The Soil Conservation Wing of the Directorate of Agriculture that undertakes minor and micro-irrigation activities under the Directorate have not required taking any clearance under this Act.

[2] Ministry of Water Resources Website, Phillip Cullet (2007) Water Laws in India: Overview of Existing Frameworks and Proposed Reforms, IELRC Working Paper; International Environmental Law Research Centre.

(3) Irrigation and Water Rights of People / Farmers

Although no individual may claim any prescriptive rights of easements against the government in the waters of rivers, streams etc, rules on irrigation rights in Himachal Pradesh still derive from the early common rule of riparian rights. The rights and obligations between the state and the irrigators in India in the matter of irrigation rest largely on customs and practices. These customs survived as living practices since they came to be recorded by the British in revenue related documents known as Wajib-ul-Arz and Riwaz-i-Abpashi. These records are available with land revenue record officers called patwaris or in the Record Rooms of the Sub –District Magistrate's Office. These records are still legally valid in the State.

Wajib-Ul-Arz: Record of Customary and Easmentary Rights:

The customary rights of records of peoples to use natural resources and existing infrastructure are known as Wazib-ul-Arz. These are records of customary rights of occupied land[3]. These records detail village wise right-of-way, access to sources of water (drinking and irrigation), usufruct rights over grazing and common lands.

Although some of the villages may not have irrigation at the time of the formation of the records, the records recognize the riparian rights of the farmers in an existing water source that can be used for irrigation. Often the user groups of new structures are based on the recognition of these rights.

Riwaz-i-Abpashi: Record of Irrigation Rights and Management System[4]:

In Himachal Pradesh, water rights and management for irrigation have been recorded in Riwaz-i-abpashi- the register for irrigation customs. This right exists mainly for Gravity Flow irrigation systems (mostly by way of Kuhls). These rights were mostly codified during the colonial rule. A typical record gives the history of the irrigation system, the list of villages and farmers served and their rights, water distribution rules, the type of diversion structures, operation and maintenance procedures, penalties for non-participation in these chores and the signatures of the beneficiaries affirming the veracity of the records.

Irrigation schemes currently operate through the creation of water user associations or through existing Krishi Vikas Sanghathans (KVS). The usufruct rights over the new systems are with the members of the WUAs or KVKs. They are also made responsible for the operations & management.

(4) Clearance Procedure for Irrigation Projects

Irrigation activities under the proposed crop diversification plan will be undertaken by Soil Conservation Wing of the Directorate of Agriculture. The Wing will undertake irrigation activities of the crop diversification as per the Rural Infrastructure Development Fund (RIDF) guidelines. As per the checklist for preparation of detailed project report through micro/ minor irrigation and related infrastructure to be submitted for loans under RIDF (applicable to sprinkler, drip, tanks, small and medium lifts, shallow wells, shallow tube wells and agriculture pumping sets) in Himachal Pradesh

[3] Chetan Singh- Polyandry and Customary Rights of Landownership in the Western Himalaya, Paper presented at XIV International Economic History Congress, Helsinki 2006. Emmanuel Bon-Common Pool Resources and Communal Control: Two Case Studies in Himachal Pradesh, India. Paper presented at 8th IASCP Conference, Bloomington, Indiana, USA

[4] *Survival Lessons: Water Management Traditions in the Central-Western Himalayas*, 2003. People Science Institute, Dehradun, U.C.Pande-*Record of Irrigation Rights, Himachal Pradesh: Riwaz-i-Abpashi Records*, 1995.FMIS Letter IMII. Ramesh Chand –*Role of Water Rights in Farmer Managed Hill Irrigation Systems*. 1994. EPW, March 26. Vol 29 (13).

the following clearances are required

Table K-5.1 Required Clearance for Irrigation Projects

S.No.	Items	Remarks
1	Ministry of Environment and Forests	Applicable when land use is under Forest Department. Cleared by State Forest Department
2.	Ministry of Agriculture	Cleared by State Agriculture Department
3.	Government of Himachal Pradesh	Administrative Approval prior to planning
4.	State Irrigation and Public Health Department, Agriculture Department	Technical Sanction
5.	Ground Water Authority	Clearance sought only in the case of Tube Wells.
6.	Panchayats	Requisition for the proposed activities has to come from the concerned Panchayats.

Source: Soil Conservation Wing, Directorate of Agriculture; Govt of HP.

(5) Dispute Resolution

Since most minor irrigation projects are undertaken on request and need expressed by the local communities or user groups and through the establishment of WUAs and KVSs, no land is acquired and any private land is used through the consensus of the individuals and the concerned Panchayats. Since projects taken up for the benefit of the people, an affidavit or certificate is taken from individual farmers or people concerned that they have no objection or are willing for implementation of the desired for the purpose of the project. Wherever there is dispute, the proposed project is dropped. Dispute over use of water resources is usually resolved on the basis of the records of rights and the authority vested upon the Collector or through a decree of the Court.

K-5.4 Legal Framework for Diversion of Forest Area for non-Forest Related Activities

(1) Regulation for Diversion of Forest Land for non-Forest Land Activities

The use of some amount of forest land and waste lands is required in some cases. All forest areas diverted or required for non-forest activity is regulated by the Forest (Conservation) Act, 1980 (FCA). FCA is essentially a regulatory act that aims to conserve the forest resources by regulating the use of forest land for non- forestry purpose. It is not a prohibitory act, it only aims to:-

i) impose restrictions on non- judicious use of forest land, and

ii) ensure adequate compensatory efforts instead of diverted forest land

The Act is applicable to all forest lands, irrespective of the presence of trees on it. Therefore, proper case under FCA for diversion of forest land, even if it does not contain any tree, has to be prepared.

The following activities of the plan if involving waste land or forest land will attract the application of the FCA.

a. Constructing/ widening farm road/ link road,

b. Construction of irrigation structure (tanks/pump house),

c. Laying of irrigation pipelines, and

d. Collection centers to be constructed in forest land.

(2) Application for Clearance

For seeking approvals for diversion of forest land under the FCA, user agencies need to make an application in the prescribed ‘Application Form’

Table K-5.2 Information to be furnished by the User Agency in Application form for use of Forest or Waste Land

Part of I of the Application Form to be filled by the User Agency has the following requirement-

1. Project Details
    a. Short Narrative of the Proposal and project/scheme for which the forest land is required
    b. Map showing the required forest land, boundary of adjoining forest on a 1: 50,000 scale map
    c. Cost of the Project
    d. Justification for locating the project in forest area
    e. Cost-benefit analysis (to be enclosed)
    f. Employment likely to be generated
2. Purpose-wise break-up of the total land required
3. Details of displacement of people due to the project, if any;
    a. Number of families
    b. Number of Schedule Caste /Schedule Tribe Families
    c. Rehabilitation plan. (to be enclosed)
4. Whether clearance under Environment (Protection) Act, 1896 required (Yes/No)
5. Undertaking to bear the cost of raising and maintenance of compensatory afforestation and /or penal compensatory afforestation as well as cost for protection and regeneration of Safety zone etc as per the scheme prepared by the State Govt (undertaking to be enclosed)
6. Details of Certificate /documents enclosed as required under the instruction.

In case of proposal regarding Road the following information/documents must be given:-

    a. Length and width of Road passing through forest and non-forest area.
    b. Length of road already existing/ constructed out of the total length involved in the project proposal.

(3) Checklist for Items to be Submitted by User Agency

A meeting was organized with the nodal officers of Punjab, Haryana, and Himachal Pradesh & Chandigarh on 16th September, 2005 in the Northern Regional Office on the ‘Proper submission of proposals seeking diversion of forest land under Forest (Conservation) Act, 1980’. A checklist has been drawn and finalized in the meeting for streamlining the submission of proposals. The Checklist relevant for the user agency is given below.

Table K-5.3 Checklist for User Agency

Checklist Serial No.	Description
08	Statement showing details of non-forest area involved in the proposal
11	Certificate for minimum use of forest land
23	Undertaking for the payment of net present value of Forest area
22	Undertaking for payment of cost of Compensatory afforestation

Source: HPFD Procedure Under FCA: Forest Department, Government of Himachal Pradesh

(4) Ascertaining the Category of Land

It is advised that the time of proposal making and designing of the above activities, the concerned implementer seek the involvement of the local Range Office of the Forest Department to assess if the proposed area for the activity falls within forest area. It is advised that during the survey of the proposed activity the concerned staff of the Forest Department at the local level is included.

As per Notification No. Ft. 29-241-49 issued in Shimla on 25th February 1952, the land use change of all wasteland or uncategorized village common land (shyamlat) will attract the FCA. The User Agency will have to make the same application as done for the diversion of forest area.

(5) Agency Concerned, Time Frame and Procedure under FCA

The final clearance for the use of forest land is given by the MoEF, Government of India. Application for the use of less than 5 hectares of forest area is cleared by the Regional Office of the Central Government in the Ministry of Environment and Forests established as part of the Ministry to deal with the forest conservation matters under the Act. Clearance for use of forest area more than 5 hectares is given by MoEF directly. Nodal officer for approval under FCA is Chief Conservator of Forest, FCA.

Part I of the form is to be filled up by the concerned user agency. Part-II, III, IV and V are to be filled up by the State Forest Department/ Government of Himachal Pradesh after receipt of the proposal with Part-I dully filled in by the user agencies. The DFO of the area shall scrutinize part-I and complete part-II of the Performa within one month of the receipt of the proposal in his/ her office. The concerned Conservator of Forests shall scrutinize the proposals (part I and II) within 15 days of receipt of the proposal in his office and the same shall be scrutinized in the head office within 7 days of their receipt from the concerned CFs. If all the necessary information has been provided and the process is complete in every way at all stages then the time period for clearance varies between 45-60 days. The delays mostly occur due to lapses in fulfilling procedure and recall of files.

