D: Promotion of vegetable production aim to sell at time of higher-price
D-1 (2): PMU's trial - Use of cultivation control technology

Execution Plan of Activity (draft):
Cucumber & Early cauliflower cultivation by use of mulching sheet [D-1(2)-5] (Extension-cum-trial of vegetable production by use of mulching sheet)

Feb 2019; Version 01

1. Sub-projects for the trial

BPMU Bilaspur: 3 sub-projects - Chibber Ballu, Fogog, Nalwar Kotlu (area size not decided), Noa
BPMU Sarkaghat: 2 sub-project - Ukhla, Damella, Ladheri Barin (not decided)
BPMU Hamirpur: 2 sub-projects - Manjru, Baleta Khurd

2. Aims

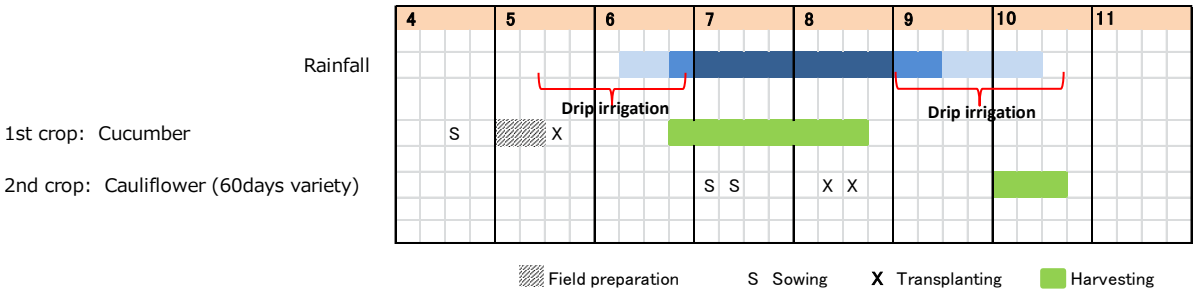
- This plan was derived from some findings in "Trial of Early cultivation of cole crops by use of mulching sheet [D-1(2)-3]" as below, conducted in 2018, to get good price of cole crops harvested in October (Ref.-1 (1)).

Aims of "Trial of Early cultivation of cole crops by use of mulching sheet [D-1(2)-3]"
- According to price trend in H.P., the price of cauliflower in October is higher than winter season because amount of cauliflower decreases in the market in that month. The reason is that it is difficult and not conventional to cultivate cauliflower at open field in summer/ rainy season. - To harvest cauliflower in October, transplanting should be done in mid - late August; i.e. cultivation starts in rainy-season; under very wet condition. Land preparation (plowing & bed making) in midst of rainy season is difficult. Therefore, it should be done before or early time of rainy-season; in mid-June, and prepared bed should be covered with mulching sheet to prevent flourishing of weed and to maintain shape of bed until transplanting take place. To utilize mulched-beds, continuous cultivation of cole crop is recommended. **Points of trial:** ➢ By using mulching sheet and bed; - Maintain (protect) shape of bed during rainy-season - Prevent washout of manure/fertilizer components by rain - Reduce labor cost for weeding (Rs1000/kanal x 2 times) - Prevent excessive soil moisture; then to promote healthy growth of roots ➢ By making seedlings in plug tray, in poly-house/poly-tunnel - Forward the harvest time; by minimizing the roots damage occurred in transplanting (minimize recovery time) ➢ By continuous (2 times) cropping in same beds; - Reduce labor cost for land preparation for 2nd crop (Rs1000/kanal)

- Prime target of the trial [D-1(2)-3] was to harvest cauliflower (1st crop) in October and it was achieved. However, good price was not expected for 2nd harvest of cole crop and farmers were not so much committed to the 2nd cole crop production.
- On the other hand, it has been confirmed that mulching sheet is durable for 2 times crop production.

- Based on these findings, **an idea to grow vegetable before early-cauliflower** is suggested and **cucumber** is selected because of its growth period, form of a plant and favorable price in July-Aug (Ref-1 (2)).

(1) Intended cropping schedule



(2) Improved technique to introduce

Technique	Effect to be expected by use of technique
Mulching by black color plastic sheet	- Maintain (protect) shape of bed during rainy-season. - Prevent washout of manure/fertilizer components by rain. - Reduce labor cost for weeding (Rs1000/kanal x 2 times). - Prevent excessive soil moisture; then to promote healthy growth of roots.
Bed preparation by use of tiller ; including a fabrication of ridger attachment improved by TCP	- Reduce labor cost for making bed.
Application of FYM*	- Improve field soil.
Timely application of insecticide ; including proper usage / self-protection	- Prevent insect's attack and keep healthy growth of plants.
Vertical training of vine by use of bamboo posts	- Keep healthy growth of plants. - Make management of cultivation easier.
Seedling production with plug-tray for cauliflower, plastic pot/ plug-tray for cucumber and chilli	- Minimize roots damage occurred in transplanting.
Use of drip irrigation** ; including proper installation of tubes and maintenance	- Supply water efficiently during May to June, September to October.

*Way of fertilizing: 1) Base fertilization: FYM and chemical fertilizer, 2) Additional fertilization: Apply common practice (manual application)
**Drip irrigation: 30cm interval of tube

(3) Cost for covering 1 kanal (400 m2) with mulching sheet:

- ✓ Sheet:
  Size: width 1.2 m x 400m/roll
  Price: Rs. 4,500/ roll (Rs. 11.25/m)
- ✓ Bed:
  Width: 80 cm
  Distance between beds: 30cm
- ✓ Field:
  Shape: 20m x 20m with 1m width pathway at two sides (both ends) ==> Bed length 18m

	Calculation
Nos. of bed (row)	20m / (0.8m + 0.3m) =18.2 => **18 beds**
Necessary length of sheet	18 beds x (18m + 1m) = **342 m**
Sheet cost	Rs. 11.25/m x 18m = **Rs. 3,847/ kanal**

(4) Expected harvest in 1 kanal:

Planting space in bed: Cucumber: 1 line x 90cm interval, Cabbage: 2 lines x 30cm interval

	Cucumber	Cauliflower
Nos. of plants	20 plants/bed x 18 = 360	120 plants/bed x 18 = 2160
Expected harvest in total (kg)	1345 kg *Cucumber @200-250g/pc. 360 x 15-20/plant x 225g x 95% = 1150 - 1540kg	1400 kg *Cauliflower@2700g/pc. 2,160 x 700g x 95% = 1,436kg

3. Participating farmers and scale of the trial (as of 05 Feb. 2019)

Sub-project	Nos. of farmer	Approximate field area per farmer	Approximate total area per sub-project
Bilaspur			
Fogog	2	500m^2 each	1000 m^2
Chibber Ballu	1	750m^2	750 m^2
Nalwar Kotlu	5	1000 - 1500m^2 each	6350 m^2
Noa	1	400m^2 each	400 m^2
Sarkaghta			
Ukhla	4	950m^2 x 1, 200m^2 x 3	1550 m^2
Dhamella	4	130 - 500m^2	1400 m^2
Hamirpur			
Manjru	3	360m^2 x 1, 180m^2 x 2	720 m^2
Baleta	1	500m^2	500 m^2
Total	21	---	12670 m^2

4. Necessary items and its costs

Items for 1 kanal of field as below.

Item	Quantity	Unit price (Rs)	Cost per kanal (Rs)	Memo
Bed preparation				
Mulching sheet	342 m	11.25/m	3,847	1.2m wide x 400m/roll (18 + 1)m per bed, Rs4500/roll
Fertilizer 12:32:16	9 kg	25/kg	225	To be prepared by farmers
FYM	1 truck	1500/truck	1500	To be prepared by farmers
Seedling production – Cucumber				
Plastic pot	400 pots	0.4/ pot	160	Local made; Rs200/kg = about 500pcs/kg
Cocopeat	1 block	200/ block	200	
Vermin compost	-	-	-	To be prepared by farmers
Seeds	1 pack	200/ pack	200	
Make vertical stacking for Cucumber				
Bamboo post	126 post	10/post	1260	3m interval = 7 pcs/bed

Item	Quantity	Unit price (Rs)	Cost per kanal (Rs)	Memo
				To be prepared by farmers
Steel wire	6 kg	120/kg	720	324m = 5-6kg for 400m2
Nail	2 kg	-	-	
Plastic string (rope)	5 bundle	80/bundle	400	To be prepared by farmers
Mesh net	1 roll	1500/roll	1500	100cm width x 100m/roll For demonstration
Seedling production – Cauliflower				
Plug tray; 98 holes	25 trays	40/tray	1000	(22 plus 3) = 25 trays *3 extra trays for replanting dried-up plants; replacing poor plants
Cocopeat	1 block	200/block	200	
Vermin compost	-	-	-	To be prepared by farmers
Seeds	1 pack	400/pack	400	About 2500 seeds/pack: - Cauliflower = Megha (Seminess brand)
Tools (per one farmer, not per 1 kanal)				
Rake	1	200	200	
Hand auger	1	250	250	
Hammer	1	100	100	
Plier	1	200	200	
Plywood	1	200	200	

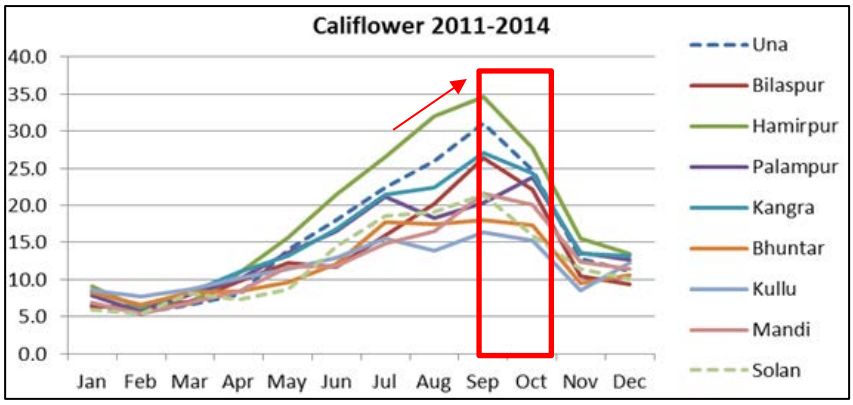
5. Work schedule plan

Schedule of key works is as follows.

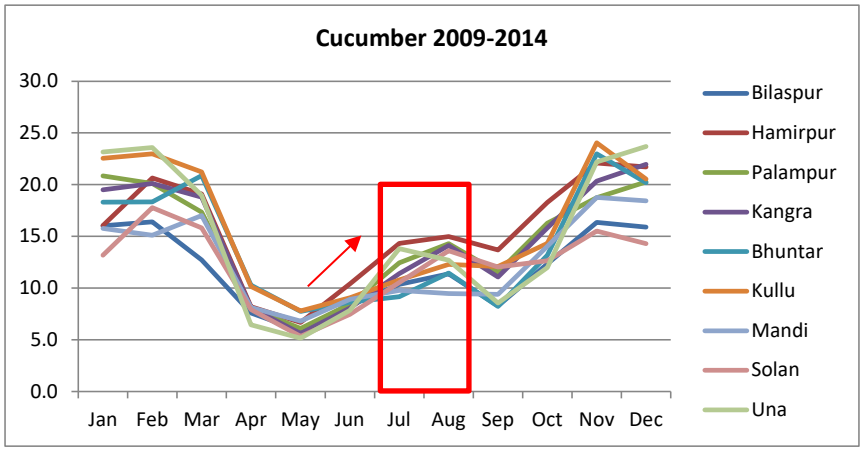
Work	Time
Determination of sub-projects and farmers/trial fields	Almost completed; except Ladheri Barin (Sarkaghat)
Installation of drip irrigation by BPMU	To be completed before end of March
Finalize costs/work sharing by TCP/BPM/farmers	To complete before early March
Procurement of items by TCP & BPMUs	To complete before end of March
On-site demonstrations/training of Bed making, Stake making & Seed sowing in pots	
Pre-demonstration for Nalwar Koltu & Noa farmers	Early March
Demonstrations/training for Bilaspur sub-projects	Early April; at Nalwar Kotlu
Demonstrations/training for Hamirpur su-projects	Early April; place has not yet decided
Demonstrations/training for Sarkaghat sub-projects	Mid April; at Ukhla
Field preparation/ Bed making	To complete before 10th of May
Seed sowing in poly-pots	Middle of April
Transplanting	Middle of May

Reference-1. Seasonal price trend of Cauliflower and Cucumber (Monthly prices at APMC market yards)

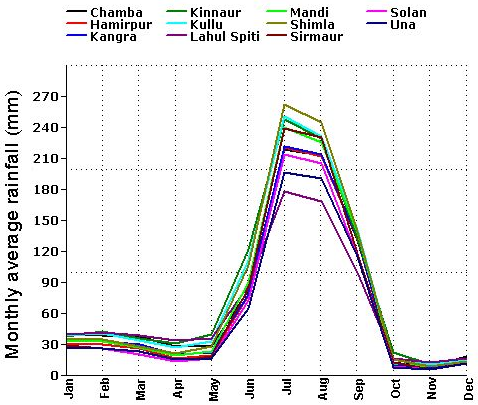
(1) Cauliflower

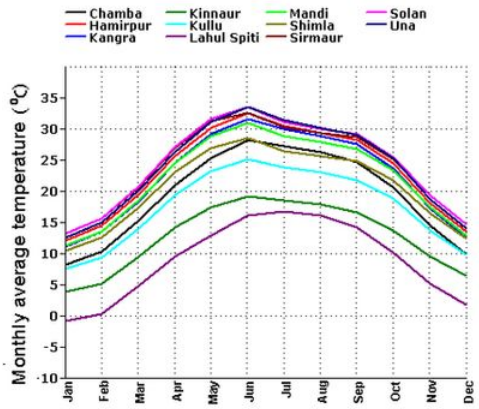


(2) Cucumber



Reference-2. Climate trend (rainfall and temperature)





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Execution results (data sheets): Cucumber & Early cauliflower cultivation by use of mulching sheet (Extension-cum-trial of vegetable production by use of mulching sheet) [D-1(2)-5]

1. Sub-projects, farmers and farm fields for the trial

Trial sites (sub-projects, participating farmers and farm fields) were determined through the site survey by JICA TCP/BPMU. This practice was carried out during Nov. 2018 to Jan. 2019.

Candidate sub-projects and Date of site survey

BPMU	Selected sub-projects	Newly nominated site	First-time survey	Follow-up survey	Date of Survey
Sarkaghat	Damella			✔	05 Nov. 2018
	Ukhla			✔	03 Jan. 2019
	Lahra			✔	03 Jan. 2019
	Ladheri Barin	★	✔		03 Jan. 2019 30 Jan 2019
Bilaspur	Swara	★	✔		16 Nov.2018
	Nalwar Kotlu			✔	03 Dec. 2018
	Fagog			✔	03 Dec. 2018
	Chibber Ballu			✔	03 Dec. 2018
	Noa	★	✔		08 Jan. 2019 29 Jan. 2019
	Domehar	★	✔		08 Jan. 2019
Dehra	Dhugiari			✔	11 Dec. 2018
Hamirpur	Baleta Khurd			✔	28 Nov. 2018
	Manjru			✔	28 Nov. 2018

Newly nominated sites are all participated the trial site visiting conducted in October 2018 under D-1(2)-3); either at Chibber Ballu or Ukhla

Source: JICA TCP Experts Team

Lahra and Ladheri Barin (Sarkaghat), Swara and Domehar (Bilaspur) and Dhugiari (Dehra) were judged as not suitable/feasible as the result of the survey. After that time Baleta Khurd (Hamirpur) declined in Feb. Final participating sub-projects/farmers/ fields for the trial are as follows.