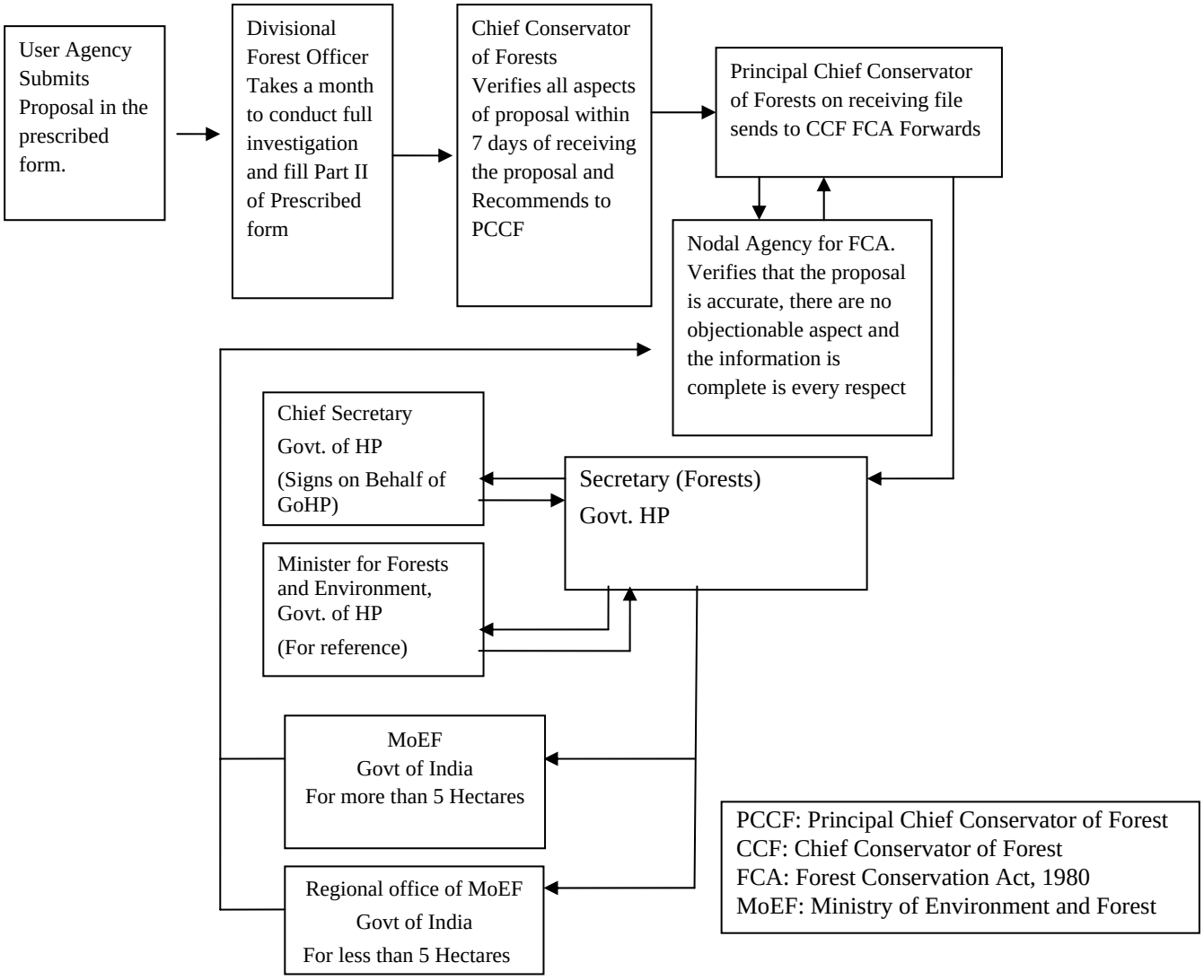

Fig. K-5.1 Procedure for Clearance of Use of Forest Land under FCA

K-6 Cultural Heritages in Himachal Pradesh

K-6.1 Major Temples and Monasteries of Himachal Pradesh

Himachal Pradesh is known as the land of Gods or Dev Bhumi and is known for its innumerable temples, monasteries and breathtakingly beautiful landscapes. The temples of Himachal reflect the architectural styles of the various civilizations that have influenced the land and its culture. The temples and monasteries and their mythical/historical past and its magnificent architectural styles are among the main cultural heritage of the State. Some of the main temples and monasteries are listed below along with their locations and are also marked on the Map provided in Fig. K-6.1.

There are also UNESCO World Heritage Sites and Heritage Places that are of importance in terms of their conservation and preservation value.

Table K-6.1 List of Major Temples of Himachal Pradesh

S. No	Name of Temple	Location	Description
1	Hatkoti	Shimla	Situated in Hatkoti, 130 Kms from Shimla town, and 14 Kms from Rohru. Temple scattered over an area of 5 Sq Km. architecture and carvings on these areas place them between 5^{th}-9^{th} centuries.
2	Tara Devi	Shimla	Temple is 21 Kms from Shimla town and 8 Kms from Shogi, on the National Highway 22. The temple is about 250 years old. The annual fair of the Shardiya Navratra is held in October November.
3	Bhima Kali	Shimla	It is located in Sarahan, 180 Kms from Shimla and 50 Kms Rampur. The Bushahr dynasty that was the ruler of the kingdom till independence constructed this magnificent temple
4	Renukaji	Sirmaur	Temple is 98 Kms from Ambala, 36 Kms from Nahan. This temple is dedicated to Parashuram was built by Sirmaur's Rajas. A popular fair is held in the temple complex in October- November.
5	Balasundari Devi	Sirmaur	The temple is 54 Kms from Ambala and 24 Kms from Nahan. Temple was built in 1573.
6	Baba Balak Nath	Hamirpur	Temple is 30 Kms away from Hamirpur town. The cave temple dedicated to Baba Balak Nath is located on the spur of a hill in Deoth-Sidh town.
7	Chamunda Devi	Kangra	Temple is 21 Kms from Kangra town, it is on the bank of Baner. The temple is said to be more than 700 years old.
8	Jawalmukhi	Kangra	The Temple is 37 Kms from Kangra town. The temple finds mention in many medieval accounts, one of which dates to the time of Firoz Shah Tuglaq of the 14^{th} Century.
9	Masrur	Kangra	The Temple is 36 Kms from Kangra town. The temples are under the jurisdiction of the ASI and dates back to the 8-9^{th} centuries AD.
10	Brijeshwari	Kangra	Located 35Kms from Palampur, the temple is known once for its legendary wealth of diamonds and pearls. It continues to be a busy place of pilgrimage.
11	Chintapurni	Una	The temple is 60 Kms from Kangra town and 32 Kms from Jawalamukhi. The present temple structure dates probably to the 15-16^{th} centuries AD.
12	Trilokinath	Chamba	The temple is located at about 9 kms from Udaipur and is built in the Kashmiri- Kannauj style of the mid 8^{th} century. The Pauri festival held here in August each year.
13	Chaurasi Complex of Temples	Chamba/ Bharmour	Located in Bharmour, at 65 Kms from Chamba town, several temples of ancient origin and significant architecture are located within the Chaurasi (eighty –four) complex-it is almost like a temple town with some temples dating back to 9-10^{th} Century. This place for famous for its Maninmesh Yatra.
14	Bijli Mahadev	Kullu	The temple is 10 Kms from Kullu town. Temple traces its origin during the medieval period and set on a commanding height at over 2,000m.
15	Nirmand T	Kullu	Nirmand town located 19 Kms from Rampur is a ancient villages that is the seat of many legendary tales of epic and mythical characters of the Hindu Pantheon and houses the famous temples of Parsurama, Ambika Devi, Chandi Devi and the cave of Dhar Deo Dhank.
16	Shikari devi	Kullu	Temple is situated in Naggar Block, of Kullu-Manali. Devoted to Vashishth Muni(sage), the temple is a specimen of Hindu mythological masterpiece.
17	Vashisht	Kullu	Its an ancient temple which is 4 Kms from Manali.
18	Jagat sukh	Kullu	Jagat such temple chiselled out in 8^{th} century AD is a perfect example of Shikara-styled architecture.
19	Mandi Temples	Mandi	Mandi town cuts across the National highway 21, and is known for its temples. The main temples of Mandi and surrounding towns are; Ardhanarishwara,Bhimakali, bhutnath, kamasha devi, Kamru Nag, Khua2 Devi, Lomas rishi, Madhava Rai, Panchavaktra,Prashaar Rishi, Tarna Devi,Trilokinath.

Table K-6.2 Major Monasteries of Himachal Pradesh

S.No	Name	Location	Description
1	Kanam	Kinnaur	Situated at Kanam Village, it has 7 big and small monasteries built by Rin-Chan-Sang-Po. It preserves copies of Kanjur and Tanjur, the great encyclopedia of Lamaism. The image of Buddha in the shrine is of gilt Bronze with blue hair.
2	Pooh	Kinnaur	On the highway, Pooh as a famous Durga-pa Monastery
3	Chango Monasteries	Kinnaur	Situated on the left bank of river Spiti in the valley of Hagarng, the Chango Monastery was supposedly founded by Padmasambhava. An image of the great translator dominates the monastery.
4	Dhankar	Lahaul & Spiti	The monastery is situated at a height of 3,890 m,. Founded between 7th and the 9th centuries, Dhankar's old temple complex is known by the name of Lha-O-pa Gompa (monastery of the followers of Lha-O). The monastery consists of a number of multi-storeyed buildings perched together, giving a fortress like impression.
5	Tabo	Lahaul & Spiti	50 Kms from Kaza, located in the valley of Spiti at an altitude of 3050m, the Tabo Monastery, built in the 996 AD, as an advanced centre of learning, this is basically a complex that houses a number of small gompas, temples and monasteries. Tabo Monastery is popularly known for its beautiful murals and stuccos.
6	Ki	Lahaul & Spiti	Situated at an altitude of 13,500 feet and in a place that is known as the 'Little Tibet', this is the largest Gompa in Spiti hilltop and houses some of the finest thangkas. The history of the monastery states that it dates back to 1000 AD.The monastery is one of the most frequented religious destinations for the Buddhists in the state along with the Tabo Monastery.
7	Gemur	Lahaul & Spiti	Located 18 km. from Keylong, the monastry has beautiful sculpture of 'Marichi Vajravarahi' belonging to the 11th to 12 th centuries AD.
8	Namgyal	Kangra	Located in Upper Dharamsala in the town of McLeodganj , the Namgyal Complex houses the main Namgyal Monastery, the Namgyal Institute and the small temples. The Namgyal monastery is the private monastery of His Holiness the Dalai Lama.
9	Kibber Monastery	Lahaul & Spiti	Kibber is located at a height of about 14,200 ft and is located 16 Kms away from Kaza. The Yaktin Gompa in Kibber is named after after Serkang Rimpochhe of Tabo.
10	Jangi Monastery	Kinnaur	Located 26 Km from Powari on NH-22, it is a cave monastery and that houses four Buddhist stupas. It is an extremely important Buddhist destination and possibly dates back to the 10-11th century AD.

Table K-6.3 World Heritage Sites of Himachal Pradesh

Kalka-Shimla Railway	As a part of the Mountain Railways in India, the Railway line from Kalka to Shimla has been declared a World Heritage Site by UNESCO in 2008.
Tabo Monastery	The thousand year old Buddhist Padam Palace monastery of Tabo in Spiti with its fine wall-paintings and stucco statues has been declared a World Heritage Site by UNESCO.

K-6.2 Heritage Sites of Himachal Pradesh

Apart from the temples and monasteries, Himachal has other heritage properties. These range from ancient forts, colonial mansions, palaces and century old hotels. Shimla, the state capital of Himachal Pradesh has some fine example of British-colonial architecture. Among them are the former Viceregal Lodge (now the Indian Institute of Advanced study), the neo-Gothic structures of the Gaiety Theatre and the former Imperial Civil Secretariat (now the Accountant General's Office), The Tudor-framed 'Barnes Court' (now the Raj Bhavan), the Vidhan Sabha and the Secretariat of the Government of Himachal Pradesh. Colonial buildings can be found elsewhere in the state, especially in the 'hill stations' of Kasauli and Dalhousie[5]. The village of Pragpur with its age-old and well preserved architecture and cobbled streets has been declared a 'Heritage village'. There are also many of Himachal's forts, palaces and residences that though privately owned are also considered to be among the heritage buildings of Himachal Pradesh.

[5] http://himachaltourism.gov.in/page/Heritage-properties.aspx

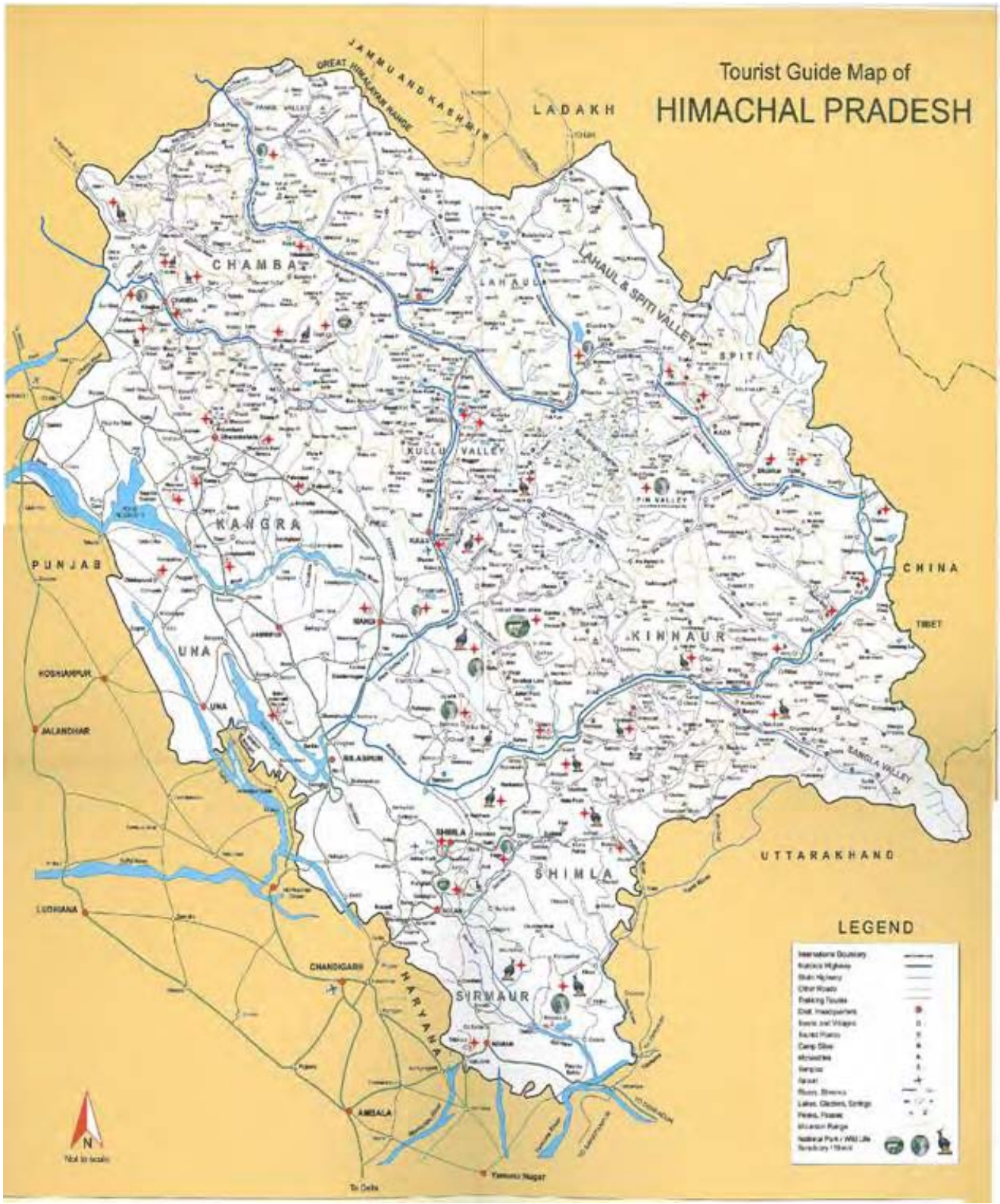

Fig. K-6.1 Map of Some of the Major Temples and Monasteries and Natural Conservation Sites in Himachal Pradesh

K-7 Schedule Castes and Schedule Tribes

According to 2001 Census the total population of the Schedule Castes in the State is 1,502,000 which account for 24.72% of the total population of the State. The list of Schedule Castes in the State are given below-

Table K-7.1 List of Scheduled Castes in Himachal Pradesh

S No.	Caste	S. No	Caste
1.	Ad Dharmi	29	Chanal
2.	Badi Nagasu	30.	Chhimbe, Dhobi
3.	Balmiki, Bhangi, Chuhra, Chuhre	31.	Dagi
4.	Bandhela	32.	Darin
5.	Bangali	33.	Darai, Daryai
6.	Banjara	34.	Daule, Daole
7.	Bansi	35.	Dhaki, Toori
8.	Barad	36.	Dhanak
9.	Barad, Burad, Berar	37.	Dhogri, Dhuai
10.	Batwal	38.	Dhogri, Dhanagri S
11.	Bahuria, Bawaria	39.	Doom, Doomana, D Dumne, Mahasha
12.	Bazigar, Bhanjra, Bhandre	40.	Gagra
13.	Banjara, Bhandre	41.	Gandhila, Gondlla
14.	Chamar, Jatia Chamar, Rehgar, Rajgar, Ramdasi, Ramdasia,Mochi	42.	Hali
15.	Holi	43	Perna
16.	Jogi	44.	Phrena, Pherera
17.	Julaha, Julahe, Kabirpanth, Keer	45.	Rehan, Reharn
18.	Kamoh, Daogli	46.	Sanahai
19.	Kuroack	47.	Sanhai
20.	Khatik	48.	Sansi, Bhedkut, Ma
21.	Kori, Koli	49.	Sansui
22.	Lohar	50.	Sapela
23.	Marija, Mareeha	51.	Sarde, Sareru, Sararo, Sarehde
24.	Muzhabi	52.	Sikigar
25.	Megh	53.	Sipi
26.	Nat	54.	Sirkband
27.	Od	55.	Teli
28.	Past	56.	Thathiar, Thathera

According to the Tribal Development Department, Govt. of HP, there are ten Schedule Tribe Communities in HP. The Table is given below-

Table K-7.2 Tribal Communities in Himachal Pradesh

Sr. No.	**Tribal Community**	**Sr. No.**	**Tribal Community**
1	Bhot, Bodh	6	Lahaula
2	Gaddi	7	Pangwal
3	Gujjar	8	Swangla
4	Jad, Lamba, Khampa	9	Beta, Beda
5	Kanaura, Kinnara	10	Demba, Gara, Zoba

Source: Tribal Development Department, Govt. of HP

The district wise distribution of Scheduled Caste population and Scheduled Tribe population is summarised below.

Table K-7.3 District Wise Population of Schedule Castes and Scheduled Tribe

Sr. No.	Name of District	Total Population	Population of Schedule Caste		Population of Scheduled Tribe	
			Population	Percent (%)	Population	Percent (%)
1.	Bilaspur	340,885	86,581	25.4	9,305	2.7
2.	Chamba	460,887	92,359	20.0	72,263	17.7
3.	Hamirpur	412,700	98,539	23.9	2,465	0.6
4.	Kangra	1,339,030	279,540	20.9	73,335	5.5
5.	Kinnaur	78,334	7,625	9.7	0	
6.	Kullu	381,571	107,897	28.3	11,461	2.0
7.	Lahaul- Spiti	33,224	2,605	7.8	0	
8.	Mandi	901.344	261,233	29	10,582	1.2
9.	Shimla	722,502	188,787	26.1	4,173	0.6
10.	Sirmour	458,593	135,774	29.6	6,016	1.3
11.	Solan	500,557	140,642	28.1	19,436	2.9
12.	Una	448,273	100,588	22.4	5,986	1.3
	Total	6,077,900	927,452	15.2	214,977	3.6

Source: XIth Five Year Tribal Sub-plan; Tribal Development Department; Govt. of HP 2007-2008, Population Census 2001

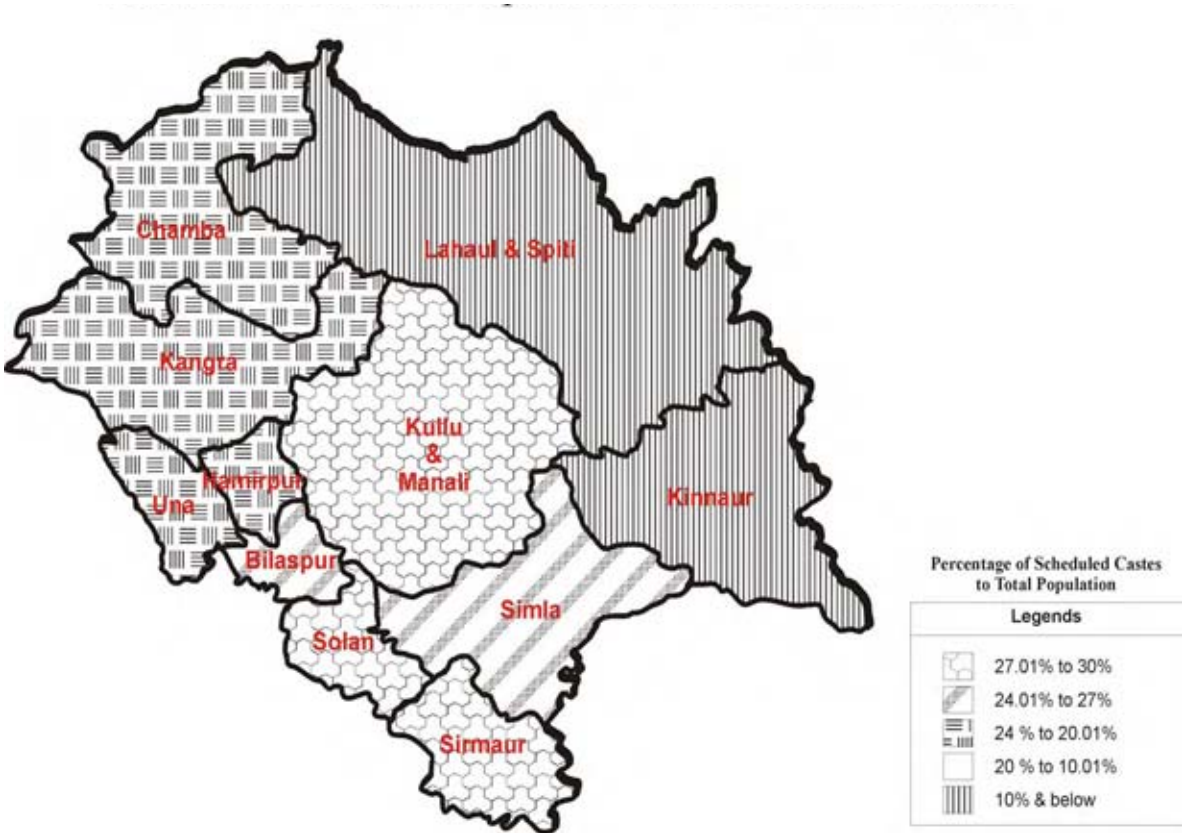

Fig. K-7.1 District Wise Distribution of Schedule Caste Population

Fig. K-7.2 District Wise Distribution of Schedule Tribe Population

K-8 Wildlife Sanctuaries and National Parks

Himachal Pradesh has a network of 32 Wildlife Sanctuary and 2 National Parks covering about 12.8% of the geographical area of the State which is much higher than the national average of 4.7%.

Given below are the list and Map of the Wildlife Sanctuary and the National Parks found in the State.