Participating sub-projects, nos. of farmers and fields area for the trial (Final)

BPMU/ Sub-project	Nos. of farmer	Approximate total area per sub-project	Trial field area per farmer
Bilaspur			
Fogog	2	1000 m^2	500m^2 each
Chibber Ballu	1	750 m^2	750m^2
Nalwar Kotlu	3	2450 m^2	500 m^2 x 1, 600 m^2 x 1, 1350m^2 x 1
Noa	1	150 m^2	150 m^2
Sarkaghat			
Ukhla	3	1350 m^2	950m^2 x 1, 200m^2 x 2
Damella	4	1400 m^2	130 - 500m^2
Hamirpur			
Manjru	3	720 m^2	360m^2 x 1, 180m^2 x 2
Total	17	7820 m^2	

Source: JICA TCP Expert Team

2. Cost sharing

Detail of necessary items, prices and cost sharing is shown at the end of this paper (Annex-1).

3. Installations of drip irrigation system by BPMU

Delivery of material and/or installation were conducted at Fagog, Chibber Ballu, Noa (BPMU Bilaspur) and Manjru (BPMU Hamirpur) in April 2019. Target time of transplanting cucumber seedlings was middle of May. However, until end of April no work has yet conducted at Ukhla and Damella (BPMU Sarkaghat) despite the selected fields were empty. This delay in the installation can cause a failure of planned cucumber cultivation.

Progress situation of installation of drip irrigation system (As of 06 May 2019)

BPMU/ Sub-project	Nos. of farmer	Approximate total area per sub-project	Progress situation of the installation works			
			All completed *	Installed but not yet tested	Delivery only	No works done
Bilaspur						
Fogog	2	1000 m^2	500 m^2	500 m^2	0	0
Chibber Ballu	1	750 m^2	0	750 m^2	0	0
Nalwar Kotlu	3	2450 m^2	1100 m^2 *	0	1350 m^2	0
Noa	1	150 m^2	150 m^2	0	0	0
Sarkaghat						
Ukhla	3	1350 m^2	400 m^2 *	0		900 m^2
Damella	4	1400 m^2	0	0		1400 m^2
Hamirpur						
Manjru	3	720 m^2	0	0	720 m^2	0

* Include the fields area where equip drip irrigation system before the trial.
Source: JICA TCP Expert Team

Date of completion of installation of drip irrigation system

BPMU/ Sub-project	Date of completion at all fields
Bilaspur	
Fogog	before 14 May
Chibber Ballu	before 14 May
Nalwar Kotlu	before 20 May
Noa	before 15 May
Sarkaghat	
Ukhla	21 May
Damella	17 May
Hamirpur	
Manjru	12 May

Source: JICA TCP Expert Team

4. Demonstration of bed preparation and staking for cucumber cultivation to farmers

Demonstrations at one sub-project in each BPMU were conducted by JICA TCP and BPMU. Purposes of demonstration are 1) to explain the trial (result of 2018 and revision of 2019, how to consider time-shifted cultivation in the market-oriented way), 2) to explain the cultivation technique to use, 3) to demonstrate (to give practice) bed making by use of ridger fabricated by JICA TCP, covering mulching sheet and making staking structure.

Date	Venue	Participants

20/03/2019	Nalwar Kotlu	19 farmers from; Nalwar Kotlu, Fagog, Chibber Ballu and Noa
25/03/2019	Manjru	10 farmers from; Manjru
06/04/2019	Ukhla	17 farmers from; Ukhla, Damella, Ladheri Barin and Khanot

Source: JICA TCP Expert Team

5. Cucumber seedling production

Sowing was completed in April at all sub-projects other than Damella. Three types (sizes) of pot (i.e. 10.5cm plastic pot, plastic bag, 50 holes plug tray) were used according to the field situations.

At Damella, direct sowing in mid-April was initially planned; i.e. no seedling preparation. However, installation of drip irrigation did not started until end of April. Therefore, seedlings were prepared in early-May to avoid further delay of harvest time.

BPMU/ Sub-project	Nos. of farmer	Approximate total area per sub-project	Number of seedlings (plan)		
			Total	Shira (East-West)	SW-224 (US Agree seed)
Bilaspur					
Fogog	2	1000 m^2	1000	600	400
Chibber Ballu	1	750 m^2	800	500	300
Nalwar Kotlu	3	2450 m^2	2700	1800	900
Noa	1	150 m^2	400 *	250	150
Sarkaghat					
Ukhla	3	1350 m^2	1500	900	600
Damella	4	1400 m^2	1500	1000	500
Hamirpur					
Manjru	3	720 m^2	1050	700	350

* Farmer reduced the trial field area to 150m2 from 400m2 after sowing.

Source: JICA TCP Expert Team

6. Fabrication of ridger for bed preparation

SPMU provided each farmer an engine-driven 2 wheel tiller. However, available ridger attachment in the shop (local design/fabrication) is too small and inadequate for bed making purpose. Therefore, most farmers make beds/ridges manually although they have a tiller. Making beds/ridges by hands is time-consuming and tiresome work and sometimes it needs hired labor. In order to improve this situation, JICA TCP fabricated a ridger using examples from ones used in Japan.

Prototype was made and tested in February 2019 and final version was prepared in March. Farmers practiced a bed making by the final model in the demonstrations held on 25 March and 06 April and farmers said that it can make ridges efficiently. New type of ridgers were provided to the participating sub-projects in early May; 1 rider for 1 sub-project except sub-project Damella. Design of ridger is shown at the end of this paper (Annex-2).

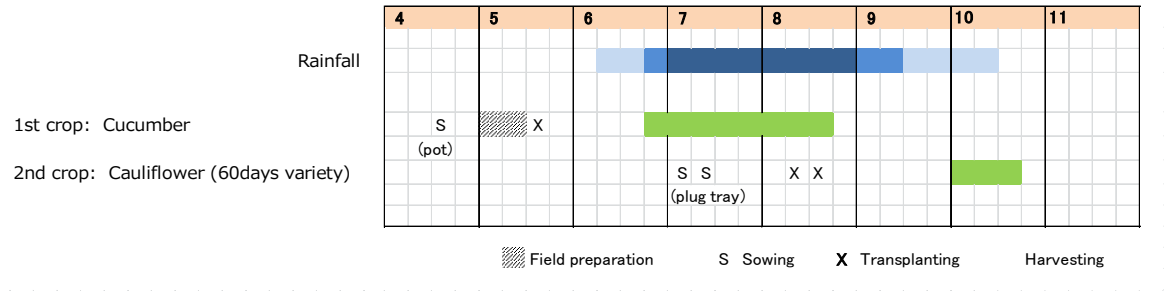




7. Date of sowing & transplanting

BPMU		Sarkaghat	Bilaspur				Hamirpur	
Sub-project		Ukhala	Fogog	Chibber Ballu	Nalwar Kotlu	Noa	Manjru	Gurriah
Cucumber								
Sowing	plan	15 - 20 April						
	actual	15, 29 April	24 - 29 April		16 - 25 April	16 April	26 - 27 April	
Transplanting	plan	15 May						
	actual	7, 14 May	13, 20 May		12, 18 May	8 May	22 May	
Cauliflower								
Sowing	plan	5-7 July	12-15 July					
	actual							
Transplanting	plan	3-5 Aug	11-14 Aug					
	actual	15-20 July (other field) Early Aug (trial field)		24 Aug - 4 Sep	2-7 Aug, 15-27 Aug		24 Aug	

Sowing & transplanting schedule Plan for 2019 season



8. Recommended pest control method for cucumber in June-July

Recommended pest control method for cucumber in June-July

June

Red pumpkin beetle: 1st application – Malathion 50 EC (1 ml/liter)

2nd application – Rocket (2 ml/liter)

** Intervals in chemical application is 10-15 days*

End of June

Fruit fly: Set pheromone trap (Palam trap) before fruit setting

1 trap/kanal

July

Fungus - Downy mildew:

1st application – Bacillus subtilis (5g/liter)

2nd application – Ridomil (2.5g/liter) or Indofil M-45 (2.5g/liter)

Fungus - Powdery mildew:

1st application – Bacillus subtilis (5g/liter)

2nd application – Contaf or Sitara (hexaconazole) (0.5 ml/liter)

or

Score (difnoconazole) (0.5 ml/liter)

** Intervals in chemical application is 10-15 days*

❖ *Bacillus subtilis is bio-fungicide. There is no frequency limitation on its usage.*

9. Target time of sowing, transplanting and pest control of Cauliflower (as of 10 June 2019)

Cucumber & Early cauliflower cultivation by use of mulching sheet [D-1(2)-5]

prepared by JICA TCP, 10 June 2019

Cauliflower cultivation
Target date of sowing & transplanting, pest control and Date of work of BPMU/JICA TCP

	Bilaspur				Sarkaghat		Hamirpur
	Fogog	Chibber Ballu	Nalwar Kotlu	Noa	Ukhla	Damella	Manjru
Sowing	July 12-15	July 12-15	July 12-15	July 12-15	July 5-7	July 1-3	July 12-15
Provide material for sowing (plug-ray, seeds, cocopeat) by BPMU	Before July 05 (at least 7 days before sowing)				Before July 01	Before June 25	Before July 05
On-site training: Sowing	July 10 or July 11				July 01		July 12
Transplanting	Aug. 11-14	Aug. 11-14	Aug. 11-14	Aug. 11-14	Aug. 3 - 5	July 27-30	Aug. 10-14
On-site training: Transplanting	Aug. 11				July 27		Aug. 10

Pest control : Cutworm

Prepare recommended method by JICA TCP, and inform it to BPMU	middle of July
Preliminarily instruction to farmers	Same time with "on-site training on transplanting"
Assistance by BPMU to get chemicals	Finish in August
Pest control by farmers	Start in September
On-site instruction to farmers	As requied / When periodic monitoring is made



10. Plan (propose) for Field Visiting (as of 10 June 2019)

Cucumber & Early cauliflower cultivation by use of mulching sheet [D-1(2)-5]

Plan (propose) for Field Visiting prepared by JICA TCP, 10 June 2019

1 **Field visiting for the purpose of exchanging experiences among 7 sub-projects**

Venue	Nalwar Koltu, Bilaspur
Date (tentative)	One day **during 17-19 July**, after sowing cauliflower seeds at all 7 sub-projects
Participants	Farmers of 7 sub-projects (Fogog, Chibber Ballu, Nalwar Kotlu, Noa, Ukhla, Damella, Manjru)
	Candidate farmers for Year 2020 selected by BPMU Bilaspur

2 **Field visiting for the purpose of showing new method to other sub-projects and 5 BPMU**

1) By BPMU Hamirpur

Venue	Guryah
Date (tentative)	**Middle of October**, After cauliflower harvest start
Participants	Candidate farmers for Year 2020 selected by BPMU Hamirpur
	Farmers of Manjru and Guyah
	PD-SPMU

2) By BPMU Sarkaghat

Venue	Ukhla or Damella
Date (tentative)	**Middle of October**, After cauliflower harvest start
Participants	Candidate farmers for Year 2020 selected by BPMU Sarkaghat
	Farmers of Ukhla and Demella

3) By BPMU Bilaspur

Venue	Narwar Koltu or Fogog
Date (tentative)	**Middle of October**, After cauliflower harvest start
Participants	Candidate farmers for Year 2020 selected by BPMU Bilaspur
	Farmers of Fogog, Chibber Ballu, Narwar Koltu, Noa
	BPMU staff of Mandi, Dehra, Nurpur, Baijnath, Una
	PD-SPMU

11. Result of Field Visiting

1. Field visiting for the purpose of showing new method to other sub-projects

1) By BPMU Sarkaghat

Venue & date: Sub-project Khannot, 11 October 2019

Participants: 16 farmers from 6 sub-projects

Ladheri Barin (3), Chir Badanoo (3), Thana Mohin (3), Tikkari (2), Thrimi (2), Ukhla (3)

2) By BPMU Bilaspur

Venue & date: Sub-project Nalwar Kotlu, 16 October 2019

Participants: 12 farmers from 4 sub-projects

Kahali (4), Parohi (3), Domehar (3), Chal Karot (2)

2. Explanation of details of the trial & field visit by EOs of 8 BPMUs

Venue & date: SPMU & Sub-project Gurriah, 25 October 2019

Participants (expected):	BPMUs :	2 extension staff per BMPU	16
	DDA Hamirpur :	1 extension staff per Block	5
	ATMA Hamirpur :	1 extension staff per Block	5

12. Cost per kanal

Items & costs for 400m2 area (1 kanal)

Bed layout Field size (assumption) 20m x 20m, 1m walk space at both ends, Bed 80cm width + 30cm walk space

==> 18 beds with length 18m in 400m2 = Total bed length is 324m in 400m2=1 kanal

Refer to the following figure.

1. Cucumber

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal	Memo
Bed preparation	Mulching sheet	342	m	7	Rs/m	2	1,197	1.2m wide x 400m/roll, Rs.2800/roll 2 uses for cucumber & cauliflower/ year x 1 year = 2 uses
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225	
	FYM	1	truck	1500	Rs/truck	2	750	2 uses for cucumber & cauliflower, per 1 year
Seedling production	Plastic pot	400	pots	0.40	Rs/pot	1	160	Rs.200/kg for 500 pots
	Cocopeat	1	block	150	Rs/block	1	150	
	Seed of cucumber	1	pack	200	Rs/pack	1	200	
Staking materials	Bamboo post	126	post	10	Rs/pot	4	315	7 posts/ 1 bed 1 use for cucumber/ year x around 4 years
	Steel wire	6	kg	100	Rs/kg	4	150	324m = 6kg/ kanal 1 use for cucumber / year x around 4 years
	Plastic rope	5	bundle	80	Rs/bundle	1	400	
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250	100g/ package
	Insecticide	1	package	250	Rs/pack	1	250	100ml/ package
Labour cost	Bed preparation + mulching	4	person*day	400	Rs/day	2	800	Rs.50/person/ h x 8h/ day = Rs.400/ person/day 2 uses for cucumber & cauliflower for 1 bed
	Nursery raising	1	person*day	400	Rs/day	1	400	
	Intercultural operations	4	person*day	400	Rs/day	1	1,600	
	Harvesting	40	person*h/day	50	Rs/h	1	2,000	1 person for 1hour /day is required. Harvesting: every 2 days for period 80 days => 80 days/2 = 40 days
Total cost/ kanal							**8,847**	

2. Cauliflower

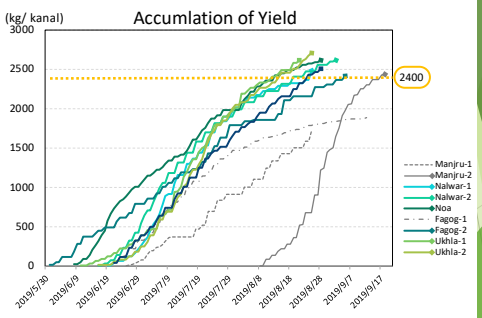
Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal	Memo
Bed preparation	Mulching sheet	342	m	7	Rs/m	2	1,197	1.2m wide x 400m/roll, Rs.2800/roll 2 uses for cucumber & cauliflower/ year x 1 year = 2 uses
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225	
	FYM	1	truck	1500	Rs/truck	2	750	2 uses for cucumber & cauliflower, per 1 year
Seedling production	Plug trays	22	trays	35	Rs/tray	4	193	1 use for cauliflower/year x 4 years
	Cocopeat	1	block	150	Rs/block	1	150	
	Seed of cauliflower	1	pack	400	Rs/pack	1	400	
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250	100g/ package
	Insecticide	1	package	250	Rs/pack	1	250	100ml/ package
Labour cost	Bed preparation + mulching	4	person*day	400	Rs/day	2	800	Rs.50/person/ h x 8h/ day = Rs.400/ person/day 2 uses for cucumber & cauliflower for 1 bed
	Nursery raising	1	person*day	400	Rs/day	1	400	
	Intercultural operations	4	person*day	400	Rs/day	1	1,600	
	Harvesting	30	person*h/day	50	Rs/h	1	1,500	1 person for 1hour /day is required. Harvesting: every 2 days for period 60 days => 60 days/2 = 30 days
Total cost/ kanal							**7,715**	