Table K-8.1 Wild Life Sanctuaries and National Parks in Himachal Pradesh

Name	Year of Formation	District	Geographical Location
Sanctuaries			
Bandli Wildlife Sanctuary	1987	Lahaul & Spiti	$31^0$45’-32^0 11’ N - $77^0$45-’78^0 06’ E
Chail Wildlife Sanctuary	1976	Solan	30 ^{0} 54’- 31 ^{0} 01’ N, 77 ^{0} 07’-77 ^{0} 17’ E
Churdhar wild life Sanctuary	1985	Shimla	33 ^{0} 48’ 37”- 30 ^{0} 54’39” N, 77 ^{0} 23’ 32”- 77 ^{0} 29’49”E
Daranghati Wildlife sanctuary	1962	Shimla,	7747’-7751’- 3122’-3128’ N
Darlaghat Wildlife Sanctuary	1991	Solan	76 ^{0}52’40” to 76 ^{0} 59’30”-31 ^{0}91’21” to 31 ^{0} 17’13” N
Dhauladhar Wildlife Sanctuary	1994	Kangra	32 ^{0}3’00” to 32 ^{0} 28’00” N; 76 ^{0}43’00” to 77 ^{0} 6’00” E.
Gamguln Siahbehi Wildlife Sanctuary	1974	Chamba	75 ^{0}52’ to 75 ^{0} 57’ E; 32 ^{0}49’ to 32 ^{0} 52’N.
Gobind Sagar Wildlife	1974	Bilaspur	$31^0$14’- 31^0 26 ’ N; 76 ^{0}26’ - 76 ^{0} 51’E
Kais Wildlife Sanctuary	1954	Kullu	$77^0$09’- 77^0 12 ’ E; 31 ^{0}59’ - 32 ^{0} 03’N
Kalatop khajjiar Wildlife	1949	Chamba	$32^0$02’to 32^0 04’ N-$76^0$01’ to 76^0 06’E.
Kanawar Wildlife Sanctuary	1954	Kullu	$77^0$17’- 77^0 23’ E- 31 ^{0}55’ - 32 ^{0} 01’N
Khokhan Wildlife Sanctuary	1954	Kullu	$31^0$50’10”to - 31^0 53’24” N- 77 ^{0}03’21”to - 77^0 06’55”E.

Name	Year of Formation	District	Geographical Location
Kibber Wildlife Sanctuary	1992	Lauhal & Spiti	$32^0$18’00” to - 32^0 42’00” N - 78 ^{0}00’00” - 78 ^{0} 25’00”E.
Kugti Wildlife Sanctuary	1974	Chamba	76^0 44’- 76^0 53’ E - $32^0$25’ - 32 ^{0} 55’ N
Lippa asrang Wildlife Sanctuary	1962	Kinnaur	$31^0$44’15” to 31^0 44’18” N - 78 ^{0}08’00” - 78 ^{0} 17’38”E
Majathal Wildlife Sanctuary	1974	Solan	$31^0$15’03” -31^0 18’43” N - $76^0$56’20” - 77 ^{0} 02’24”E.
Manali Wildlife Sanctuary	1954	Kullu	$32^0$13’- 32^0 15’ N - 77 ^{0}05’ - 77^0 10’E.
Naina Devi Wildlife Sanctuary	1974	Bilaspur	$31^0$16’- 31^0 24’ N - 76 ^{0}25’ - 76^0 35’E.
Nargu devi Wildlife Sanctuary	1974	Mandi	$31^0$46’36”- 32^0 05’00” N - 76 ^{0}50’00” - 77^0 04’38”E.
Pong dam lake Wildlife Sanctuary	1983	Kangra	$31^0$50’- 32^0 07’ N - $75^0$58’ - 76^0 25’E.
Rakchham Chitkul Wildlife Sanctuary	1989 .	Kinnaur	$31^0$10’20”to - 31^0 25’05” N – $78^0$15’10”to - 78^0 20’00”E
Renuka Wildlife Sanctuary	1964	Sirmaur	$30^0$35’58” to 30^0 37’08”N - $77^0$26’34”to 78^0 28’21”E.
Rupi Bhabha Wildlife Sanctuary	1982	Kinnaur	$31^0$30’00” to 31^0 47’06”N - $77^0$45’06”to 78^0 09’00”E.
Sainj Wildlife Sanctuary	1994	Kullu	$77^0$27’-77^0 37’E - $31^0$34’- 31^0 39’N
Sechu taun nala Wildlife Sanctuary	1974	Chamba	$77^0$27’-77^0 37’E - $31^0$34’- 31^0 39’N
Sikari Devi Wildlife Sanctuary	1974	Mandi	$31^0$27’03‘”-31^0 32’16” N - $77^0$05’36”- 77^0 13’41 E
Shilli Wildlife Sanctuary	1963	Solan	$30^0$54’15‘”-30^0 54’41” N - $77^0$07’45”- 77^0 09’13” E
Shimla Water Catchments Sanctuary	1958	Shimla	$31^0$05’12’”-31^0 07’11” N - $77^0$12’54”- 77^0 16’04” E
Simbalwara Wildlife Sanctuary	1958	Sirmaur	$30^0$24’21’”-30^0 28’13” N - $77^0$27’18”- 77^0 31’26”E
Talra Wildlife Sanctuary	1962	Shimla	$30^0$57’46’”-31^0 03’19” N - $77^0$43’30”- 77^0 48’21” E
Tirthan Wildlife Sanctuary	1976	Kullu	$77^0$27’-77^0 37’ E -$31^0$34’- 31^0 39’ N
Tundah Wildlife Sanctuary	1962	Chamba	$32^0$27’-00^0 to 32’- $40^0$00’ N- 76^0 27’00” to $76^0$37’00”E
National Parks			
Great Himalayan National Park	1994	Kullu	$31^0$38’28^0 to $1^0$54’58^0 N to $77^0$20’11^0 to $77^0$45’52^0 E
Pin Valley National Park	1987	Lahaul & Spiti	31^0 45’- $32^0$11’ N to $77^0$45’-$78^0$06’ E

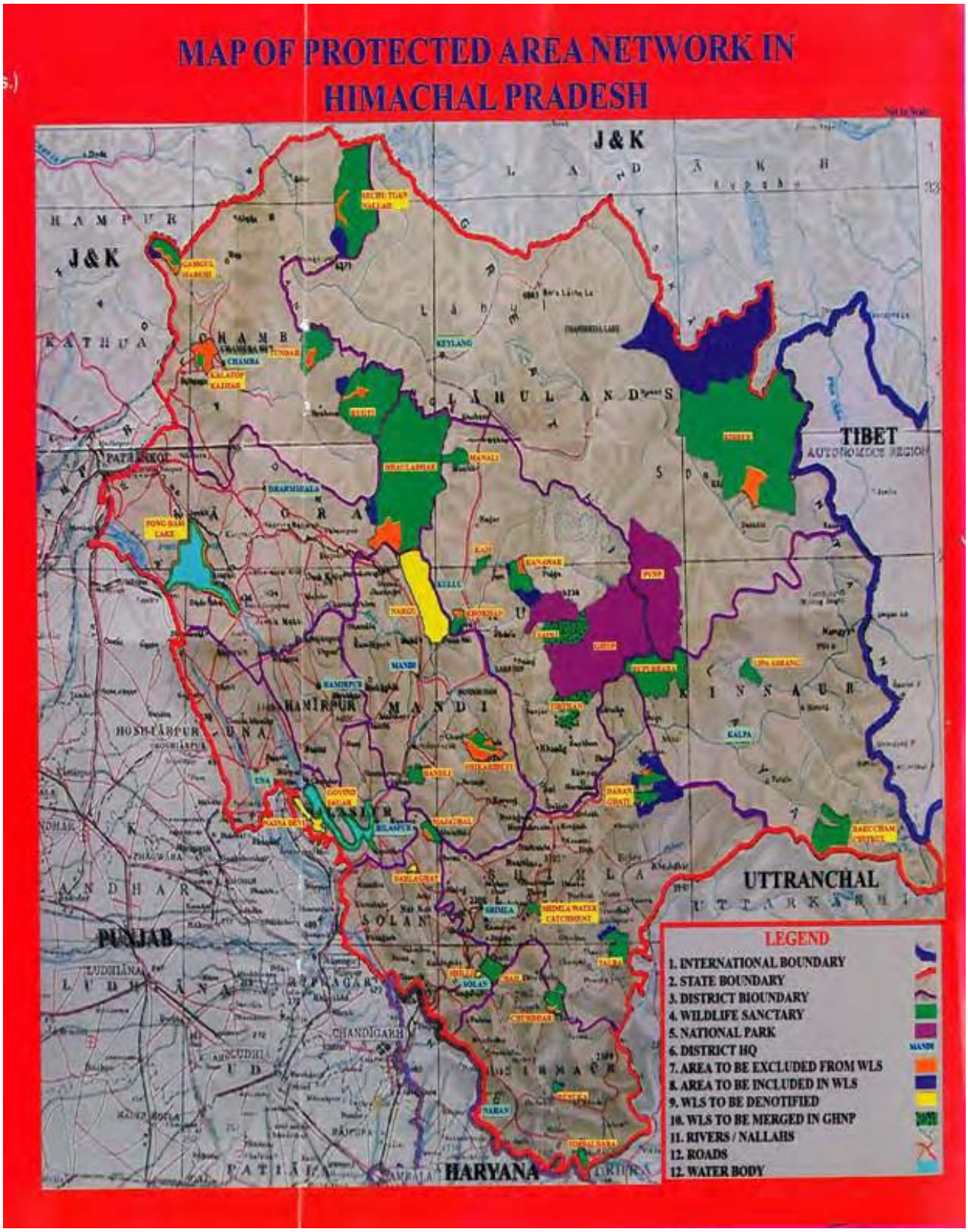

Fig. K-8.1 Map of Protected Area Network in Himachal Pradesh

K-9 Initial Environment Examination of Master Plan

K-9.1 Framework for Initial Environmental Examination for Master Plan

The main objectives of the initial environmental examination (IEE) are to identify potential negative environmental impacts caused by implementation of proposed program components of the Master Plan and to suggest mitigation measures and monitoring methods in order to avoid and/ or mitigate the negative impacts as much as possible.

The framework of the IEE study in this section is shown in the following figure. After the screening of the program components of the Master Plan, IEEs are implemented for selected program components which need to be examined. The potential impacts are examined based on the activities of the program components. In addition, the mitigation measures and monitoring methods are preliminarily proposed. On the other hand, the impacts that would result without implementation of any activities of the Master Plan was also examined based on the current condition. The Result is compared with the impacts that would result with implementation of all Projects of the Master Plan.

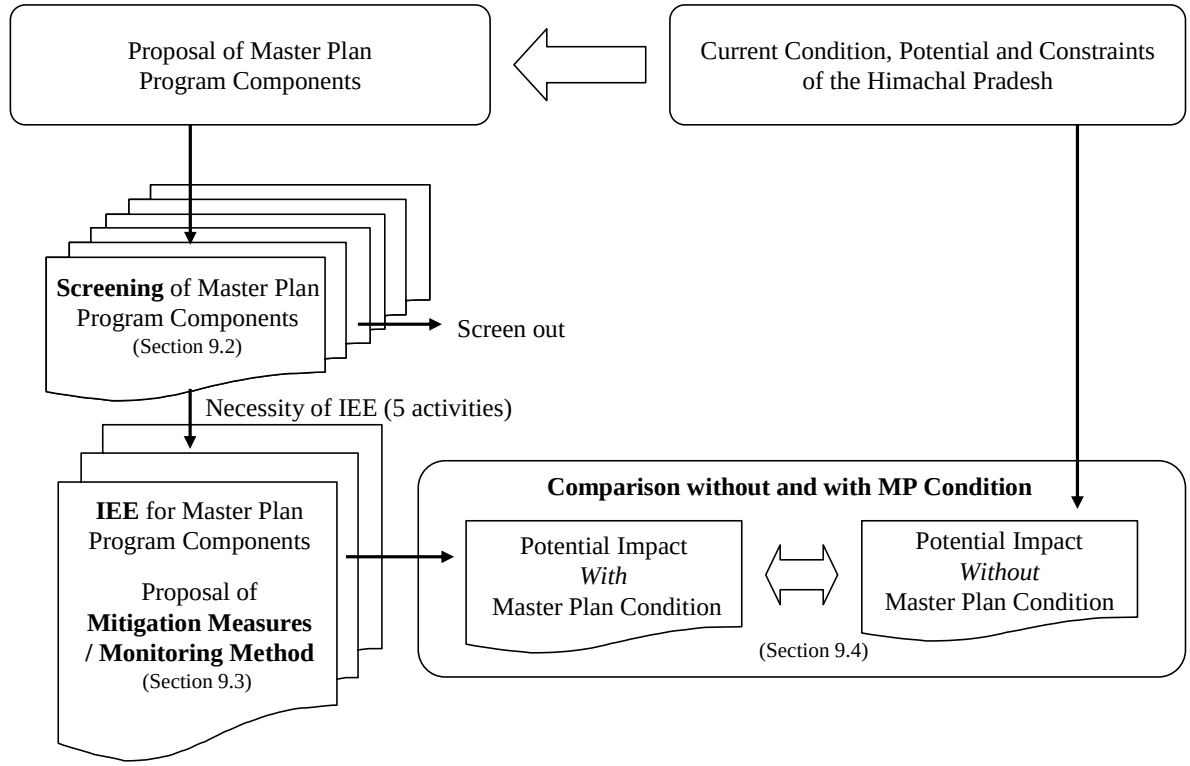

Fig. K-9.1 Framework for IEE for Master Plan Study

K-9.2 Screening of Master Plan

(1) Result of Screening of Mater Plan

The results of the screening of the proposed program components are summarized below.

Table K-9.1 Summary of Result of Screening of the Master Plan Program Components

Program	Sub-Program	Program Component	Screening	Remarks
I. Institutional Development Program		1. Strengthening of Department of Agriculture	Screened Out	Capacity Development and Training
		2. Strengthening of Extension Service Functions	Screened Out	Capacity Development and Training

II. Farmers Support Program	**II-1 Production**	3. Vegetable Promotion	Screened Out	Demonstration, and dissemination
		4. Food Grain Productivity Improvement	Screened Out	Demonstration and dissemination
		5. Integrated Farm Management (Horticulture, Animal Husbandry and Fishery)	Screened Out	Demonstration and dissemination
	II-2 Post Harvest Processing and Marketing	6. Post Harvest Processing Promotion	Screened Out	Demonstration, dissemination
		7. Marketing System Improvement	IEE	Construction of new Market Yard and Collection Centers in this program for improved market system may have some environmental and social impacts
III. Infrastructure Development Program		8. Infrastructure Development/Improvement	IEE	Construction activities for new minor irrigation, new water harvesting facilities and new farm road in this program component may give some environmental or social impacts.
		9. Infrastructure Development Support	Screened Out	Strengthening of community institution of water management and maintenance and promotion of drip and sprinkler irrigation

Note: Screening result is categorized into two groups; i) program component needs Initial Environmental Examination which is stated as IEE in the table and ii) program component is screened out and no IEE is required.

(2) Screening of Program Components in Mater Plan

Future program components proposed in Master Plan have been screened from view-points of environment and social consideration. Two-step screenings have been carried out hereunder and finally tentative "Environmental and Social Issues to be Noted" have been prepared for future actions.

Table K-9.2 Results of Screening of the Master Plan Program Components

Program Component in Draft M/P	Outline of the Program Component	Necessity of the Program Component	Main Activity of the Program Component	Preliminary Environmental Screening
I. Institutional Development Program				
1. Strengthening of Department of Agriculture	This program component aims at capacity development of planning and monitoring & evaluation of crop diversification including its implementation works. Under this component, Management Information System (MIS) with data collecting system will be established, covering terminal blocks and districts. Planning and monitoring & evaluation officers will be able to use the MIS to plan diversification and monitor and evaluate the results of plan implementation.	With the national Policy of decentralization, the State Government transferred most of development administrative responsibilities and staffs for planning, implementation and monitoring to district and block level offices. It is necessary to develop their capacities of planning and monitoring & evaluation with provision of Management Information System for successful implementation for the diversification	1. Capacity building of staffs on planning, implementation, monitoring and evaluation of crop diversification 2. Establishment of the MIS for implementation of crop diversification 3. Training of staffs for the effective use and maintenance of the MIS system 4. Provision of necessary equipment and tools to department, district and block offices, and soil conservation offices for	The activities in this program component are capacity development of district and block planning officers, establishment of MIS and providing material support. Accordingly, it is judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter.

Program Component in Draft M/P	Outline of the Program Component	Necessity of the Program Component	Main Activity of the Program Component	Preliminary Environmental Screening
			implementation of crop diversification 5. Increasing the number of extension, and soil conservation staff in the department of agriculture, and filling up the vacancies.	
2. Strengthening of Extension Service Functions	This program component aims at strengthening of existing extension system, so-called ATMA, aiming to match with various needs at grass root level and designed in line with the national extension reform policy based on lessons learn from the previous rationalization of extension services. This ATMA system has been just established in all of 12 Districts in the State and its implementation has not been matured yet, especially in newly established ATMAs. It is indispensable for successful diversification to provide sufficient agricultural extension services to farmers for their implementation of diversified agriculture. This program component also aims at sustainable linkage and communication among research institute, university, farmers and others. in order to develop applicable farming techniques.	Existing extension service system ATMA is rather new, and its organization is composed of not only government staffs but also non-governmental parsons. Accordingly, it is essential to strengthen newly-established system, ATMAs for provision of efficient and effective agricultural extension services to farmers. Communication and Linkage between research and extension activities on vegetable or fruit cultivation has not been always sufficient. Research side has not had enough information on constraints of the extension and farmers side, and extension side has not been using research results fully for extension activities. Accordingly it is necessary to reinforce the linkage and to keep closer communication between the research side and the extension side.	1. Using ATMA model, coordinating the extension officers of the line departments, and conducting trainings for the extension trainers 2. Establishment of farm schools (model demonstration farms) for conducting demonstration of advanced farming practices to farmers 3. Preparation of more easily understandable information on diversified agriculture and dissemination through television & radio networks, and popularization of existing Kisan (Farm) Call Center. 4. Improvement of soil diagnosis services of the department of agriculture. 5. Support to farm women in their exhibition-and-sale activity for women' capacity building 6. Information dissemination on subsidy by extension works 7. Periodical meetings and workshops among the research institutes, extension departments and farmers' representatives at the state and district level. 8. Field visits of researchers together with extension officers in order to cope up with on-going constraints in the field, and linking of research activities matching demands of the farmers. 9. Monitoring and Evaluation	The activities in this program component are staff capacity development, strengthening of function of existing agricultural extension system. Accordingly, it is judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter.

Program Component in Draft M/P	Outline of the Program Component	Necessity of the Program Component	Main Activity of the Program Component	Preliminary Environmental Screening
II. Farmers' Support Program				
3. Vegetable Promotion	This program component aims at promoting crop conversion from food grain crops to or cultivation of vegetables including exotic vegetables within existing farmland and fallow areas. Site-specific promotion activities will be programmed and implemented. Essential points for vegetable cultivation are improvement of (i) productivity and (ii) quality. Under crop diversification organic vegetables cultivation will be promoted through introduction of production and application technique of organic manure or fertilizer in vegetable cultivation.	Majority of farmers in the Sate belong to marginal and small farmers whose farmlands are limited to less than 1 ha. These farmers mainly do food grain cultivation at a subsistence level. In order to enhance their income, it is necessary to diversify from food grain crops to cash crops such as vegetables or fruits to some extent especially since the domestic demand for these crops are expanding in India. Organic farming done through the use of home made fertilizer is both environmental friendly and reduces the farmers' constraints to purchase high priced fertilizer from the markets.	1. Introduction of cropping patterns suitable for markets 2. Promotion of strategic vegetables such as potato, tomato, cauliflower and peas 3. Introduction and promotion of exotic vegetables 4. Improvement of productivity and quality of vegetables 5. Promotion of organic farming	The activities in this program component will be made in existing farmland, fallow areas or in offices. New development of farmland for expansion of cultivation area is not included in this component. Improved farming practice will be recommended and promoted. Accordingly, it is judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter.
4. Food Grain Crops Productivity Improvement	This program component aims at productivity improvement of food grain crops such as wheat, rice and maize in existing farmland. Food grain crop production is predominant in agriculture of the State and occupies most of farmland in the State. Accordingly, it is necessary in general to increase productivity of food grain crops. On the other hand, major land source of crop diversification is existing farmland cultivated for food grain crops in the State.	In order to promote crop diversification for the above Program Component "Vegetable Promotion" and to keep production of food grain for farmers in subsistence level, it is essential to increase or improve food grain crops' productivity.	1. Promotion of diversified cropping patterns suitable for productivity increase of food grain crops 2. Promotion of optimum quantities of farm inputs such as seeds and fertilizers	The activities in this program component will be made in existing farmland or in offices. Accordingly, it is judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter.
5. Integrated Farm Management (Horticulture, Animal Husbandry and Fishery)	This program component aims at promotion of integrated farm management consisting of fruit cultivation, fodder crop cultivation and small scale inland fishery in check dam or ponds.	The main concern of this master plan is crop diversification, particularly conversion to vegetable cultivation in the State. However, there are potentials to enhance the farm income of small and marginal farmers in horticulture, animal husbandry and fisheries sub-sectors. Accordingly, it is needed to pay attention on horticulture production, fodder production for animals, and fish production aiming at increasing cash income sources for farmers who will be involved in diversified agriculture	1. Improvement of productivity and quality of horticulture crops 2. Promotion of fodder production and reuse of vegetable residues under integrated farming in crop diversification 3. Promotion of warm water fish culture (carp & cat fish) or cold water fish culture (trout) under integrated farming including the irrigation system.	The activities in this program component will be made in existing farmland. New development of farmland for expansion of cultivation area is not included in this component. The activities for small-scale fish culture in this program component will be made in check dam or ponds. The small scale fish culture will not bring about water contamination Accordingly, it is judged to be "**Screened Out**" in this program component. No further screening or discussion of this

Program Component in Draft M/P	Outline of the Program Component	Necessity of the Program Component	Main Activity of the Program Component	Preliminary Environmental Screening
		activities.		component will be made hereinafter.
6. Post Harvest Processing Promotion	This program component aims at promotion of post harvest activities such as grading, sorting and packing for value addition of agricultural produces and agricultural processing of vegetables and fruits which are produced by farmers under crop diversification for their income generation. Scale of agricultural processing is small like cottage industry. Management of processing facilities will be done by farmers' self-help groups as well as women's groups.	Majority of farmers in the Sate belong to marginal and small farmers whose farmlands are limited to less than 1 ha. Post harvest activities and small scale agricultural processing is one of alternative ways for value addition and enhanced their income for marginal and small farmers.	1. Introduction or promotion of post-harvest activities such as grading, sorting and packing etc., in accordance with the quality standard. 2. Introduction or promotion of small scale agro-processing activities.	The activities in this program component will be made in existing farmers' houses or in offices. New development of large scale processing factories on enterprise basis is not included in this component. Accordingly, it is judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter.
7. Marketing System Improvement	This program component aims at market-oriented quality improvement of diversified crops under guidance of Agricultural Marketing Board and APMCs and improvement of existing information system and establishment of information dissemination system on and of vegetable & fruit producing areas in the State to traders and consumers outside.	Common quality standard for agricultural commodities has not been established. Accordingly, it is essential to introduce and promote the quality improvement through establishment of quality standard of common diversified crops and dissemination of importance and necessity on quality control of vegetables to stakeholders. Information on daily market price is limited in some market yards. On the other hand, traders outside of the State do not have enough information of produces in the State. Accordingly, it is necessary to improve existing system, and also upgrade an interactive information system among farmers, traders, and consumers.	1. Capacity building for staff of Agricultural Marketing Board and APMCs 2. Preparation of quality standard 3. Improvement and enhancement of the system to record and bi-directionally transmit marketing information such as market price, arrival amount, other technical information (harvesting season, production, varieties, etc.) among producers and marketers. 4. Provision of computer system and improvement of marketing network **5. New construction or rehabilitation of market yards and other market facilities** 6. Market promotion through branding (Registration of brand or trademark) , advertisement, campaign, agricultural fair, etc.	Most of the activities under this program component include, establishment of required standard, capacity development of stakeholders, trial for quality control, Improvement & enhancement of interactive information system, strengthening of function of existing agricultural extension system, organizing workshops, awareness of extension services staff and farmers and monitoring & evaluation. Accordingly, the above activities are judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter. **Construction of new Market Yards and new Collection Center** in this program for improved market system may give some environmental or social impacts Accordingly, it is necessary to **proceed to further screening** for new construction activities in this program component. Further screening or discussion of new construction activities of this component will be made hereinafter.