13. Results of Cucumber cultivation in 2019

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ **Result of 2019-Trial (Cucumber)**

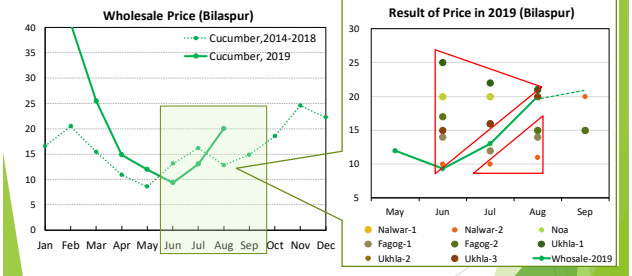
1. Yield



Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ **Result of 2019-Trial (Cucumber)**

2. Price @Bilaspur

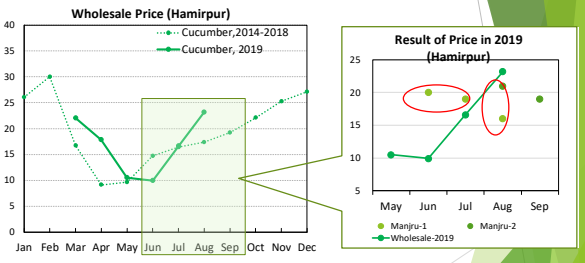


Upper than wholesale price: Direct selling to consumers
Lower than wholesale price: Selling to retailers nearby village

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ **Result of 2019-Trial (Cucumber)**

2. Price @Hamirpur



Upper than wholesale price: Direct selling to consumers
Lower than wholesale price: Selling to retailers nearby village

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ **Result of 2019-Trial (Cucumber)**

3. Profit

BPMU	Hamirpur		Bilaspur					Sarkaghat		
Sub-project	Manjru		Nalwar Kotlu		Noa	Fagog		Ukhla		
Farmer No.	1	2	1	2	1	1	2	1	2	3
Field size (m2)	200	200	300	900	200	500	150	150	150	200
Average price (Rs/kg)	18	20	20	11	20	14	16	23	17	18
Total yield (kg)	855	1,217	1,860	5,893	1,306	2,357	942	983	1,016	1,255
Total sale (Rs)	14,745	23,885	35,075	60,230	25,820	30,422	17,333	21,285	16,866	21,520
Yield/ kanal	1,710	2,434	2,480	2,619	2,612	1,886	2,512	2,621	2,709	2,510
Sale/ kanal	29,490	47,770	46,767	26,769	51,640	24,338	46,221	56,760	44,976	43,040
Cost/ kanal	10,397	10,397	10,397	10,397	10,397	10,397	10,397	10,397	10,397	10,397
Profit/ kanal	19,093	37,373	36,370	16,372	41,243	13,941	35,824	46,363	34,579	32,643
How to sell:	1, 2	1	1	2	1	2	2	1	2	2

1. direct selling to consumer
2. Selling to retailer

✓ Not only direct selling, but also selling to retailer at lower price, farmer can get profit due to good cost performance (Cost Rs. 10,397/kanal)

✓ Especially, even if price is not so high, when farmer can harvest more than 2400kg/kanal, profit will reach more than Rs. 32,000/kanal.

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

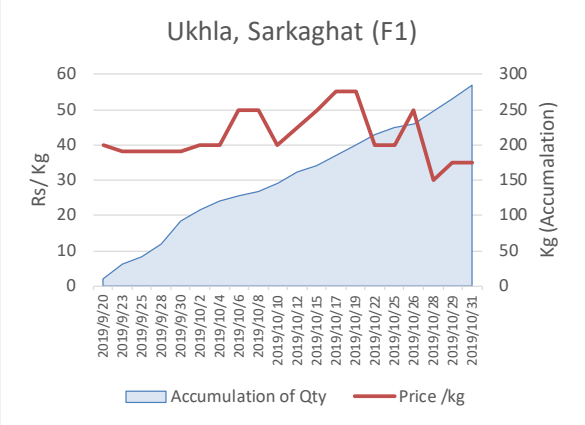
◆ Results of 2019-Trial (Cucumber)

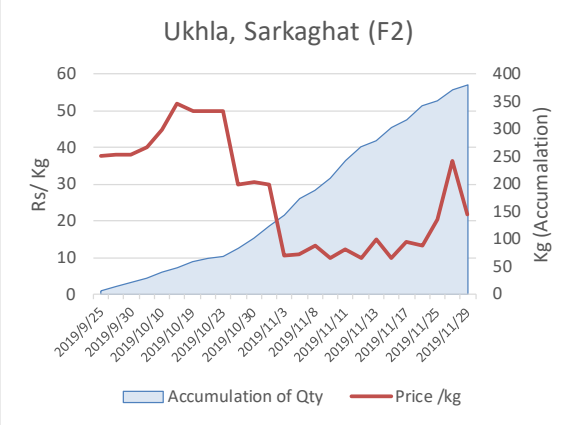
Cost	• Around Rs. 8,900/ kanal
Yield	• More than 2,400kg/ kanal
Price	• Direct selling can higher than wholesale price, average Rs.20/kg • Selling to retailer: same or lower
Profit	• Reasonable cost, enough yield and good / not bad price can make profit of more than Rs. 32,000/ kanal
Techniques	• Mulching sheet, drip irrigation, staking structure and other techniques are effective.
	• Two varieties “Saira” or “SW224” have resistance to diseases during rainy season.
Farmer’s mind	• Very motivated. • Getting to consider about next season (kind of crops, field size, schedule, how to sell). • Generating marketing mind.

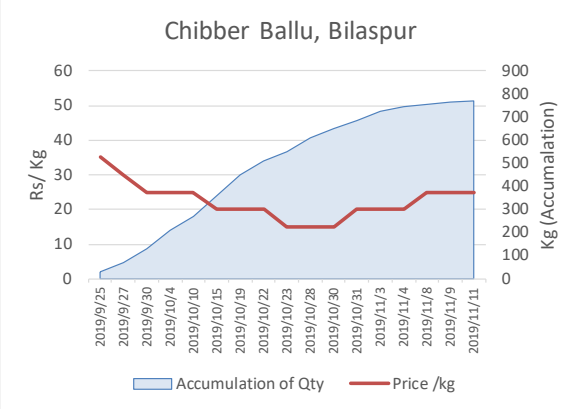
14. Results of Cauliflower cultivation in 2019

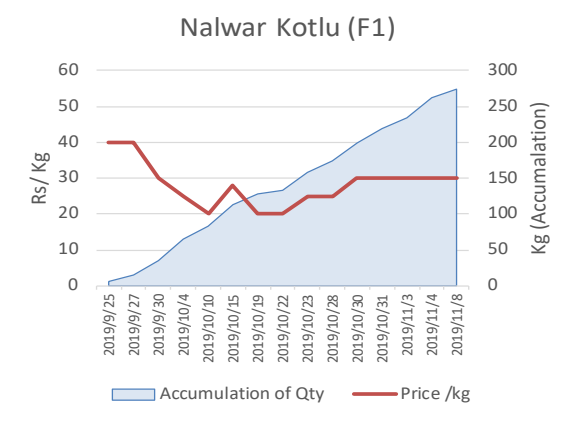
1) Results of harvest and sales

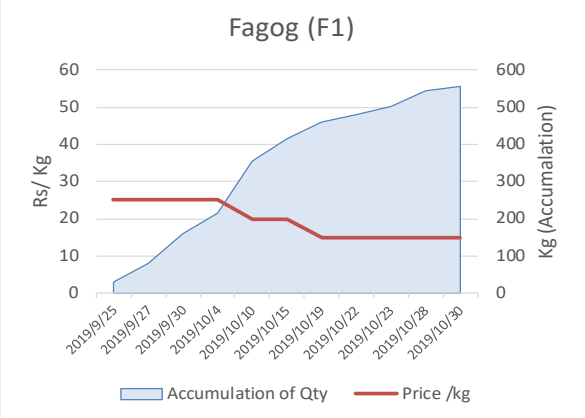
BPMU	Sarkaghat		Bilaspur		
Sub-project	Ukhla		Chibber Ballu	Nalwar Kotlu	Fagog
Farmer No.	1	2	1	1	1
Field size (m2)	200	200	400	250	300
Average price (Rs/kg)	41	24	22	28	21
Total yield (kg)	285	381	770	274	556
Total sale (Rs)	11,645	8,945	16,675	7,575	11,490
Yield/ kanal (kg)	569	761	770	438	741
Sale/ kanal (Rs)	23,290	16,990	16,675	12,120	15,320
Profit/ kanal with labour (Rs)	15,404	9,104	8,789	4,234	7,434
Profit/ kanal without labour (Rs)	19,704	13,404	13,089	8,534	11,734











2) Results of 2019 trial (Cauliflower)

Cost	• Around Rs. 7800/ kanal * Include hired labour costs
Yield	• 700 -800 kg/ kanal * This is lower than the expectation (1200 kg/kanal)
Price	• High : Rs. 40/kg in late Sep. - early Oct • Low : Rs. 10-15/kg • Average : Rs. 20 – 25/kg
Profit	• Rs. 7500 – 9000/kanal * This is lower than the expectation (Rs. 24,000/ kanal). Low yield resulted the low profit.
Farmer's mind	• Getting to consider about next season; such as time of starting cucumber cultivation *, cucumber + cucumber cropping system.

* Harvest of cucumber was delayed. It remained up to end of August to beginning of September. Therefore, transplanting of cauliflower was delayed. Some farmers transplanted cauliflower seedlings in the beds while cucumber plans were still vigor, so growth of cauliflower seedlings was not good and some died due to less sunshine.

15. Lessons Learnt

EOs of BPMUs stated the lessons learnt as follows;

Hamirpur - Manjru

Crop (onions for seed production) remained in the trail field until middle of May, and it delayed the schedule, and no cultivation of early cauliflower. Field should be empty in early April to install drip irrigation, to plow and make beds, to set mulching sheets and to transplant seedlings in early May.

All farmer's skill as well as cultural environment of seedling production should be improved.
Ladies also should be trained.

Bamboo posts for staking should be strong and staking should be prepared on time.

Sarkaghat - Ukhala

Based on the results of last year trial, farmers wanted to do a 10-15 days early transplanting of cauliflower; i.e. transplant in last week of July. As the result in this time, earlier harvest was made, but flowers were yellowish and small (about 300g). Seedlings transplanted 1st - 2nd week of August, color and size is OK. Transplanting in early July is considered too early & risky.

Farmer's skill as well as cultural environment of seedling production should be improved.
For the farmers who have no poly-house, poly-tunnel and shade net are necessary.

Farmers who have never made a vertical staking with bamboo posts underestimate the workload.
Farmer's capacity (available manpower, firm intention) for making bamboo staking is a one important factor to determine the field area for cucumber cultivation.
Maybe 1 kanal is maximum area for a first-time farmer.

Bilaspur

More number of seedlings should be prepared in rainy season, because of damage and less germination.

Some farmer's skill as well as cultural environment of seedling production should be improved.
For the farmers who have no poly-house, poly-tunnel and shade net are necessary.

Noa ---- Lady farmer is very much beginner of vegetable cultivation. All farm works are to be improved. Specially, bamboo posts for staking should be strong and it should be prepared on time. Field use / cropping plan should be considered and prepared.

Annex-1: Detail of necessary items, prices and cost sharing

BPMU Hamirpur

Output-3
D-1(2)-5: Cucumber in Aug + Cauliflower in Oct
Material List procured by TCP

Discussed with farmers (FINAL)
25, March 2019

m2	727
kanal (approximate)	2
no. of farmers	3

Items					Hamirpur								
					Who pay cost	Each Qty				Total Qty	Total Cost (Actual)	Check for Procurement "✓"	Total Cost (Estimate)
						Manjru			Baleta				
Item	Character	Qty/ kanal		Unit price (Rs)		Krishan	Prem Lal	Prakash Chand	Manju				
					kanal	1.00	0.50	0.50	0.00				
Bed preparation													
Mulching sheet	c	342	m	11	B	342	171	171	0	684 m	7,695		7,695
Fertilizer 12:32:16	c	9	kg	25	F	9	5	5	0	19 kg	475		450
FYM	c	1	truck	1,500	F	1	1	1	0	2 truck	3,000		3,000
Seedling production - Cucumber													0
Plastic pot	c	400	pots	0	T	400	200	200	0	800 pots	320		320
Cocopeat	c	1	block	200	B	1	1	1	0	3 blocks	600		400
Vermin compost	c				F						0		0
Seeds (3 varieties)	c	1	pack	200	B	1	1	1	0	3 packs	600		400
Make vertical staking for cucumber													0
Bamboo post	5	126	post	10	F	126	63	63	0	252 posts	2,520		2,520
Steel wire	5	6	kg	120	B	6	3	3	0	12 kg	1,440		1,440
Nail	c	2	kg		F	2	1	1	0	4 kg	0		0
Plastic rope	c	5	bundle	80	F	5	3	3	0	11 bundles	880		800
Seedling production - Cauliflower													0
Plug tray; 98 holes	2	25	trays	40	B	25	13	13	0	51 trays	2,040		2,000
Cocopeat	c	1	block	200	B	1	1	1	0	3 blocks	600		400
Vermin compost	c				F								0
Seeds	c	1	pack	400	B	1	1	1	0	3 packs	1,200		800
Sub total											21,370		20,225
Tools (1 pc. for 1 farmer, not per 400m2)													
Rake	5	1	pc	200	B	1	1	1	1	4 pc	800		600
Hand auger	10	1	pc	250	B	1	1	1	1	4 pc	1,000		750
Hammer	10	1	pc	100	B	1	1	1	1	4 pc	400		300
Plier	10	1	pc	200	B	1	1	1	1	4 pc	800		600
Plywood for standing-on	5	1	pc	200	T	1	1	1	1	4 pc	800		600
Sub total											3,800		2,850
Others													
Mesh net (1m x 100m)/ 1 farmer	5	1	roll	1,500	T	no	no	no	no	no no	no		3,000
Fish net (2m x 200m) / 1 kanal	5	2	roll	600	T	2	1	1	0	4 rolls	2,400		0
sub total											2,400		3,000

Costs of consumable items	"c"	a	15,370	14,265
Costs of durable items				
2 times use	"2"	b	1,000	1,000
5 times use	"5"	c	1,632	1,632
10 times use	"10"	d	165	165
Total Cost		a+b+c+d	18,167	17,062
Initial investment to be covered by BPM		**"B"**	**17,175**	**15,385**
Initial investment to be covered by TCP		**"T"**	**3,520**	**3,920**
Initial investment to be covered by Farmers		**"F"**	6,875	6,770
by 1 Farmer			1,719	2,257

BPMU Sarkaghat

Output-3
D-1(2)-5: Cucumber in Aug + Cauliflower in Oct
Material List procured by TCP

Discussed with farmers (FINAL)
06, April 2019
m2 2,763
kanal (approximate) 7.0
no. of farmers 9

Items					Sarkaghat												
					Who pay cost	Each Qty											
						Ukhla				Damella				Ladheri			
Item	Character	Qty/ kanal		Unit price (Rs)		Amar (Pres.)	Amar	Om Prakash	Raghunath	Shoal Lal	Pardeep	Ramesh	Gurdev	Ravinder	Total Qty	Total Cost (Actual)	Check for Procurement "✓"	Total Cost (Estimate)
					kanal	2.40	1.00	0.50	0.00	1.30	1.00	0.40	1.00	0.00				
Bed preparation																		
Mulching sheet	c	342	m	11	B	821	342	171	0	445	342	137	342	0	2,600 m	29,250		26,933
Fertilizer 12:32:16	c	9	kg	25	F	22	9	5	0	12	9	4	9	0	70 kg	1,750		1,575
FYM	c	1	truck	1,500	F	3	1	1	0	2	1	1	1	0	10 truck	15,000		10,500
Seedling production - Cucumber																		0
Plastic pot	c	400	pots	0	T	960	400	200	0	520	400	160	400	0	3,040 pots	1,216		1,120
Cocopeat	c	1	block	200	B	3	1	1	0	2	1	1	1	0	10 blocks	2,000		1,400
Vermin compost	c				F													0
Seeds (3 varieties)	c	1	pack	200	B	3	1	1	0	2	1	1	1	0	10 packs	2,000		1,400
Make vertical staking for cucumber																		0
Bamboo post	5	126	post	10	F	303	126	63	0	164	126	51	126	0	959 posts	9,590		8,820
Steel wire	5	6	kg	120	B	15	6	3	0	8	6	3	6	0	47 kg	5,640		5,040
Nail	c	2	kg		F	5	2	1	0	3	2	1	2	0	16 kg	0		0
Plastic rope	c	5	bundle	80	F	12	5	3	0	7	5	2	5	0	39 bundles	3,120		2,800
Seedling production - Cauliflower																		0
Plug tray; 98 holes	2	25	trays	40	B	60	25	13	0	33	25	10	25	0	191 trays	7,640		7,000
Cocopeat	c	1	block	200	B	3	1	1	0	2	1	1	1	0	10 blocks	2,000		1,400
Vermin compost	c				F													0
Seeds	c	1	pack	400	B	3	1	1	0	2	1	1	1	0	10 packs	4,000		2,800
Sub total																83,206		70,788
Tools (1 pc. for 1 farmer, not per 400m2)																		
Rake	5	1	pc	200	B	1	1	1	1	1	1	1	1	1	9 pc	1,800		1,800
Hand auger	10	1	pc	250	B	1	1	1	1	1	1	1	1	1	9 pc	2,250		2,250
Hammer	10	1	pc	100	B	1	1	1	1	1	1	1	1	1	9 pc	900		900
Plier	10	1	pc	200	B	1	1	1	1	1	1	1	1	1	9 pc	1,800		1,800
Plywood for standing-on	5	1	pc	200	T	1	1	1	1	1	1	1	1	1	9 pc	1,800		1,800
Sub total																8,550		8,550
Others																		
Mesh net (1m x 100m)/ 1 farmer	5	1	roll	1,500	T	no	no	no	no	no	no	no	no	no	no no	no		13,500
Fish net (2m x 200m) / 1 kanal	5	2	roll	600	T	5	2	1	0	3	2	1	2	0	16 rolls	9,600		0
sub total																9,600		13,500
Costs of consumable items	"c"	a														60,336		49,928
Costs of durable items																		
2 times use	"2"	b														3,820		3,500
5 times use	"5"	c														5,686		6,192
10 times use	"10"	d														495		495
Total Cost		a+b+c+d														70,337		60,115
Initial investment to be covered by BPM		**"B"**														**59,280**		**52,723**
Initial investment to be covered by TCP		**"T"**														**12,616**		**16,420**
Initial investment to be covered by Farmers		**"F"**														29,460		23,695
by 1 Farmer																3,273		2,633

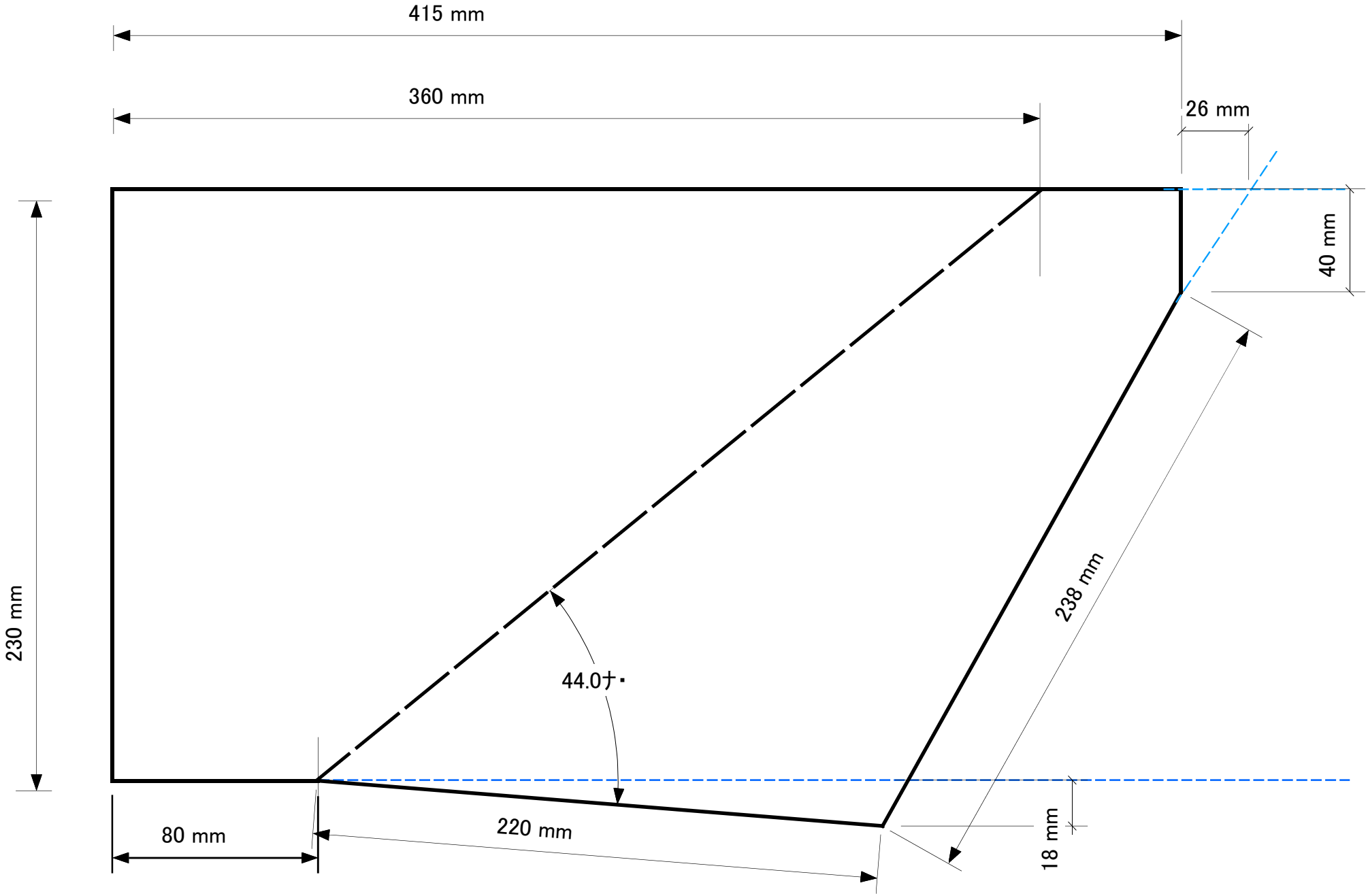
BPMU Bilaspur

Output-3
D-1(2)-5: Cucumber in Aug + Cauliflower in Oct
Material List procured by TCP

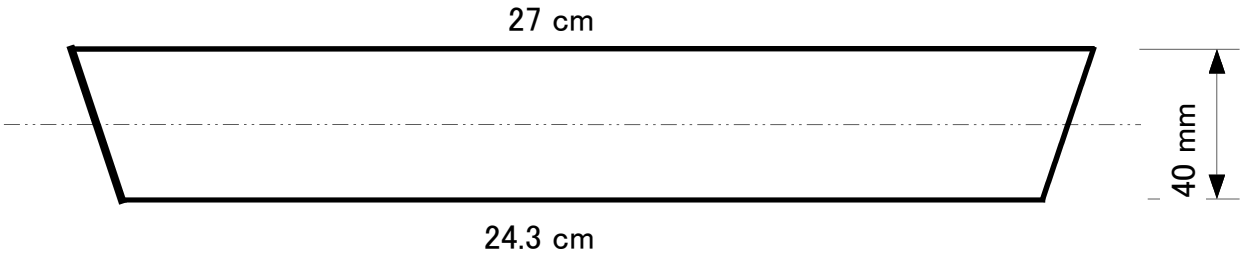
Discussed with farmers (FINAL)
20, March 2019
m2 (tentative) 4,656
kanal (approximate) 12.0
no. of farmers 7

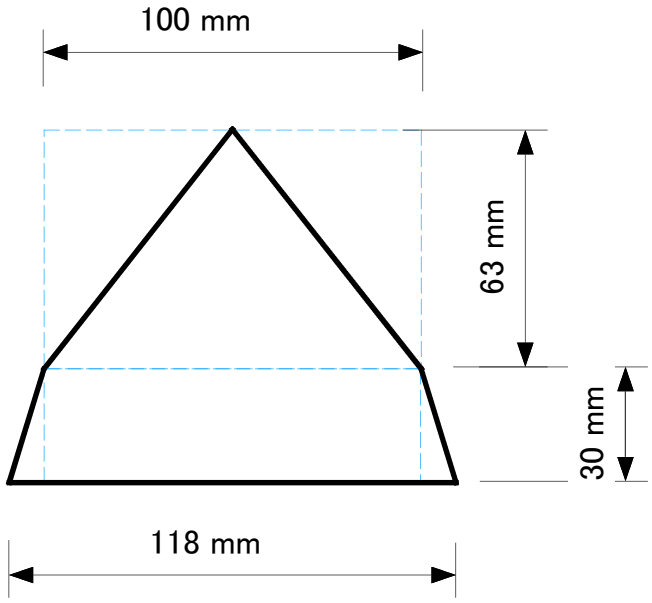
Items					Bilaspur													
					Who pay cost	Each Qty												
						Fagog		Chibber	Nalwar					Noa				
Item	Character	Qty/ kanal		Unit price (Rs)		Mehar Singh	Kamal Dev	Krishan Chand	Pawan kumar (President)	Babita Devi (Ms)	Ranjeet Singh	Daulat Ram	Rattan Lal	Dashoda Devi (Ms)	Total Qty	Total Cost (Actual)	Check for Procurement "✓"	Total Cost (Estimate)
					kanal	1.40	1.40	1.90	3.40	1.50	1.30	0.00	0.00	1.00				
Bed preparation																		
Mulching sheet	c	342	m	11	B	479	479	650	1,163	513	445	0	0	342	4,071 m	45,799		46,170
Fertilizer 12:32:16	c	9	kg	25	B	13	13	18	31	14	12	0	0	9	110 kg	2,750		2,700
FYM	c	1	truck	1,500	F	2	2	2	4	2	2	0	0	1	15 truck	22,500		18,000
Seedling production - Cucumber																		0
Plastic pot	c	400	pots	0	T	560	560	760	1,360	600	520	0	0	400	4,760 pots	1,904		1,920
Cocopeat	c	1	block	200	B	2	2	2	4	2	2	0	0	1	15 blocks	3,000		2,400
Vermin compost	c				F										0	0		0
Seeds (3 varieties)	c	1	pack	200	B	2	2	2	4	2	2	0	0	1	15 packs	3,000		2,400
Make vertical staking for cucumber																		0
Bamboo post	5	126	post	10	F	177	177	240	429	189	164	0	0	126	1,502 posts	15,020		15,120
Steel wire	5	6	kg	120	B	9	9	12	21	9	8	0	0	6	74 kg	8,880		8,640
Nail	c	2	kg		F	3	3	4	7	3	3	0	0	2	25 kg	0		0
Plastic rope	c	5	bundle	80	F	7	7	10	17	8	7	0	0	5	61 bundles	4,880		4,800
Seedling production - Cauliflower																		0
Plug tray; 98 holes	2	25	trays	40	B	35	35	48	85	38	33	0	0	25	299 trays	11,960		12,000
Cocopeat	c	1	block	200	B	2	2	2	4	2	2	0	0	1	15 blocks	3,000		2,400
Vermin compost	c				F										0	0		0
Seeds	c	1	pack	400	B	2	2	2	4	2	2	0	0	1	15 packs	6,000		4,800
Sub total																128,693		121,350
Tools (1 pc. for 1 farmer, not per 400m2)																		
Rake	5	1	pc	200	F	1	1	1	1	1	1	1	1	1	9 pc	1,800		1,400
Hand auger	10	1	pc	250	B	1	1	1	1	1	1	1	1	1	9 pc	2,250		1,750
Hammer	10	1	pc	100	F	1	1	1	1	1	1	1	1	1	9 pc	900		700
Plier	10	1	pc	200	B	1	1	1	1	1	1	1	1	1	9 pc	1,800		1,400
Plywood for standing-on	5	1	pc	200	T	1	1	1	1	1	1	1	1	1	9 pc	1,800		1,400
Sub total																8,550		6,650
Others																		
Mesh net (1m x 100m)/ 1 farmer	5	1	roll	1,500	T	no	no	no	no	no	no	no	no	no	no no	no		18,000
Fish net (2m x 200m) / 1 kanal	5	2	roll	600	T	3	3	4	7	3	3	0	0	2	24 rolls	14,280		0
sub total																14,280		18,000
Costs of consumable items	"c"	a														92,833		85,590
Costs of durable items																		
2 times use	"2"	b														5,980		6,000
5 times use	"5"	c														8,356		8,912
10 times use	"10"	d														495		385
Total Cost		a+b+c+d														107,664		100,887
Initial investment to be covered by BPM		**"B"**														**88,439**		**84,660**
Initial investment to be covered by TCP		**"T"**														**17,984**		**21,320**
Initial investment to be covered by Farmers		**"F"**														45,100		40,020
by 1 Farmer																5,011		5,717

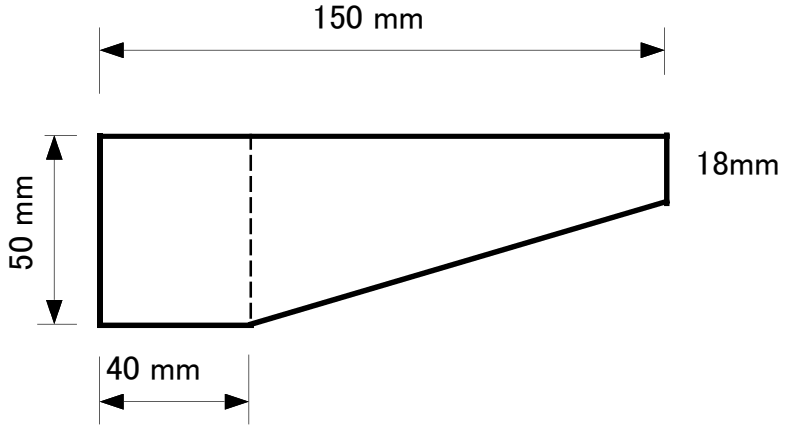
Model 2



Model 2







Promotion of vegetable production to sell at time of higher price (Time-shifted cultivation)

-Cucumber + Cauliflower-

Training for **Extension Officer** on Marketing Activity

Supported by TCP

October 2019

Attachment-2.4.19

Introduction of marketing activities supported by TCP

- Purpose of marketing activity

  To promote crop diversification, economical motivation, "getting profit by selling vegetables", is important for farmers.