Program Component in Draft M/P	Outline of the Program Component	Necessity of the Program Component	Main Activity of the Program Component	Preliminary Environmental Screening
III. Infrastructure Development Program				
8. Infrastructure Development / Improvement	This program component aims at new development of minor irrigation (less than 50 ha) and rehabilitation/improvement of the existing minor irrigation schemes and on-farm facilities in the crop diversification area and new construction of water harvesting facilities. In addition, construction, rehabilitation and up-grading of farm roads in crop diversification area.	Existing irrigation systems and farm roads as production infrastructure are not enough for the promotion of the diversified agriculture. It is essential to upgrade and rehabilitate existing irrigation systems as well as commission the construction of new irrigation systems. Rehabilitate existing farming road and build new ones for improving connectivity from farmland to market	**1. Construction of new small scale minor irrigation systems** 2. Rehabilitation and improvement of existing minor irrigation and traditional irrigation systems **3. Construction of water harvesting facilities** **4. Construction of new access farm roads which will not be covered by PWD.** 5. Repair and rehabilitation of damaged existing farm roads 6. Improvement of existing footpath and mule track 7. Construction of ropeway	Rehabilitation and improvement will be made in existing irrigation systems or existing farm roads. Accordingly, it is judged to be **"Screened Out"**. No further screening or discussion of this component will be made hereinafter. Construction activities for **new small scale minor irrigation, new water harvesting facilities and new farm road** in this program component may give some environmental or social impacts. Accordingly, it is necessary to **proceed to further screening** of these activities in this program component discussions on which will be made hereinafter.
9. Infrastructure Development Support	This program component aims at Strengthening of function of existing water users associations (KVS) through their training and aims at increase in their management capability together with provision of micro-irrigation materials and field water tanks to be subsidized by the State. In addition, regular maintenance works for keeping good condition of irrigation system, farm roads and access roads to their market should be executed by the farmers group under sufficient support, technically and administratively given by the State.	At present, there are gaps between the area with irrigation facilities and actual irrigated area. Accordingly it is necessary to improve irrigation efficiency through proper water management under this program component, which should be realized by strengthening of water users associations (KVS) and increase in their management capability together with provision of micro-irrigation materials and field water tanks.	1. Strengthening of WUA for improvement of water management 2. Strengthening of O&M activities for road and other infrastructures concerned by farmers' groups 3. Strengthening of supporting system for farmers' irrigation system including micro irrigation (sprinkler and drip irrigation, etc.)	The activities in this program component will be made in existing farmland or in offices. New infrastructure construction is not included. Accordingly, it is judged to be **"Screened Out"** in this program component. No further screening or discussion of this component will be made hereinafter.

The Initial Environmental Examination was carried out for Program Component "7. Market System Improvement" and Program Component "8. Infrastructure Development/Improvement".

Under Program Component "7. Market System Improvement", IEE was carried out for the following activities

a. **Construction of new Market Yard**: This work consists of construction of one auction platform, one building (2 floors in most cases), parking area, loading & unloading area and store houses in rural area. The yard will be used for shipment of vegetables and fruits produced by local farmers around the yard. The yard is a small scale and its total area will be around 0.5 ha for building and is less than 1.0 ha for land. Market yard will be constructed in governmental land.

b. **Construction of new Collection Center:** This work consists of construction of store house with multi-purpose rooms (1 floor structure, around 200 m2) and parking area in rural village. The center is a consolidating point of vegetables and fruits produced by local farmers around the center for shipment to Market Yard. The center is also in a small scale and its total area is less than 0.1 ha. Location of new center will be in community land.

Under "8. Infrastructure Development/Improvement", IEE was carried out for the following activities

a. **Construction of new Minor Irrigation:** Small scale minor irrigation command area is less than 50 ha in general. This work consists of construction of water intake facility such as headworks in tributary (so-called Nalla) or groundwater, main and distribution irrigation lines which consist of canals or pipelines. Land for construction is beneficiary area or community land.

b. **Construction of new Water Harvesting Facility:** Water harvesting facility is a small-scale community system to be provided for life saving irrigation in rain-fed farmland which irrigation command area is less than 5 ha in general. This work consists of construction of rain water collecting ditches (30cm x 30cm), and/or water tank (10 m3, approx.) or pond (Max. 100 m2) and water distribution lines of ditches or tubes.

c. **Construction of new Farm Road:** Road to be constructed newly is a farm access for transport of farm inputs and outputs connecting between vegetable or fruit cultivation area and existing public road constructed and managed by PWD (Public Works Department). The roads to be constructed are divided into two types which are motorable farm road (2-4 m width) and foot path (1-2 m width).

K-9-3 Result of Initial Environment Examination

(1) Summary of Initial Environment Examination

Impact matrix has been prepared for the above 5 activities of the two program components in Master Plan. In the matrix, the following screening toward potential impacts and phase-wise impacts has been carried out. The result of preliminary environment examination of master plan program component is summarized following Table K-9.3 and results of each program component are shown in next sections.

Remarks in Impact Matrix
Potential impacts a) social environment, b) natural environment and c) pollution were studied in each separate phase, i.e. i)designing phase, ii) construction phase, and iii)operation phase. The mark in the table means the categories of impact
Left-side of each cell represents a direction of impact and right side represents a magnitude of impact as follows: Left side : ++: Positive impact --: Negative Impact =: Neutral Impact Right side: A : relatively significant impact, B: relatively medium size impact' C: relatively small impact, D: unknown as of now *: No impact or no corresponding impact

Table K-9.3 Result of Initial Environment Examination of the Master Plan Program Components

Activities / Potential Impacts		II. Farmers' Support Program		III. Infrastructure Development Program		
		7-a Market Yard	7-b Collection Center	8-a Minor Irrigation	8-b Water Harvesting	8-c Farm Road
Social Environment						
1	Involuntary Resettlement	*	*	*	*	*
2	Local economy (employment, etc)	++/B	++/C	++/B	++/B	++B
3	Land use and utilization of local resources	*	=/C	--/C	--/C	--/C
4	Social institutions	*	++/C	++/B	++/B	*
5	Existing social infrastructures and services	++/C	++/C	*	*	++/C
6	The poor, indigenous and ethnic people	++/C	++/C	++/B	++/B	++/C
7	Misdistribution of benefit and damage	*	*	*	*	*
8	Cultural heritage	*	*	*	*	*
9	Local conflict of interests	*	*	*	*	*
10	Water Usage	*	*	--/D	*	*
11	Sanitation	--/C	*	*	*	--/C
12	Hazards (Risk), Infectious diseases	--/C	*	*	*	--/C
Natural Environment						
13	Topography & Geographical features	*	*	*	*	*
14	Soil Erosion	*	*	*	*	*
15	Groundwater	*	*	--/D	*	*
16	Hydrological Situation	*	*	*	*	*
17	Flora, Fauna and Biodiversity	--/D	*	--/C	*	--/C
18	Meteorology	*	*	*	*	*
19	Landscape	*	*	*	*	*
20	Global Warming	*	*	*	*	*
Pollution						
21	Air Pollution	--/C	*	*	*	*
22	Water Pollution	*	*	*	*	*
23	Soil Contamination	*	*	*	*	*
24	Waste	=/C	*	*	*	--/C
25	Noise and Vibration	*	*	*	*	*
26	Ground Subsidence	*	*	*	*	*
27	Offensive Odor	*	*	*	*	*
28	Bottom sediment	*	*	*	*	*
29	Accidents	--/C	--/C	--/C	--/C	--/C

Left-side of each cell represents a direction of impact and right side represents a magnitude of impact as follows:
Left side: ++: Positive impact --: Negative Impact =: Neutral Impact
Right side: A : relatively significant impact, B: relatively medium size impact'
C: relatively small impact D: unknown as of now
**: No impact or no corresponding impact*

(2) Construction of New Market Yard

Table K-9.4 Impact Matrix of Construction of New Market Yard

	Activities / Potential Impacts	Designing	Construction	Operation	Comments
Social Environment					
1	Involuntary Resettlement	*	*	*	New market yard will be constructed on government land. No land acquisition is predicted.
2	Local economy (employment, etc)	*	=/C	++/B	Local economy will be encouraged.
3	Land use and utilization of local resources	*	*	*	New market yard will be constructed on government land. No land acquisition is predicted.
4	Social institutions	*	*	*	
5	Existing social infrastructures and services	*	*	++/C	Improvement of farmers' marketing.
6	The poor, indigenous and ethnic people	*	*	++/C	Target Beneficiaries in M/P are small and marginal farmers. The program will also make an effort to include Schedule Caste, Schedule Tribe and Other Backward Class communities to be included as beneficiary where relevant.
7	Misdistribution of benefit and damage	*	*	*	
8	Cultural heritage	*	*	*	New market yard will not be constructed on cultural heritage area.
9	Local conflict of interests	*	*	*	
10	Water Usage	*	*	*	
11	Sanitation	*	--/C	*	Construction worker will enter in the site during the construction time.
12	Hazards (Risk), Infectious diseases	*	--/C	*	Construction worker will enter in the site during the construction time.
Natural Environment					
13	Topography & Geographical features	*	*	*	
14	Soil Erosion	*	*	*	
15	Groundwater	*	*	*	
16	Hydrological Situation	*	*	*	
17	Flora, Fauna and Biodiversity	--/D	*	*	Depending on detailed design of the yard (Construction site shall be decided not to affect rare species)
18	Meteorology	*	*	*	
19	Landscape	*	*	*	
20	Global Warming	*	*	*	
Pollution					
21	Air Pollution	*	--/C	*	During land levelling for building in dry season, some construction dust may occur.
22	Water Pollution	*	*	*	
23	Soil Contamination	*	*	*	

24	Waste	*	*	=/C	Some waste of vegetables or fruits may occur in their shipping.
25	Noise and Vibration	*	*	*	
26	Ground Subsidence	*	*	*	
27	Offensive Odor	*	*	*	
28	Bottom sediment	*	*	*	
29	Accidents	*	--/C	*	During construction, some accident may occur.

Table K-9.5 Potential Impacts and Possible Mitigation Measure of Construction of New Market Yard

Potential Impacts	Phase	Rating	Impact Cause/ Severity	Assumed Mitigation Measures / Monitoring Method	Action Time for Avoidance / mitigation
11. Sanitation	Construction	C	Sanitary condition may degenerate due to input of construction workers at construction site.	- Provision of temporary sanitary arrangements (toilet, other requirement).	Construction (Mitigation)
12. Hazard (Risk), Infectious Diseases	Construction	C	Infected construction workers may enter into the construction site.	- Implementation of health monitoring of construction workers by their declaration	Construction (Mitigation)
17. Flora, Fauna and Biodiversity	Designing	D	New construction site may affect them.	- Design should be made based on their site survey results, - Construction site shall be decided not to affect rare species	Designing (Mitigation or Avoidance)
21. Air pollution	Construction	C	Dust may be spread during land for 0.5 – 1.0 ha.	- Watering if land surface is dry, especially in dry season	Construction (Mitigation)
24. Waste	Operation	C	In shipping some agric produces may become waste.	- Effective utilization of vegetable or fruit waste (for animal feed, or compost) - Dispose waste at designated place	Construction (Mitigation)
29. Accidents	Construction	C	Accidents caused by construction machinery and vehicles are predicted during the construction phase.	- Appropriate maintenance of machinery and vehicles - Periodic caution to workers on disciplines for safety operation.	Construction (Mitigation)

Conclusion

- This activity in the program component is mainly construction of a small-scale building & parking area with a total area of less than 1.0 ha. Accordingly, significant negative impacts are not predicted with proper management at construction phase. In addition, mitigation measure proposed will minimize negative impacts.

(3) Construction of New Collection Center

Table K-9.6 Impact Matrix of Construction of New Collection Center

Activities / Potential Impacts		Designing	Construction	Operation	Comments
Social Environment					
1	Involuntary Resettlement	*	*	*	
2	Local economy (employment, etc)	*	=/C	++/C	Local economy will be encouraged.
3	Land use and utilization of local resources	=/C	*	*	New collection center will be constructed on community land. No land acquisition is predicted.
4	Social institutions	++/C	++/C	++/C	Strengthened as the management will be largely community-based

5	Existing social infrastructures and services	*	*	++/C	Improvement of farmers' marketing
6	The poor, indigenous and ethnic people	*	*	++/C	Target Beneficiaries in M/P are small and marginal farmers. The program will also make an effort to include Schedule Caste, Schedule Tribe and Other Backward Class communities to be included as beneficiary where relevant
7	Misdistribution of benefit and damage	*	*	*	
8	Cultural heritage	*	*	*	No activities will be conducted in on cultural heritage sites
9	Local conflict of interests	*	*	*	Participatory process for implementation will be made.
10	Water Usage	*	*	*	
11	Sanitation	*	*	*	Construction will be made by community people.
12	Hazards (Risk), Infectious diseases	*	*	*	Construction will be made by community people.
Natural Environment					
13	Topography & Geographical features	*	*	*	
14	Soil Erosion	*	*	*	
15	Groundwater	*	*	*	
16	Hydrological Situation	*	*	*	
17	Flora, Fauna and Biodiversity	*	*	*	
18	Meteorology	*	*	*	
19	Landscape	*	*	*	
20	Global Warming	*	*	*	
Pollution					
21	Air Pollution	*	*	*	
22	Water Pollution	*	*	*	
23	Soil Contamination	*	*	*	
24	Waste	*	*	*	
25	Noise and Vibration	*	*	*	
26	Ground Subsidence	*	*	*	
27	Offensive Odor	*	*	*	
28	Bottom sediment	*	*	*	
29	Accidents	*	--/C	*	During construction, some accident may occur.

Table K-9.7 Potential Impacts and Possible Mitigation Measure of Construction of New Collection Center

Potential Impacts	Phase	Rating	Impact Cause/ Severity	Assumed Mitigation Measures / Monitoring Method	Action Time for Avoidance / mitigation
3. Land Use and Utilization of Local Resources	Designing	C	The land will be decided by farmer's group or organization.	- Farmer's meetings to discuss the site and obtain consensus with the land owners	Designing (Mitigation)
29. Accidents	Construction	C	Accidents caused by vehicles for transportation of building materials are predicted during the construction phase.	- Periodic caution to workers on disciplines for safety operation.	Construction (Mitigation)

Conclusion

- The construction site should be decided by farmer's meeting and consensus should be obtained prior to the construction.

- This activity in the program component is mainly construction of a small-scale house & parking space with a total area of less than 0.1 ha. Accordingly, significant negative impacts are not predicted with proper management at construction phase. In addition, mitigation measure proposed will minimize negative impacts.

(4) Construction of New Minor Irrigation

Table K-9.8 Impact Matrix of Construction of New Minor Irrigation

Activities / Potential Impacts		Designing	Construction	Operation	Comments
Social Environment					
1	Involuntary Resettlement	*	*	*	Location of water distribution route will be designed avoiding houses
2	Local economy (employment, etc)	*	=/C	++/B	Local economy will be encouraged.
3	Land use and utilization of local resources	--/C	*	*	Land securement (Buried pipeline will be applied in order to reduce land securement for construction.)
4	Social institutions	*	*	++/B	Formation or strengthening of farmers' group (KVS) / WUAs
5	Existing social infrastructures and services	*	*	*	
6	The poor, indigenous and ethnic people	*	*	++/B	Target Beneficiaries in M/P are small and marginal farmers. The program will also make a special effort to include Schedule Caste, Schedule Tribe and Other Backward Class communities to be included as beneficiary where relevant
7	Misdistribution of benefit and damage	*	*	*	
8	Cultural heritage	*	*	*	No activities will be conducted in on cultural heritage sites
9	Local conflict of interests	*	*	*	Participatory process for implementation will be made.
10	Water Usage	--/D	*	--/D	Depending on detailed design of the minor irrigation system.
11	Sanitation	*	*	*	Construction will be made by community people.
12	Hazards (Risk), Infectious diseases	*	*	*	Construction will be made by community people.
Natural Environment					
13	Topography & Geographical features	*	*	*	
14	Soil Erosion	*	*	*	
15	Groundwater	--/D	*	--/D	In case of groundwater use through well (tube well irrigation)
16	Hydrological Situation	*	*	*	
17	Flora, Fauna and Biodiversity	--/C	--/C	*	If water source is perennial flow, fish might be affected by muddy flow during construction. some

					forest land may be used for structures and laying of pipes.
18	Meteorology	*	*	*	
19	Landscape	*	*	*	
20	Global Warming	*	*	*	
Pollution					
21	Air Pollution	*	*	*	
22	Water Pollution	*	*	*	
23	Soil Contamination	*	*	*	
24	Waste	*	*	*	
25	Noise and Vibration	*	*	*	
26	Ground Subsidence	*	*	*	
27	Offensive Odor	*	*	*	
28	Bottom sediment	*	*	*	
29	Accidents	*	--/C	*	During construction, some accident may occur.

Table K-9.9 Potential Impacts and Possible Mitigation Measure of Construction of New Minor Irrigation

Potential Impacts	Phase	Rating	Impact Cause/ Severity	Assumed Mitigation Measures / Monitoring Method	Action Time for Avoidance / mitigation
3. Land Use and Utilization of Local Resources	Designing	C	Land securement is required for construction.	- The plan will be implemented on application basis by farmers' groups. Farmer's meeting to discuss and obtain consensus with land owners	Designing (Mitigation)
10. Water Usage	Designing & Operation	D	Water intake from a river is registered in District office. New water intake may affect other existing intake downstream in the river.	- Confirmation of new water intake in District office in design stage get necessary clearance from IPH and other concerned Departments and no-objection from neighbor Panchayats. - Meeting to discuss and obtain consensus with the affected irrigation system under district administration in design stage - When necessary, meeting to discuss and obtain consensus in water allocation among water users in operation stage	Designing & Operation (Mitigation)
15. Groundwater	Designing & Operation	D	Groundwater intake is managed and a new intake must be permitted by Irrigation & Public Health Department (IPHD) and the Ground Water Authority (GWA) in the design stage. Over-lift of groundwater will cause decline of water level in operation stage.	- Confirmation of new water intake in IPHD and GWA in design stage - When necessary, meeting to discuss and obtain consensus in groundwater intake allocation among water users in operation stage	Designing & Operation (Mitigation)
17. Flora, Fauna and Biodiversity	Designing, & Construction	C	Construction works in a perennial river flowing may affect fish. Some forest land may be used for the irrigation structures and for laying of pipes	- Minimize muddy water flowing into the river during construction. -The use of forest land is managed by the Forest Department and therefore they	Designing, & Construction (Mitigation & Avoidance)

				must be consulted and appropriate clearance from them should be sought for the use of the land -	
29. Accident	Construction	C	Accidents caused by vehicles for transportation of construction materials are predicted during the construction phase.	- Periodic caution to workers on disciplines for safety operation.	Construction (Mitigation)

Conclusion

- The plan will be implemented on application basis by farmer-groups' initiative. The water distribution route should be decided and beneficiaries should be clearly identified by farmer's meeting and consensus should be obtained from the land owner prior to the construction.

- When water shortage occurs during operation stage, meetings with attendants of water users and stakeholders should be held in order to discuss and obtain consensus on modified water allocation under water shortage condition.

- This activity in the program component is construction of a small-scale irrigation networks covering existing farmland of around 50 ha. Any new land development is not done and all beneficiary area is existing farmland. Accordingly, significant negative impacts are not predicted with proper management at construction stage. In addition, mitigation measure proposed will minimize negative impacts.

(5) Construction of Water Harvesting Facility

Table K-9.10 Impact Matrix of Construction of New Water Harvest Facility

Activities / Potential Impacts		Designing	Construction	Operation	Comments
Social Environment					
1	Involuntary Resettlement	*	*	*	Facility will be within farmland.
2	Local economy (employment, etc)	*	=/C	++/B	Local economy will be encouraged.
3	Land use and utilization of local resources	--/C	*	*	Land securement (Buried pipeline can be applied in order to reduce land securement for construction.)
4	Social institutions	*	*	++/B	Formation or strengthening of farmers' group (KVS) / WUAs
5	Existing social infrastructures and services	*	*	*	
6	The poor, indigenous and ethnic people	*	*	++/B	Target Beneficiaries in M/P are small and marginal farmers. The program will also make a special effort to include Schedule Caste, Schedule Tribe and Other Backward Class communities to be included as beneficiary where relevant
7	Misdistribution of benefit and damage	*	*	*	
8	Cultural heritage	*	*	*	No activities will be conducted in on cultural heritage sites
9	Local conflict of interests	*	*	*	Participatory process for implementation will be made.
10	Water Usage	*	*	*	Water source is rainfall and

					runoff of farmland.
11	Sanitation	*	*	*	Construction will be made by community people.
12	Hazards (Risk), Infectious diseases	*	*	*	Construction will be made by community people.
Natural Environment					
13	Topography & Geographical features	*	*	*	
14	Soil Erosion	*	*	*	
15	Groundwater	*	*	*	
16	Hydrological Situation	*	*	*	
17	Flora, Fauna and Biodiversity	*	*	*	
18	Meteorology	*	*	*	
19	Landscape	*	*	*	
20	Global Warming	*	*	*	
Pollution					
21	Air Pollution	*	*	*	
22	Water Pollution	*	*	*	
23	Soil Contamination	*	*	*	
24	Waste	*	*	*	
25	Noise and Vibration	*	*	*	
26	Ground Subsidence	*	*	*	
27	Offensive Odor	*	*	*	
28	Bottom sediment	*	*	*	
29	Accidents	*	--/C	*	During construction, some accident may occur.

Table K-9.11 Potential Impacts and Possible Mitigation Measure of Construction of New Water Harvesting Facility

Potential Impacts	Phase	Rating	Impact Cause/ Severity	Assumed Mitigation Measures / Monitoring Method	Action Time for Avoidance / mitigation
3. Land Use and Utilization of Local Resources	Designing	C	Land securement is required for construction.	- The plan will be implemented on application basis by farmers' groups. Farmer's meeting to discuss and obtain consensus with land owners	Designing (Mitigation)
29. Accident	Construction	C	Accidents caused by vehicles for transportation of construction materials are predicted during the construction phase.	- Periodic caution to workers on disciplines for safety operation.	Construction (mitigation)

Conclusion

- The plan will be implemented on application basis by farmer-groups' initiative. The construction site should be decided by farmer's meeting and consensus should be obtained from the land owner prior to the construction.