  One simple key is to increase selling price of farmers. TCP have focused on this and planned some activities.

  Through conducting the activities, TCP expect to clarify which activity is effective for farmers in HP. "Effective" means that farmers can be motivated to cultivate more vegetables.

List of Activities Supported by TCP

	Category	Support for
A	Promotion of market-oriented production planning by farmers	• Planning by farmers on buyer, production and shipment
B	Promotion of direct sales to local consumers/ retailers	• Direct selling : - To consumers by use of mobile cart, permanent - type stall - To retailers through collection point - Pakchoy at target to Tibetan monastery - Cherry tomato at target to Buyer
C	Promotion of collective shipment to APMC market yard	• Linkage building with wholesalers in APMC Chandigarh
D	**Promotion of vegetable production aim to sell at time of higher price (Time-shifted cultivation)**	• Early okra & cucumber to be harvested in Apr-June • Coriander to be harvested in rainy season • Early cole crops to be harvested in Oct. • **Cucumber to be harvested in August & cauliflower in Oct.**
E	Verification of effects on value-adding	• Nil
F	Challenge to entry into niche/ particular market in the big city	• Linkage building with buyers in Delhi • Study on introducing exotic vege. In Nurpur

Attachment-2.4.19

D: Promotion of vegetable production aim to sell at time of higher price (Time-shifted cultivation)

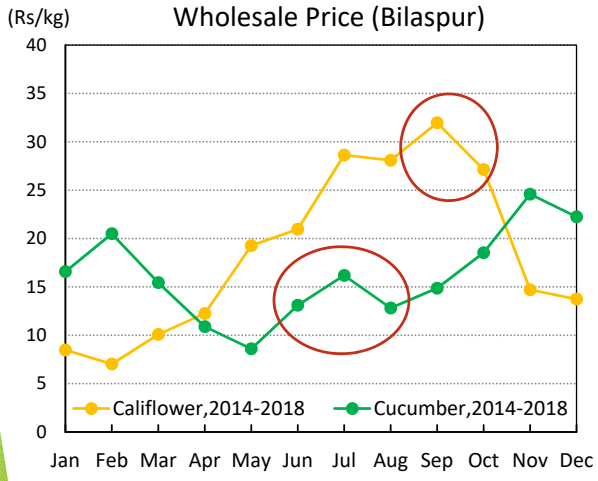
◆ **Trial for Time-shifted cultivation in 2019**
Cucumber to be harvested in August & cauliflower in Oct. at time of higher price

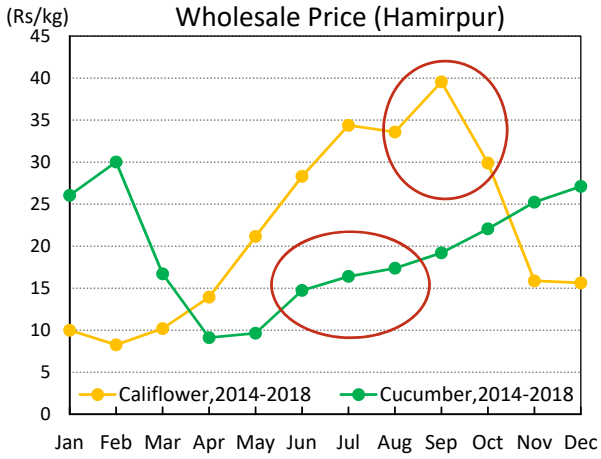
◆ **Sub-projects for trial (No. of farmers)**

- Hamirpur
  Manjru (2)
- Bilaspur
  Nalwar Kotlu (2)
  Noa (1)
  Fagog (2)
- Sarkaghat
  Ukhla (3)

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

- **Let's observe wholesale price on AGMARKNET**





Note: Average price from 2014 to 2018
Source: AGMARKNET

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

- ***When is the highest price of cauliflower?***
- ***When is good price of cucumber except period that cauliflower's price is the highest?***
- ***Why are those prices getting higher?***

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆Point

When the wholesale price is high, quantity of crops in local market is less, because …..

1) There are less inflow from other states.
2) It is difficult to cultivate crops in ordinary way in HP.

➢ There is chance to sell crops at the price as high as wholesale price, *If it is possible to cultivate and harvest crops at the HIGH-PRICE time…*

For harvesting and selling at target = HIGH-PRICE time, what kind of cropping schedule and techniques are required?

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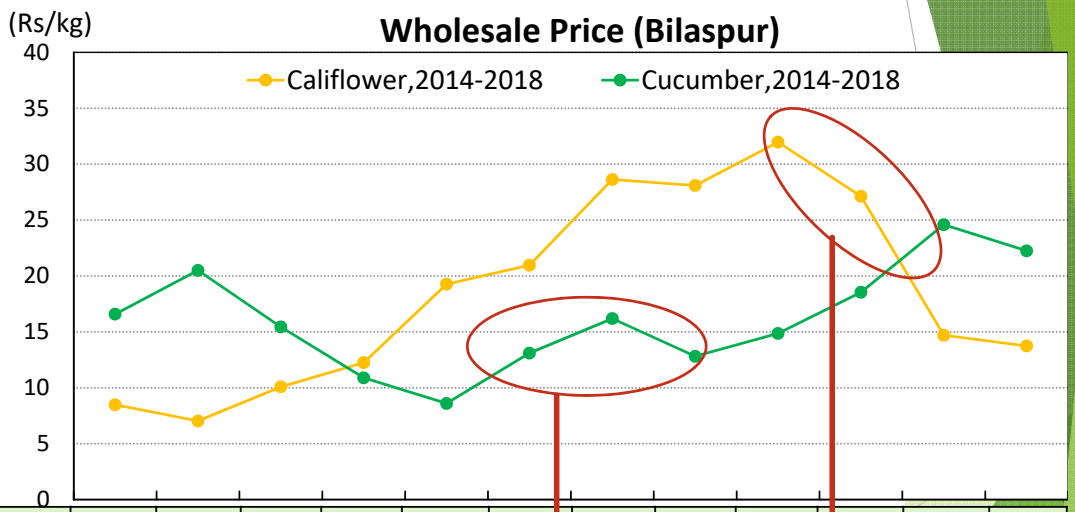
Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Cropping Schedule

➢ With price fluctuation



Cropping Schedule	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sowing		***Cucumber***						***Cauliflower***				
Transplanting												
Harvesting												

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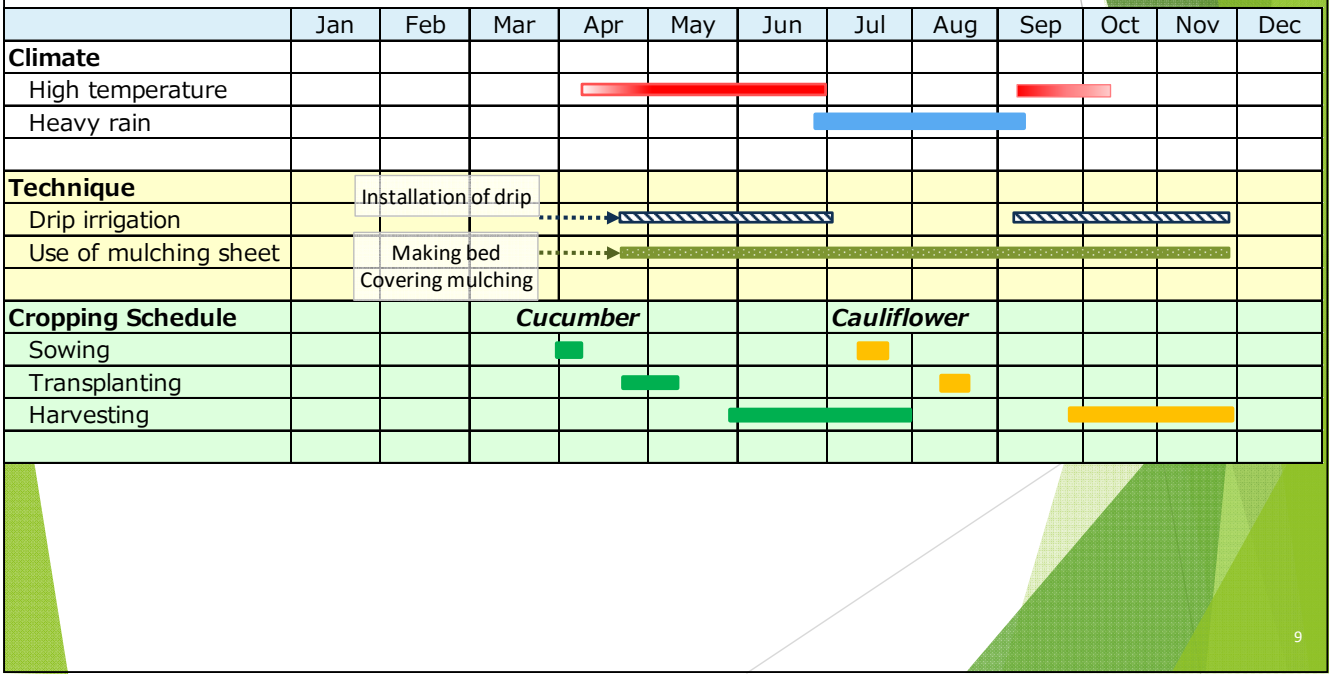
Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Cropping Schedule

- With climate condition in HP
- With mainly required techniques



Attachment-2.4.19

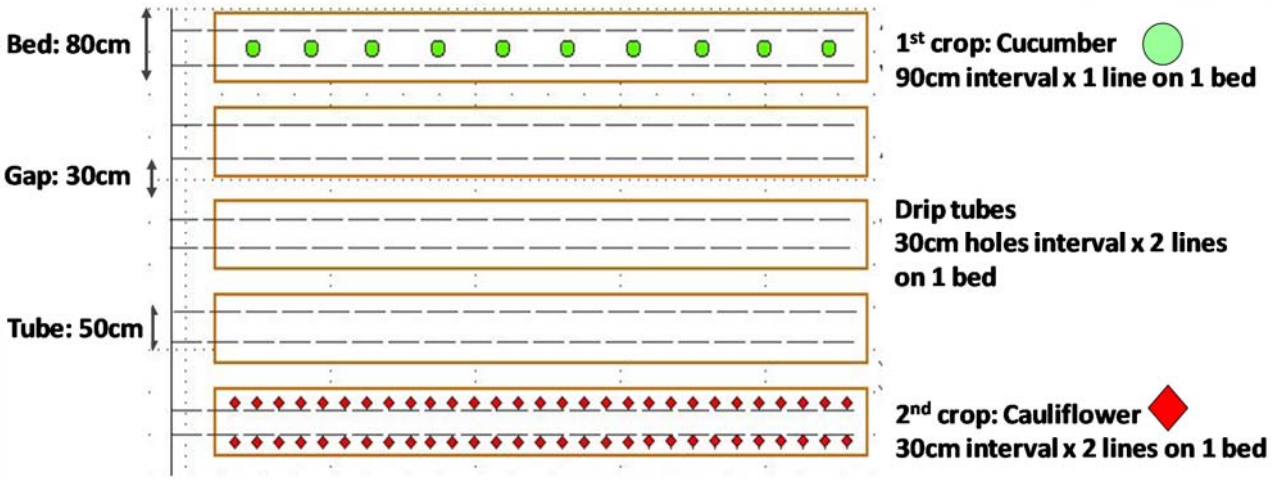
Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Techniques to be applied

Techniques	Effects to be expected
Mulching sheet	• Maintain shape of bed during rainy-season. • Prevent rain-washout of manure/fertilizer. • Prevent excessive soil moisture. • Reduce labour cost for weeding
Bed preparation by use of tiller	• Reduce labour cost for making bed.
Application of FYM	• Improve field soil.
Application of insecticide	• Prevent insect's attack and keep healthy growth of plants.
Vertical training by use of bamboo	• Keep healthy growth of cucumber.
Seedling production with plug-tray or plastic pot	• Minimize roots damage at transplanting.
Drip irrigation	• Supply water efficiently and easily during period except rainy season.

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆Field Design



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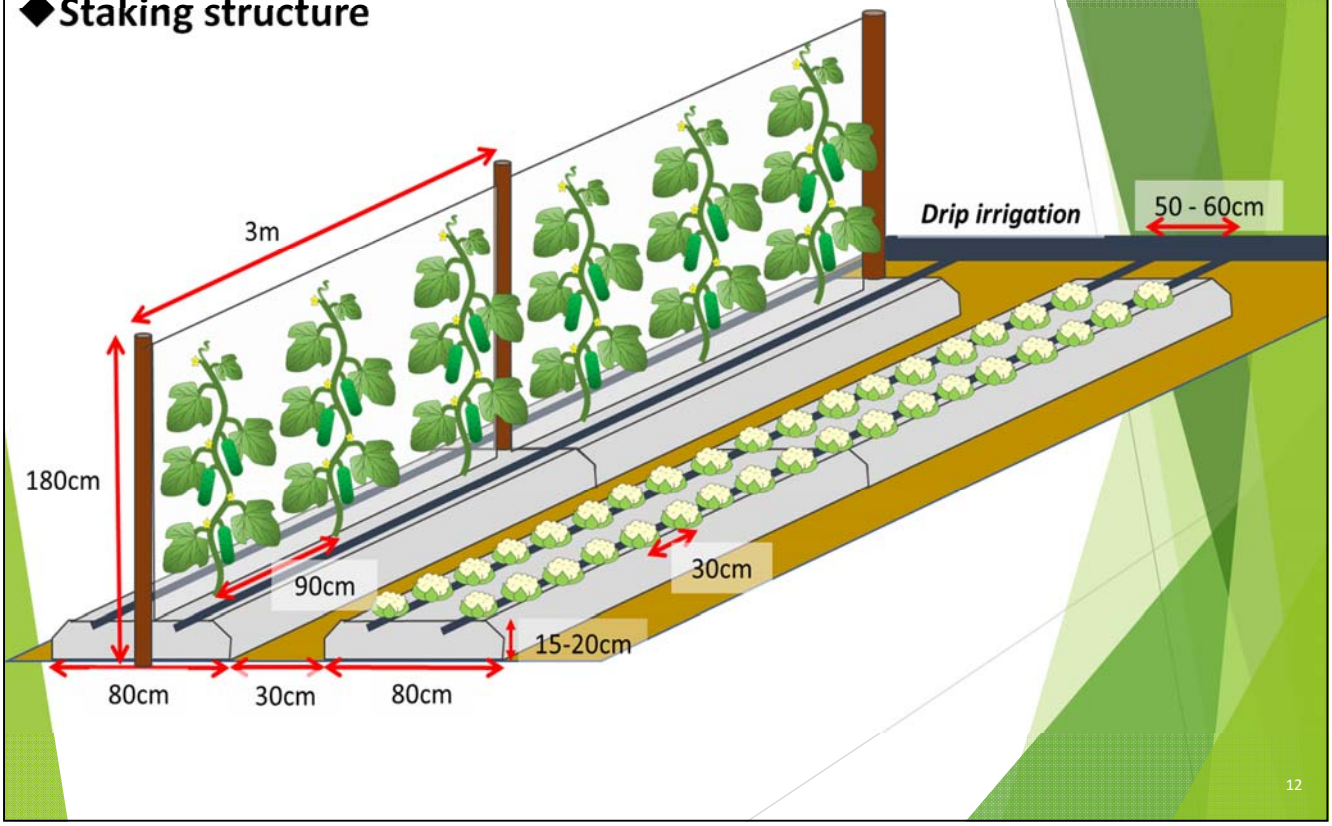
Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆Staking structure



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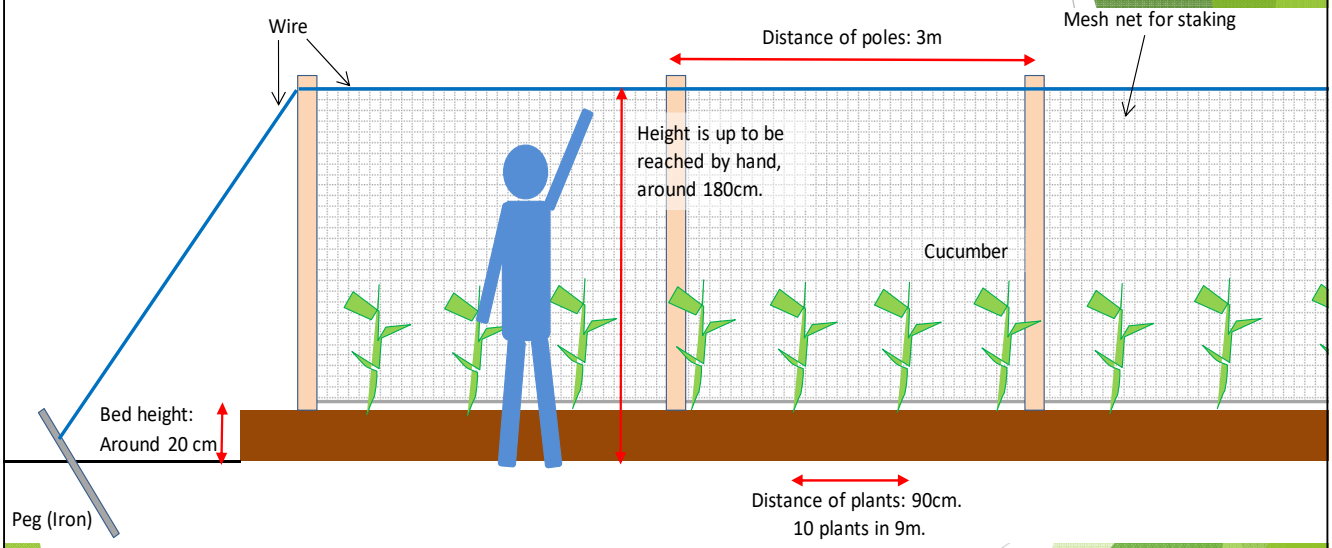
Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆Staking structure



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Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Cost for Cucumber per 1 kanal

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal
Bed preparation	Mulching sheet	342	m	7	Rs/m	2	1,197
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225
	FYM	1	truck	1500	Rs/truck	2	750
Seedling production	Plastic pot	400	pots	0.40	Rs/pot	1	160
	Cocopeat	1	block	150	Rs/block	1	150
	Seed of cucumber	1	pack	200	Rs/pack	1	200
Staking materials	Bamboo post	126	post	10	Rs/pot	4	315
	Steel wire	6	kg	100	Rs/kg	4	150
	Plastic rope	5	bundle	80	Rs/bundle	1	400
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250
	Insecticide	1	package	250	Rs/pack	1	250
Labour cost	Bed preparation + mulching	4	Person/day	400	Rs/day	2	800
	Nursery raising	1	Person/day	400	Rs/day	1	400
	Intercultural operations	4	Person/day	400	Rs/day	1	1,600
	Harvesting	40	Person/h/day	50	Rs/h	1	2,000
						Total cost/ kanal	**8,847**

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Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Cost for Cauliflower per 1 kanal

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal
Bed preparation	Mulching sheet	342	m	7	Rs/m	2	1,197
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225
	FYM	1	truck	1500	Rs/truck	2	750
Seedling production	Plug tray	22	pots	35	Rs/pot	1	193
	Cocopeat	1	block	150	Rs/block	1	150
	Seed of cauliflower	1	pack	400	Rs/pack	1	400
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250
	Insecticide	1	package	250	Rs/pack	1	250
Labour cost	Bed preparation + mulching	4	Person/day	400	Rs/day	2	800
	Nursery raising	1	Person/day	400	Rs/day	1	400
	Intercultural operations	4	Person/day	400	Rs/day	1	1,600
	Harvesting	40	Person/h/day	50	Rs/h	1	1,500
					Total cost/ kanal		**7,715**

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Procedure of Activity

0. Installation of drips

Finished by Service Provider arranged by BPMU, before transplanting

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

1. Bed making

1) Plow well

2) Measure length of bed

3) Put tape on field

4) Draw line for making ridge

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

1. Bed making

5) Put edge of ridger on the line, and go straitly

Modified model of ridger: easy to make bed

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

1. Bed making

6) Level bed well

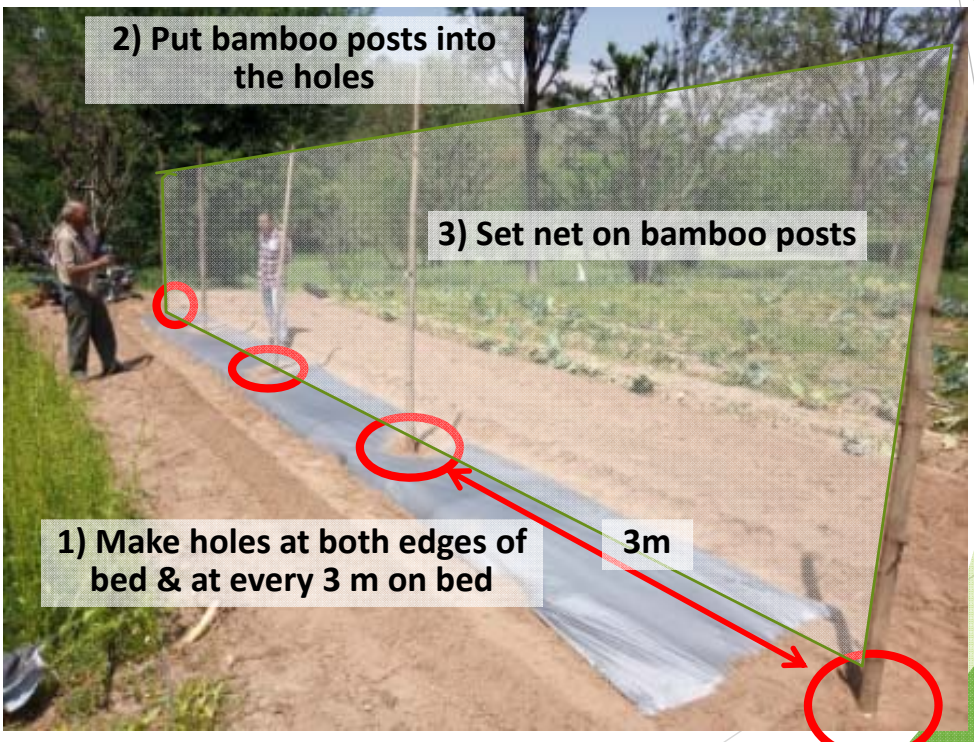
7) Covered by mulching sheet

8) Finalize making bed

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

2. Staking



Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

3. Cultivation of **Cucumber**

1) Preparation of media

2)-1 Sowing to poly pot

2)-2 Sowing to plug tray

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

3) Transplanting

4) Cultivation

5) Harvesting

6) Sales record

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

4. Cultivation of **Cauliflower**

1) Preparation of media

2) Sowing

3) Transplanting

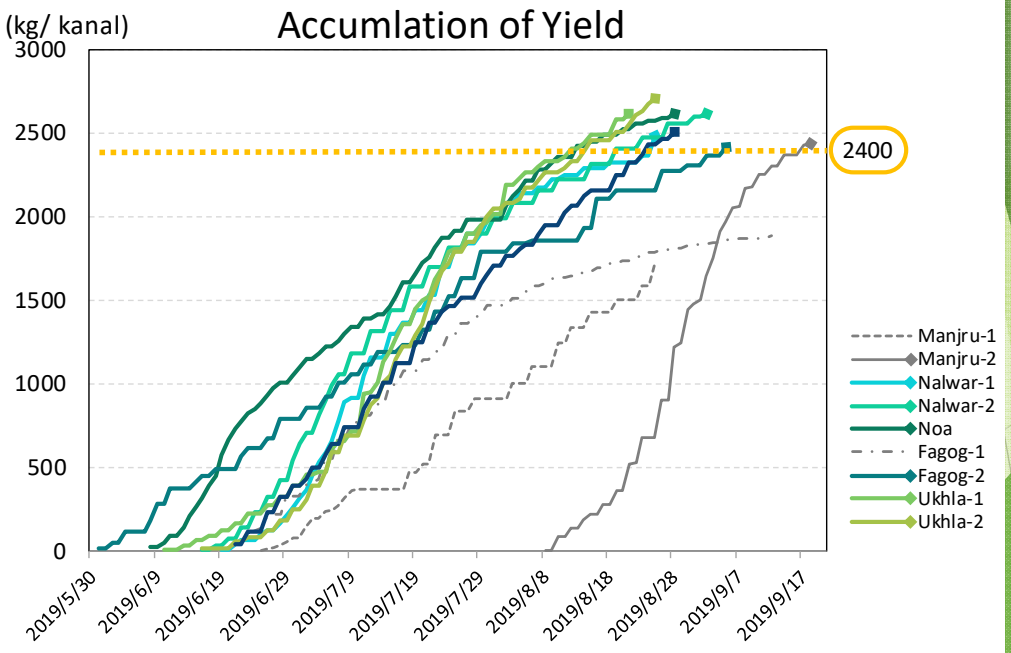
4) Harvesting

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Result of 2019-Trial (Cucumber)

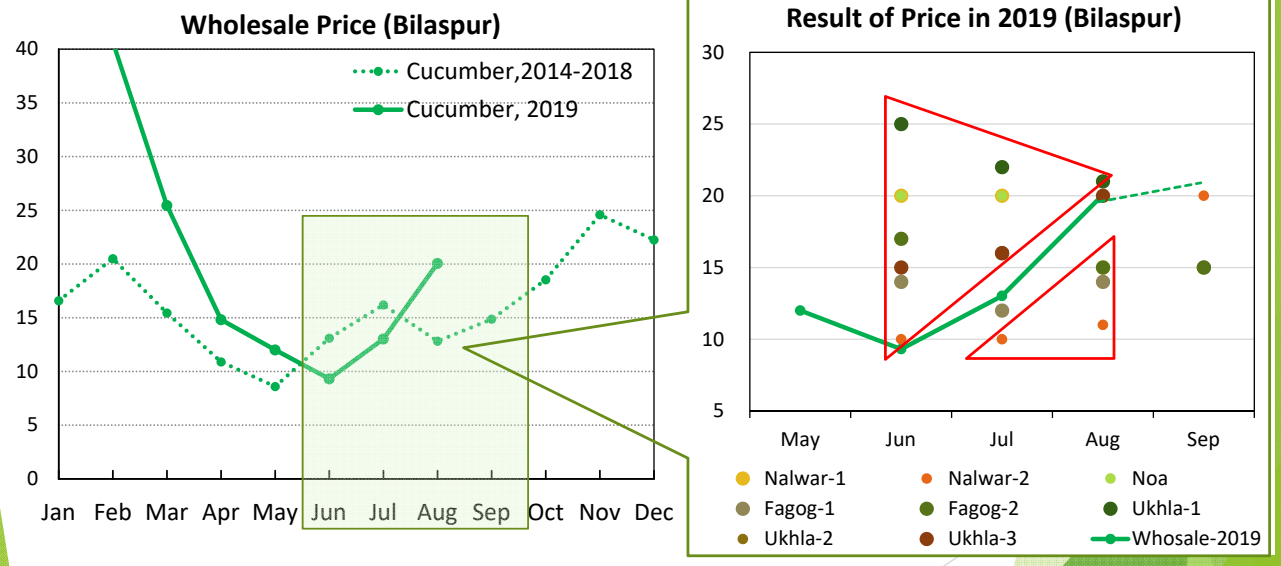
1. Yield



Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Result of 2019-Trial (Cucumber)

2. Price @Bilaspur



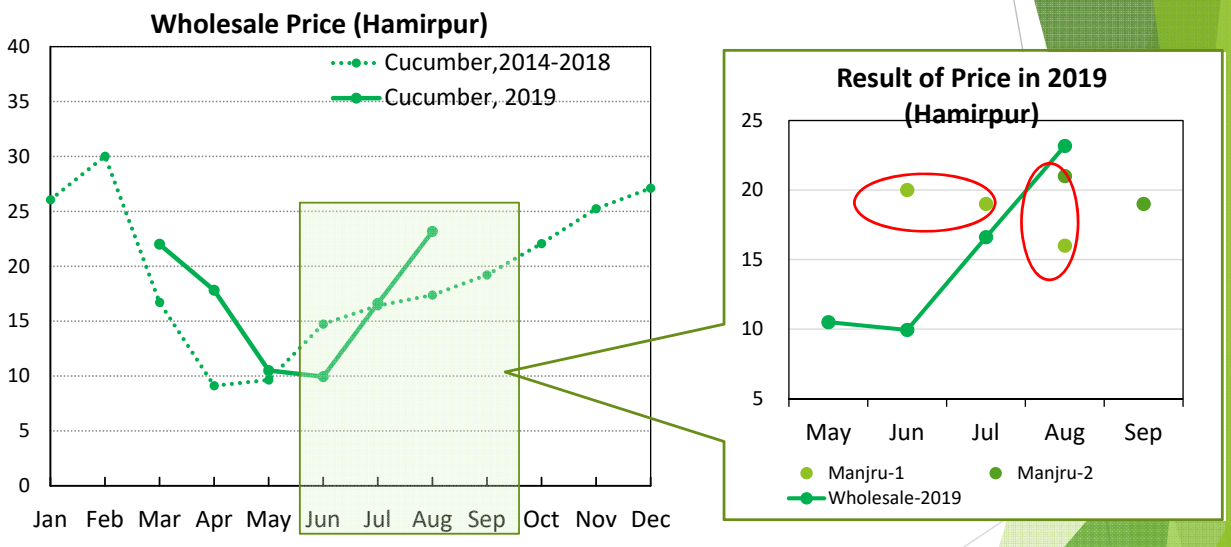
Upper than wholesale price: Direct selling to consumers
Lower than wholesale price: Selling to retailers nearby village

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Result of 2019-Trial (Cucumber)

2. Price @Hamirpur



Upper than wholesale price: Direct selling to consumers
Lower than wholesale price: Selling to retailers nearby village

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Result of 2019-Trial (Cucumber)

3. Profit

BPMU	Hamirpur		Bilaspur					Sarkaghat		
Sub-project	Manjru		Nalwar Kotlu		Noa	Fagog		Ukhla		
Farmer No.	1	2	1	2	1	1	2	1	2	3
Field size (m2)	200	200	300	900	200	500	150	150	150	200
Average price (Rs/kg)	18	20	20	11	20	14	16	23	17	18
Total yield (kg)	855	1,217	1,860	5,893	1,306	2,357	942	983	1,016	1,255
Total sale (Rs)	14,745	23,885	35,075	60,230	25,820	30,422	17,333	21,285	16,866	21,520
Yield/ kanal	1,710	2,434	2,480	2,619	2,612	1,886	2,512	2,621	2,709	2,510
Sale/ kanal	29,490	47,770	46,767	26,769	51,640	24,338	46,221	56,760	44,976	43,040
Cost/ kanal	10,397	10,397	10,397	10,397	10,397	10,397	10,397	10,397	10,397	10,397
Profit/ kanal	19,093	37,373	36,370	16,372	41,243	13,941	35,824	46,363	34,579	32,643
How to sell:	1, 2	1	1	2	1	2	2	1	2	2

1. direct selling to consumer
2. Selling to retailer

- ✓ Not only direct selling, but also selling to retailer at lower price, farmer can get profit due to good cost performance (Cost Rs. 10,397/kanal)
- ✓ Especially, even if price is not so high, when farmer can harvest more than 2400kg/kanal, profit will reach more than Rs. 32,000/kanal.