- This activity in the program component is construction of a small-scale water tank (10 m^3 approx.) or pond (Max. 100 m^2), rainwater harvesting ditches (30 cm x 30 cm) and distribution networks covering existing farmland of around 2-5 ha. The facility will be provided in rain-fed farmland where no irrigation source is available and farming depends on only direct rainfall on crops. Accordingly, significant negative impacts are not predicted at construction stage. In addition, mitigation measure proposed will minimize negative impacts.

(6) Construction of New Access Farm Road

Table K-9.12 Impact Matrix of Construction of New Farm Road

	Activities / Potential Impacts	Designing	Construction	Operation	Comments
Social Environment					
1	Involuntary Resettlement	*	*	*	The route shall be decided by beneficiaries to avoid involuntary resettlement
2	Local economy (employment, etc)	*	*	++/B	Local economy will be encouraged.
3	Land use and utilization of local resources	--/C	*	*	Land securement is required for construction.
4	Social institutions	*	*	*	
5	Existing social infrastructures and services	*	*	++/C	Improvement of farm produce transport
6	The poor, indigenous and ethnic people	*	*	++/C	Target Beneficiaries in M/P are small and marginal farmers. The program will also make a special effort to include Schedule Caste, Schedule Tribe and Other Backward Class communities to be included as beneficiary where relevant
7	Misdistribution of benefit and damage	*	*	*	
8	Cultural heritage	*	*	*	No activities will be conducted in on cultural heritage sites
9	Local conflict of interests	*	*	*	Participatory process for implementation will be made.
10	Water Usage	*	*	*	
11	Sanitation	*	--/C	*	Construction worker may enter in the site during the construction time.
12	Hazards (Risk), Infectious diseases	*	--/C	*	Construction worker may enter in the site during the construction time.
Natural Environment					
13	Topography & Geographical features	*	*	*	
14	Soil Erosion	*	*	*	
	Groundwater	*	*	*	
16	Hydrological Situation	*	*	*	
17	Flora, Fauna and Biodiversity	--/C	--/C	*	Some forested areas may be used and tree clearance might take place
18	Meteorology	*	*	*	
19	Landscape	*	*	*	
20	Global Warming	*	*	*	
Pollution					
21	Air Pollution	*	*	*	
22	Water Pollution	*	*	*	
23	Soil Contamination	*	*	*	
24	Waste	*	--/C	*	Excavated earth material will be generated.

25	Noise and Vibration	✻	✻	✻	
26	Ground Subsidence	✻	✻	✻	
27	Offensive Odor	✻	✻	✻	
28	Bottom sediment	✻	✻	✻	
29	Accidents	✻	--/C	✻	During construction, some accident may occur.

Table K-9.13 Potential Impacts and Possible Mitigation Measure of Construction of New Farm Road

Potential Impacts	Phase	Rating	Impact Cause/ Severity	Assumed Mitigation Measures / Monitoring Method	Action Time for Avoidance / mitigation
3. Land Use and Utilization of Local Resources	Designing	C	Land securement is required for construction.	- Farmer's meeting to discuss and obtain consensus with land owners	Designing (Mitigation)
11. Sanitation	Construction	C	Sanitary condition may degenerate due to input of construction workers at construction site.	- Provision of temporary sanitary arrangements (toilet, other requirement).	Construction (Mitigation)
12. Hazard (Risk), Infectious Diseases	Construction	C	Infected construction workers may enter into the construction site.	- Implementation of health monitoring of construction workers by their declaration	Construction (Mitigation)
17. Flora, Fauna and Biodiversity	Designing & Construction	C	Some forest land may be required for the construction in some cases.	- Meetings with the local Forest Department to assess the use and get due clearance for the use of land - Construction by approved manner.	Designing & Construction (Mitigation & Avoidance)
24. Waste	Construction	C	Excavated earth material will be generated	- The excavated earth material should be reused as much as possible - Dumping sites for the debris must be identified.	Designing and Construction (Mitigation)
29. Accidents	Construction	C	Accidents caused by construction machinery and vehicles are predicted during the construction phase.	- Appropriate maintenance of machinery and vehicles - Periodic caution to workers on disciplines for safety operation.	Construction (Mitigation)

Conclusion

- The plan will be implemented on application basis by farmer-groups' initiative. The construction route should be decided by farmer's meeting and consensus should be obtained from the land owner prior to the construction.

- This activity in the program component is construction of small-scale farm roads and foot paths the width of which is 1-4 m. The road or path will connect between crop production area and public PWD road nearby. Accordingly, significant negative impacts are not predicted at construction stage. In addition, mitigation measure proposed will minimize negative impacts.

K-9.4 Comparison between With and Without Master Plan

The following tables shows the supposed conditions under the "Without the Master Plan" case compared with the "With the Master Plan". It is noted that in the case of "With Master Plan" mitigation measures are assumed to be implemented properly under the Master Plan Implementation.

Table K-9.14 Condition Without and With Master Plan

Item	Without the Master Plan	With the Master Plan
Agriculture	Unable to tap the potential for the natural advantage it has in growing off-season vegetable. The production of traditional agriculture will not increase.	The State will be able to tap its potential for the production and effective marketing of its off-season vegetable. In 2005-2006 the total area under vegetable production was 73,000 hectares. With the Master Plan the area under taken under vegetable cultivation is projected to be 124,000 hectares by 2022/23
Availability of Irrigation Facilities, Water and Access Farm Road	Inefficient use of its water resources Unable to tap the existing potential for irrigation Unable to promote crop diversification because of lack of irrigation water and access farm road.	Will rehabilitate existing structures and create minor irrigation and water harvesting structure for more efficient use of available sources of irrigation. With the Master Plan, an additional 16,000 hectares will be brought under irrigation and 5,000 ha under life saving irrigation by 2022/23 Construction of farm road can promote crop diversification especially in hilly area.
Society	Weak social institutions for management of local resources	Strengthening of local institutions for effective management of local resources
Environmental Impact	Improper management of local resources including water	Proper use of resources as well as promotion of organic farming and rational use of fertilizers.

(1) Examination of the Condition Without Master Plan

The following table shows potential negative impacts without implementation of the master plan.

Table K-9.15 Potential Negative Impacts Without Master Plan

Potential Impacts	Impact cause/ severity
Social Environment	
Local Economy	Almost 66.7% of the population is dependent on agriculture and traditional agriculture productivity has seen only a slight increase over the years because of the increasing small landholdings, lack of adequate irrigation facilities, lack of agricultural know-how and poor market. Diversification of agriculture to vegetables has been project as absolutely essential for contributing towards economic growth, ensuring food security and reducing the vulnerability of farmers to poverty as the price fetched by vegetables is nearly four times more than food grains. Hence without master plan local economy may take much longer time to improve. This diversified agriculture will not be attained without Master Plan
Social Institutions	Most social institutions like Farmers Interest Groups, Water Users Associations etc have had only one time input and many of them are not functioning effectively and some have become defunct. In other areas there seems a total breakdown of traditional institutions of resource management. Without inputs as designed in the Master Plan these institutions will only further weaken.
The poor, indigenous ethnic people	There is both class and caste based difference in the rural economy. In most areas Scheduled Castes are among the poorest, without a planned effort to

	include them, many of them tend to be marginalized from the social institutions and from benefit sharing accrue to initiatives. Hence without master plan this injustice may not be rectified. Also without proper regulation and norms, the more well-off people tend to be able to take advantage of any new initiative.
Local Conflict of Interest	Without proper mechanisms for transparency and equitable distribution of benefits, often local conflicts of interest occur especially in relation to the water where disputes between upstream and downstream communities are common. Since water scarcity may be further heightened without the program interventions, the local conflicts may continue to prevail.
Water Usage	The current shortage of irrigation facilities and lack of maintenance of the existing structures has led to inefficient use of the existing water sources and resources. Rain water harvesting potential of the State has not been adequately explored as yet.
Natural Environment	
Soil Erosion	Improper and unplanned farming poses threats to soil erosion along the hill sides.

(2) Examination of the Condition With Master Plan

On the other hand, the following table shows the potential negative impacts with implementation of the Master Plan. As described above, the projects of the Master Plan are assumed to be implemented with appropriate environmental management activities in order to avoid and /or mitigate the negative impacts.

Table K-9.16 Potential Negative Impacts With Master Plan

Potential Impacts	Impact/ Cause Severity
Social Environment	
Land Use and Utilization of local resources	Some amount of private land and sometimes farmland may be used for the various infrastructure development activities. This however will be minimized and land will be secured with the farmers consent and will be used to give them benefits to better use their land resources.
Sanitation, Hazards (Risk), Infectious diseases	Sanitary condition may degenerate due to input of construction workers at construction site and infected construction workers may enter into construction site.
Natural Environment	
Groundwater	Over-lift of groundwater may cause decline of water level in operation stage.
Flora, Fauna and Bio Diversity	Some forest land may be required for the construction of minor irrigation pipeline or farm road.
Pollution	
Air Pollution, waste and increase of accidents during construction phase	During the construction phase, small and temporary impacts on air quality, waste and increase of accidents might be made.

(3) Result of Comparison

The result of comparison with and without Master Plan conditions is shown in the following table.

Table K-9.17 Result of Comparison Without and With Master Plan

	Activity / Potential Impact	Without Master Plan	With Master Plan
Social Environment			
1	Involuntary Resettlement	*	*
2	Local economy (employment, etc)	--/C	++/B
3	Land use and utilization of local resources	*	--/C
4	Social institutions	--/C	++/B

5	Existing social infrastructures and services	*	++/C
6	The poor, indigenous and ethnic people	--/C	++/B
7	Misdistribution of benefit and damage	*	*
8	Cultural heritage	*	*
9	Local conflict of interests	--/C	*
10	Water Usage	--/C	*
11	Sanitation	*	--/C
12	Hazards (Risk), Infectious diseases	*	--/C
Natural Environment			
13	Topography & Geographical features	*	*
14	Soil Erosion	--/C	*
15	Groundwater	*	--/D
16	Hydrological Situation	*	*
17	Flora, Fauna and Biodiversity	*	--/C
18	Meteorology	*	*
19	Landscape	*	*
20	Global Warming	*	*
Pollution			
21	Air Pollution	*	--/C
22	Water Pollution	*	*
23	Soil Contamination	*	*
24	Waste	*	*
25	Noise and Vibration	*	*
26	Ground Subsidence	*	*
27	Offensive Odor	*	*
28	Bottom sediment	*	*
29	Accidents	*	--/C

Left-side of each cell represents a direction of impact and right side represents a magnitude of impact as follows:
Left side: ++: Positive impact --: Negative Impact =: Neutral Impact
Right side: A : relatively significant impact, B: relatively medium size impact'
C: relatively small impact D: unknown as of now

It is understood form above table that implementation of the Master Plan will bring about positive impacts with avoidance and/or mitigation measures against the negative impacts.

(4) Conclusion

The IEE study for Master Plan concludes as follows;

- Master Plan would have positive impacts for social environment, especially for local economy to encourage and social institutions to strengthen. Master Plan also made consideration of the poor, indigenous and ethnic people. Thus it could be judged to be acceptable form an environmental view point.
- Implementation of Master Plan would not bring about serious social and natural negative environmental impacts and that impacts can be avoided/ mitigated by proposed countermeasures.
- It is under stood that implementation of the Master Plan will bring about positive impacts with avoidance and/or mitigation measures against the negative impacts.