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Results of 2019-Trial (Cucumber)

Cost	• Around Rs. 8,900/ kanal
Yield	• More than 2,400kg/ kanal
Price	• Direct selling can higher than wholesale price, average Rs.20/kg • Selling to retailer: same or lower
Profit	• Reasonable cost, enough yield and good / not bad price can make profit of more than Rs. 32,000/ kanal
Techniques	• Mulching sheet, drip irrigation, staking structure and other techniques are effective.
	• Two varieties “Saira” or “SW224” have resistance to diseases during rainy season.
Farmer’s mind	• Very motivated. • Getting to consider about next season (kind of crops, field size, schedule, how to sell). • Generating marketing mind.

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆Expected results

Cucumber harvested in June - August
Cauliflower harvested in October - November

Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆**Cucumber** harvested in June – August

Cost	• Rs. 8,900/ kanal **It is amount in case that farmer will pay all expenditure by yourself.*
Yield	• More than **2,400 kg/ kanal**
Price	• **Rs.20 – 15 /kg** by Direct selling: higher than wholesale price • Same or lower price by Selling to retailer
Profit (net)	• More than **Rs. 34,000/ kanal**

Note: All the data are based on result of 2019-trial

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆Early Cauliflower harvested in October - November

Cost	• Rs. 7800/ kanal **It is amount in case that farmer will pay all expenditure by yourself.*
Yield	• **1,200 kg/ kanal** **Estimate with proper management of cultivation*
Price	• **Rs. 40/kg in beginning of Oct.** **Rs. 25/kg in mid of Oct.** **Rs. 15/kg in end of Nov.** by Direct selling can higher than wholesale price • Same or lower price by Selling to retailer
Profit (net)	• **Rs. 24,000/ kanal**

Note: Price is based on result of 2018-trial. Yield and Profit are estimate.

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Attachment-2.4.19

Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆ Impact of Trial (Cucumber)

TCP is supporting 5 sub-projects in Hamirpur, Bilaspur and Sarkaghat.

In addition, other sub-projects and persons have been interested in this trial, and they are doing *by themselves.*

- Guriah, Hamirpur
- Khannot, Sarkagaht
- DPM Hamirpur, ADO Sarkaghat

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Time-shifted cultivation:
Cucumber to be harvested in August & cauliflower in Oct.
at time of higher price

◆In 2020…..

We, TCP expect this activity will be continued and expanded more by BPMUs in 2020.

If you have interest in this activity,
please discuss with BPM and inform TCP.

Thank you!!

Plan for Study on introducing exotic vegetables production in sub-project(s) in Nurpur

This paper is prepared by TCP team to propose BPMU Nurpur a launching of new activity.
TCP team believes that our proposal is in line with on-going efforts of BPMU to promote exotic vegetable.

Back ground

As per described in Annex

Aim of the Study:

Study a possibility to sell exotic vegetables to GREEN LEAF and identify traders who market vegetables to McLeod Ganj / Dharmsala.

Understand the trader's demand and required conditions to do business with them. Then, based on the current technical ability of farmers to grow vegetables, make a realistic plan for how to introduce exotic vegetables production in sub-project(s) in Nurpur.

Study and making a plan are to be carried out together with BPMU; as OJT for BPMU staff.

Reason to target Green Leaf or traders (Marketing strategy):

There is Green Leaf (opportunity) who comes to collect each farmer's house if produce is more than 60-70kg. Whereas it is hard to expect the restaurants in McLeod Ganj come to farmer's house.

Farmers prefer easier way to sell their produce, and cumbersome delivery work can be an obstacle to challenge/continue the production. Therefore, possibility to sell to Green Leaf should be studied prior to (or in parallel) plan/work on a sale to restaurants.

It may be risky to totally dependent on GL's demand. At present time, names & contacts of traders who market vegetables to McLeod Ganj / Dharmsala are not in our hands. Therefore, a trader(s) who can come to villages; who can buy even small quantity should be identified.

STAGE 1 : Study the possibility to sell exotic vegetables to GREEN LEAF and identify potential buyers (traders)

★Target time to complete the WORKs of STAGE 1 = Before 15 Dec.

(1) WORK 1 : Collect information

1) From the farmers in Minjh Gram / BPMU Nurpur ➔➔ ***Almost done on 25 Oct. 2018***

- Items/volume/month to sell (sold) to GREEN LEAF
- Details of deal with GREEN LEAF - Price setting, payment method, packing & delivery method, quality requirements/inspection, etc.
- Contact of GREEN LEAF
- Problems faced in the business with GREEN LEAF

2) From GREEN LEAF

- Current state of procurement of exotic vegetables - Items, Volume, Season, Sources, etc.
- Shortage items and its time
- Can you buy vegetables from new farmers? What is your conditions for new farmers?
- Details of deal with farmers (* To double-check the information given by Minji Gram farmer)
- Future plan of business expansion/procurement

Note: Even if GREEN LEAF can't buy exotic vegetables, try to get information of other traders who market vegetables to McLeod Ganj / Dharmsala; who buy exotic vegetables.

3) From/at APMC Kangra

Find traders who market exotic vegetables to McLeod Ganj / Dharmsala, and get information of their demand/requirements.

Display and/or pass out leaflets (A4 or A5 or B5 size) in APMC which says that;

(Example)

Farmers in Nurpur look for buyers of exotic vegetables. Production will start soon. Trader who can come to villages to buy fresh produce is desired. In addition, farmers will try to produce vegetables based on your request/demand. If you are interested in, please contact to: Mr. xxxxxxxxxx (12345-67890) BPMU Nurpur

Explain to the Secretary APMC Kangra to get permission to do it.

Inquire of the Secretary APMC Palampur -- "Are there traders who buy exotic vegetables at APMC Palampur and sell them at McLeod Ganj / Dharmsala?" If yes, do this method at APMC Palampur, too.

When get a phone call from trader, get following information.

Potential buyer data sheet

Date received phone call		Serial No.	
Name		Contact	
1. Can he come to villages in ????? area to buy vegetables ?		Yes	No
2. He sells vegetables to: * make sure he does not sell at APMC		Retailers	Restaurants
		Others (	

3. He sells vegetables at:				McLeod Ganj		Dharmsala	
				Other place (			
4. He sells exotic vegetables				Yes, always		Yes, sometimes	
(Experience in exotic vegetables deals)				No, not yet			
5. Items he want to buy:							
Item	Kg	Order	Top 3	Item	Kg	Order	Top 3
Lettuce (head)				Capsicum			
Lettuce (leaf)				Cherry tomato			
Broccoli				Zucchini			
Pakchoi				Squash			
Chinese cabbage							
Celery							
6. Minimum volume (in total) to come to village							
7. Particular conditions to buy (other than minimum volume), e.g. cleaning/packing/payment/etc.							
8. Type of vehicle(s) he use	Bolero			Small elephant (Chota Hati)		3-wheel	
	Other type (						
Memo							

Questions to ask:

2. Do you sell vegetables to retailers or restaurants ? Or both? (Question to reject trader who sell at AMPC)
3. Are those retailers/restaurants in McLeod Ganj or Dharmsala? Or in other place?
4. Do you already sell exotic vegetables to those retailers/restaurants?
   When did you started a trade of exotic vegetables ?
5-1. What items do you want to buy? How many Kg each at one time?
   * Record the order of items he mentioned.
5-2. Which item do you want most ? First / Second / Third (Top 3)
   Which item is now in high demand ? First / Second / Third (Top 3)
6. You said that you can come to village. As you know harvest volume changes, sometime it can be very limited. How many Kg is minimum volume for you to come to village?
7. Do you have any particular conditions to buy from farmers other than minimum volume?

4) Quick survey of sub-projects near Dharmsala or on the route to Dharmsala

TCP team shall make quick visits to sub-projects at every chance when team visits GREEN LEAF, AMPC Kangra and BPMU Nurpur. TCP team shall consult the BPMU to select the sub-projects for quick survey.

It is said that farmers' willingness to do farming is low in sub-projects near Dharmsala since farmers are not dependent on farm income. Avoid such sub-projects for quick survey.
It is preferable that sub-projects for quick survey are on the route to Dharmsala from Kangra town.

Prepare a brief report shows current state of vegetable production and your opinion (judgment) on farmers' willingness to challenge an exotic vegetable production.

(2) WORK 2 : Review the collected information and clarify demand for exotic vegetables
Discuss by BPMU/TCP to judge the possibility to sell exotic vegetables to Green Leaf.
Analyze the potential buyer data sheets to generalize (modeling) the demand & requirement of traders.
If necessary, make a call to Green Leaf / traders for further inquiry.

Prepare a report covers following contents.

1-1. Demand & requirement of Green Leaf
- Items at shortfall of supply
- Quantity demanded
- Time of shortfall
- Requirement to do business with Green Leaf

1-2. Conclusion & Suggestion

2-1. A model (typical case) of demand & requirement of traders
- Items & its quantity
- Minimum volume (in total) to come to village
- Requirement to do business with traders

2-2. Suggestion

STAGE 2 : Plan how to introduce exotic vegetables production in sub-project(s) in Nurpur

★Target time to start & finish the STAGE 2 = Start in middle of Jan 2019, finish in middle of Feb.

(1) Base on the result of WORK 2, draw up a draft plan. Conduct site survey to confirm the current state in the sub-projects collaterally.

A plan shall covers following contents.
- Target buyer (s) include the detail description of buyer's requirements
- Production plan: items, volume, harvest time (cropping calendar), necessary field area
- Cultivation method of each item: method of watering/seeding/spacing/weeding/pest control/etc.
- Postharvest handling plan: method of cleaning/sorting/ packing/delivery/etc.
- Skills and equipment/materials/tools newly required to realize above production plan and postharvest handling plan.
- On-site training plan; include the necessity to prepare new training materials
- In-kind support plan: items & specification, quantity, deadline of provision, prices, total cost
- Overall time schedule in Gantt chart
- Implementation strategy based on the limitation of BPMU/TCP - manpower, budget

- Candidate sub-project(s) include the reasons for selection by BPMU
- Demarcation of works/costs between BPMU and TCP

* Production plan shall be varied in accordance with farmer's skill level and available resources such as land/labour/equipment/tools/etc.
  Before starting a planning, try to define types of vegetable farming by degree of commercialization and categorize the sub-projects. Then, decide which type to target.
  If current situations are similar in all sub-projects, categorization is no necessary.
  Work with BMPU staff who best informed person about the sub-projects and farmers.

* Cropping system (land-use plan) for a whole year should be prepared; considering the price trends, climate conditions, available materials, applicable technique and etc. Several cropping systems (production plans) can be prepared. Cropping system must be a combination of exotic and ordinary vegetables.

* Method of collection, transporting shall be planned after determining the sub-project(s)-cum-farmers through discussion with farmers. If group work is essential / If farmers have to deliver produce.

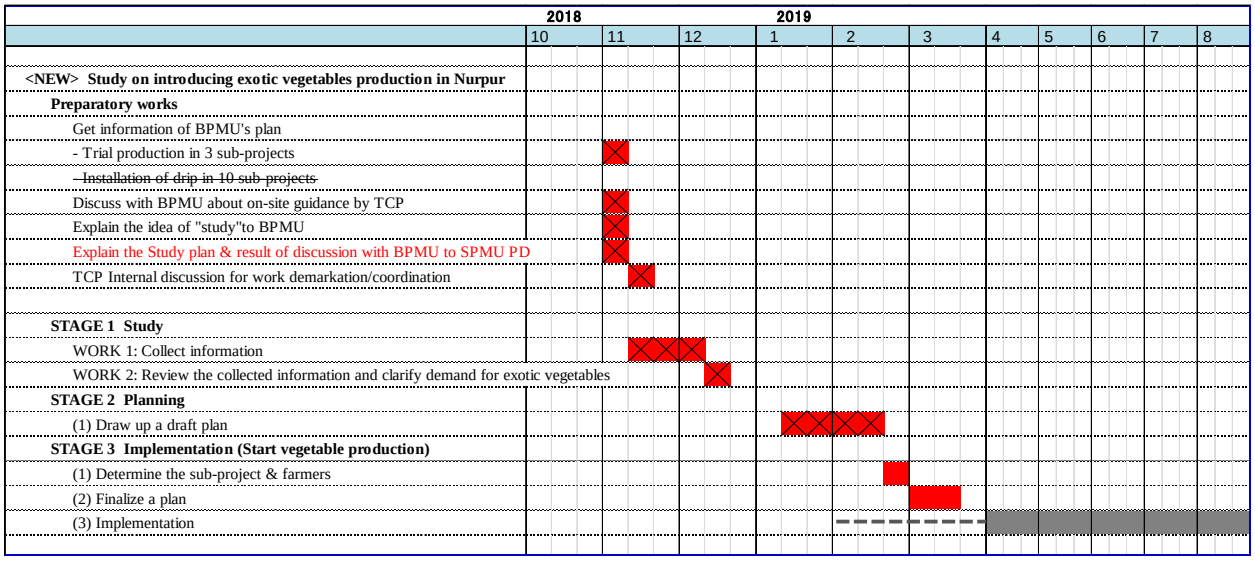
------ End of the Study ----------

STAGE 3 : Implementation

(1) Determine the sub-project(s)-cum-farmers
  1) Explain/discussion with farmers by BPMU/TCP
  2) Determination by BPMU/TCP

(2) Finalize a plan
  Based on farmers' comments, review and modify the draft plan to fit the actual conditions of selected sites.

(3) Implementation of plan
  * Note:
  Since the target time to finish making a draft plan (STAGE 2) is middle of Feb., implementation (start growing vegetable) starts in March at the earliest. However, it is too late for most of exotic vegetables.
  Therefore, production of easiest and short-duration exotic vegetable such as Pakchoi may be started in early Feb. in a small scale, if BPMU/TCP identifies the highly promising candidate sub-project(s)-cum-farmers before end of January 2019.
  Or, start production in March with ordinary vegetables.


2018
2019
10
11
12
1
2
3
4
5
6
7
8
<NEW> Study on introducing exotic vegetables production in Nurpur
Preparatory works
Get information of BPMU's plan
- Trial production in 3 sub-projects
--Installation of drip in 10 sub projects
Discuss with BPMU about on-site guidance by TCP
Explain the idea of "study"to BPMU
Explain the Study plan & result of discussion with BPMU to SPMU PD
TCP Internal discussion for work demarkation/coordination
STAGE 1 Study
WORK 1: Collect information
WORK 2: Review the collected information and clarify demand for exotic vegetables
STAGE 2 Planning
(1) Draw up a draft plan
STAGE 3 Implementation (Start vegetable production)
(1) Determine the sub-project & farmers
(2) Finalize a plan
(3) Implementation

//end

Study on introducing exotic vegetables production in sub-project(s) in Nurpur

Annex

Back ground

TCP team visited the farmer in Minji Gram who sells vegetables to Green Leaf on 25-Oct to look for a key to promote vegetable production in Nurpur; with an idea to increase number of farmers sell to Green Leaf. By chance TCP team was informed that BPMU has started a trial production in 3 sub-projects including Minji Gram.

1. Information given on 12 Sep. 2017

Some (2-4) farmers in Minjh Gram produce vegetables to sell to GREEN LEAF who markets vegetables to McLeod Ganj. 60-70 farmers in 10 villages provide vegetables to GREEN LEAF.

2. Information collected on 25 Oct. 2018 from the farmer - Mr. Anil Saini 97361-46865

Current situation of vegetables sales to GREEN LEAF in Minjh Gram

Now only 1 farmer (Mr. Anil Saini, who own project poly-house) sell vegetables to GREEN LEAF. Outline of deal is as follows;

- He started selling vegetables to GL before the project started. There is no written contract.
- He informs (offers) available items and volume to GL 2 days before harvesting. Volume is set in this time.
- Price setting : Retail price in Kangra area minus 5 - 10 Rs/kg discount.
- Delivery : GL comes to collect; if more than 60-70kg in total.
- Packing : No packing by him; he keeps vegetables in creates. GL comes with her crates.
- Quality check by GL : GL check one by one. He considers GL's check is reasonable. Since he knows GL's quality requirement, he supply only OK ones.
- Payment : < *Forgot to ask* >
- His items to sell to GL

  Main items: Cabbage, Broccoli, Cauliflower,

  Sub items: Spinach, Radish, Cucumber, Tomato, Squash

Why other farmers in the village do not deal with GL? ➔ No answer

Number of farmers who supply vegetables to GL

It is guessed that about 40 farmers in the surrounding area.

Contact of Green Leaf

Mr. Ashish 70181-62362

Office is in McLeod Ganj (location in unknown, Mr. Anil Saini has never visited)

Demand of GREEN LEAF based on Mr. Anil Saini's experiences

GL's demand is stable, but there is limitation in buying volume (in each item).

GL's demand is stable, but there is period he (farmers) cannot supply enough.

He said that GL buy only organic. But he uses chemicals & no record of chemical usage. GL may be a buyer somewhat concerned about food-safety.

Demand of exotic vegetables:

- GL's seeks Lettuce, Broccoli, Zucchini
- Demand of Pakchoi, Chinese cabbage must be small (Mr. Anil Saini is not very sure, because he has never grown & sold them to GL)

- Tomato is always demanded.

How to start business with GL ? (Hearing from Mr. Anil Saini)

Farmer proposes a deal to GL. GL selects farmers. There is no rule on field size/farming scale.

3. Information collected on 25 Oct. 2018 from BPMU AEO - Mr. Opinder Guleria 82192-38850

BPMU has just started a trial production of exotic vegetables in 3 sub-projects

BPMU has started a trial production in three (3) sub-projects; Minji Gram, Dari and Chateri.

In case of Minji Gram, BPMU works with one (1) farmer (Mr. Anil Saini who owns project poly-house & sells to GL); to grow Chinese cabbage, Pakchoi, Lettuce (head), Broccoli; in total of 1.5 - 2.0 kanal.

At this time, above kinds of vegetables were transplanted in the field of about 120 - 150m2 with black-color mulch. And more seedlings are in poly-house.

Photos at Minji Gram on 25 Oct. 2018

Lettuce

Chinese cabbage

Pakchoi

Pakchoi

Output-2 made a demonstration of nursery raising (cole crops) in Minji Gram in about 1 month ago. Both of BPMU staff and Minji Gram farmer (Mr. Anil Saini) are first time to grow these crops. As it is seen in above photos, spacing is wrong; all same spacing for Lettuce, Chinese cabbage and Pakchoi.

No information has been obtained about current state of the trial in Dari and Chateri.

BPMU's idea for selling:

Plan/idea of BPMU (Agriculture Expert) on "how to sell small volume of produce to restaurants" and "what kinds of support BPMU will provide to farmers" are not known yet.

It was explained by BPMU staff that this trial is initiated by BPMU Agriculture Expert (Mr. Mridul Thakur 70182-76367) who participated the market survey on restaurant demand of exotic vegetables in McLeod Ganj (5 restaurants were surveyed) conducted in July 23, 2018 by TCP Output-2; based on the findings in this survey. And the trial targets to sell produce to those restaurants and BPMU will work to make a linkage between the farmers and the restaurants.

Following points should be planned and prepared with farmers in advance to realize a deal with restaurants.

- Are those restaurants buy even a small volume ? << Principle question >>
- Method of commodification based on the requirement of buyer -- cleaning / sorting / etc.
- Method of packing to meet buyer's requirement / to keep freshness / to protect produce, and how to get packing materials ?
- Delivery method to McLeod Ganj by farmer : motorcycle or bus ?
- Method of price setting and payment

//end

Results of the Study on introducing exotic vegetables production in sub-projects in Nurpur [F-1-2]

(1) STAGE 1: Study the possibility to sell exotic vegetables to GREEN LEAF (GL) and identify potential buyers (traders)

Field survey was conducted in Nov.- Dec. 2018. Review of collected information in the field survey was carried out in Jan. 2019. In addition, collection of supplemental information was continued in Feb. and March 2019.

Surveyed places / informant

Date	Place/ informant	Purpose
21st Nov. 2018	• Person in charge in APMC sub-yard, Dharamshala • Farmers selling exotic vegetables • Restaurants in Mcleod Ganj	• Collection of information of trading situation of exotic vegetables around Dharamshala, Nurpur
5th Dec. 2018	• BPMU Nurpur, GL • Tibetan monastery	• Collection of information of GL's business on collecting, shipping and selling vegetables • Interview to monastery on demand of Tibetan monastery (kind of exotic vegetables and high demanding season)
21st Jan. 2019	• Secretary, APMC Kangra • Traders at APMC Kangra	• Collection of information of trading situation of exotic vegetables at area of Kangra
14th Mar. 2019	• GL	• Collection of detail information of GL's business on collecting, shipping and selling vegetables (demand of quantity, price, season, quality) • Possibility to collaborate with cultivation trial of exotic vegetables at sub-projects under TCP activity

Result of Stage 1

Findings:

- None of the trader comes to APMC Dharmsala sub-yard deal with exotic vegetables. No traders who sell exotic vegetables to retailers/restaurants at McLeod Ganji have been identified in the field survey.
- Retailers at McLeod Ganji buy vegetables directly from farmers. Restaurants at McLeod Ganji buy vegetables from retailers, not from traders come from APMC/outside.
- Demand of exotic vegetables is high in McLeod Ganj during March to October.
- Tibetan monasteries buy vegetables from trader-cum-farmers. Buying price is not favorable in main season. Demand increase from March to September.

- Green Leaf (GL) had no intension to increase her vegetable suppliers (farmers; about 200 in Shahpur and Dharamshala block) because supply was sufficient (as of January 2019). However, in February, BPMU Nurpur has got news that Green Leaf may buy exotic vegetables from sub-project(s).
- GL has her own direct selling system. GL sell vegetables directly to consumers at 10 locations nearby McLeod Ganj. Main customers are likely European / American. GL inform customers about available vegetables by SMS and then customers send his/her request. Delivery takes place 2 times per week.

Conclusions (As of January 2019):

- Newcomer has to market his produce directly to retailer/ restaurant/Tibetan monastery and have to compete with antecessors.
- Exotic vegetable (Chinese leafy vegetables) production should be time-shifted. Since price is already not favorable in usual season and buyers are limited, it is pointless to encourage Chinese leafy vegetables production in usual season. Tibetan monasteries are considered as the best target.
- Main customers of Green Leaf are likely European/American; i.e. there must be a chance to enter into business by producing new Western vegetables. It was no doubt that Green Leaf has no/short supply items because her suppliers are all local farmers. However, since Green Leaf has no intension to increase suppliers, the farmer in Minji Gram who has been selling vegetables to Green Leaf becomes a target farmer for TCP/BPM's supportive activity.

(2) STAGE 2: Plan how to introduce exotic vegetables production in sub-project(s)

As shown in above, two ideas on introducing exotic vegetables production in sub-project(s) were derived.

Idea-1: Exotic vegetable (Chinese leafy vegetables) production to target Tibetan monasteries; to sell directly when prices are favorable; specially summer time.

Idea-2: Exotic vegetable (Western vegetables which Green Leaf has no/short supply) production to target European/American consumers; to sell through Green Leaf.

To materialize these ideas, following works were carried out in May-June 2019.

Result of Stage 2

1) Idea-1

Among the Chinese leafy vegetables, pak-choi was selected as target crop because; 1) short-period crop and easy to cultivate, 2) it is possible to grow in hot season under shade net. Rainy season (July-Aug.) is an important target time of shipping because vegetable prices are high. To grow pak-choi in rainy season in Nurpur (high rainfall area), poly-house is essential. Therefore, sub-project Chatredi was selected to introduce Pak-choi production to target Tibetan monasteries because 3 farmers own poly-houses and there are some monasteries at a short distance.

JICA TCP prepared a rough production plan based on farmers' ideas obtained in the meeting held on 14 May 2019. It was explained and discussed by Chatredi farmers, BPMU Nurpur and JICA TCP on 27 May 2019 and then "Planned production of Pak-choi in polyhouse to sell to nearby Tibetan monastery, Production/shipment plan during June - Oct. 2019" was formulated. Also, BPMU/JICA TCP's activity to support the implementation of planned production was planned.

2) Idea-2

As the result of the Study, an idea to produce new exotic vegetable (Western vegetables) which Green Leaf cannot supply to her European/American customers was derived. It was no doubt that Green Leaf has no/short supply items because Green Leaf's suppliers are all local farmers. In the meeting with Green Leaf held on 17 May 2019, mini-tomato was identified as the best potential crop so far. The target farmer in sub-project Minjh Gram also participated in the meeting and he expressed a willingness to challenge a mini-tomato production after the meeting.

Upon the request from Green Leaf, sample of mini-tomatoes to examine the customers' demand were provided to Green Leaf on 27 May. Based on the Green Leaf's idea on prospective demand of mini-tomato and farmer's skill level/resources, "Startup production plan of mini-tomato to sell to Green Leaf" was prepared by the farmer in sub-project Minjh Gram and BPMU/JICA TCP. Also, BPMU/JICA TCP's supportive activity was planned.

//end

Operating Plan

for

Extension of Cucumber + Early Cauliflower cultivation

by use of mulching sheet & drip irrigation (2020)

BPMU Bilaspur

January 2020

Prepared by JICA TCP & BPMU

Note

This paper is prepared to assure an error-free and on-time launch of this extension activity by BPMUs and TCP.

This paper covers the:
Essential information for planning such as target sub-projects, farmers & field area, available irrigation facility/machinery, Procurement plan, Cultivation schedule and target time of sowing, TOT plan, Use of "WhatsApp" and WBS for preparatory works. And overall schedule of on-site guidance by TCP until early-August is attached for reference.

This paper does not describe the:
Procurement plan and TOT plan for cauliflower cultivation, and associated works to carry out in/after July such as field visiting by farmers of other sub-projects in harvest time, crop-wise reports preparation, review/wrap-up meeting, etc.

Sheet A : Summary sheet of sites for 2020-activity "Extension of Cucumber + Early Cauliflower [D-2(1)]"

BPMU BILASPUR

	Sub-project	EO in charge	Farmer's name	Did the trial in 2019	CCA or not	Current situation (Availability)				Required Installation	Field area (m2) to install drip irrigation	Field area (m2) for Cucumber	Field area (m2) for Cauliflower	Procurement of tiller	Procurement of low poly tunnel	Support by BPMU	Remarks
						Water source	Drip irrigation	Tiller (small)	Low poly tunnel								
New sites	LIS Kahali	Vikram Singh	Sh.Ripu Daman	no	CCA	Project hydrant	No	Yes	Yes	Drip	400	400	400	No	No	90% on Drip irrigation, 90% on Materials procured by BPMU	Tomato producers
			Sh.Mangal Singh	no	CCA	Project hydrant	No		Yes	Drip	400	400	400		No		
	LIS Parohi	Vikram Singh	Sh.Sukh Ram	no	CCA	Project hydrant	No	Yes	No	Drip	400	400	400	No	Yes. By BPMU		Owner of project poly-house 105m2
			Sh.Dila Ram	no	CCA	Project hydrant	No		No	Drip	400	400	400		Yes. By BPMU		
	LIS Domehar	Anoop Kumar	Sh.Sunil Kumar	no	CCA		No	Yes	Yes	Drip	400	400	400	No	No		
			Sh.Amba Prasad	no	CCA		No		Yes	Drip	400	400	400		No		
			Sh.Madan Lal	no	CCA		No		Yes	Drip	400	400	400		No		
			Sh.Ramesh Kumar	no	CCA		No		Yes	Drip	400	400	400		No		
			Smt.Kamesh Kumari	no	CCA		No		Yes	Drip	400	400	400		No		
	LIS Ghandir	Vikram Singh	Sh.Ramesh	no	CCA		No	Yes	Yes. 30m2 walk-in polyhouse	Drip	400	400	400	No	No		Output-2 site for year 2020
			Smt.Sunita	no	CCA		No		Yes	Drip	400	400	400		No		
	LIS Swara	Anoop Kumar	Sh.Jorabar	no	CCA		Yes. 500m2 in Polyhouse by DOA subsidy	Yes	Yes	Nil	-----	500	500	No	No		- No need to provide mulching sheet. - Need to provide differnet cucumber variety; good for in polyhouse such as KIAN, ALEX, Multi Star.
Preceding sites	LIS Noa	Anoop Kumar	Smt. Dasoda	yes	CCA	Private tube well =>Motor pump	Yes (installed by 2019 trial), 400m2	Yes	Yes	Nil	-----	200	200	No	No	Same as above.	
			Anil Kumar	no	CCA	Project hydrant	No. But materials have been provided by DOA	Yes	No	Drip, Only installation	400	400	400	No	No		Use big polyhouse for nursery
	LIS Nalwar Kotlu	Amit Sharma	Sh. Pawan (President)	yes	CCA	Project hydrant	Yes (installed by 2019 trial)	Yes	Yes	Nil	-----	800	800	No	NO		
			Smt. Babita	yes	CCA	Project hydrant		Yes	Yes		-----	400	400		NO		
			Sh. Rattan	yes	CCA	Project hydrant		Yes	Yes		-----	500	500		NO		
			Sh. Sita Ram	yes	CCA	Project hydrant		Yes	Yes		-----	500	500		NO		
	LIS Chhiber Ballu	Vikram Singh	Sh.Krishan Lal	yes	CCA	Project hydrant => Project water tank =>Pump by solar panel	Yes (installed by 2019 trial)	Yes	Yes	Nil	-----	800	800	No	No		Ploting into 2 sections.???? Need to discuss on cucumber cultivation (use of drip field after harvesting cauliflower in Feb-March) with farmer.
	LIS Fogog	Amit Sharma	Mehar Singh	yes	CCA	Project hydrant => Project water tank =>Motor pump	Yes (installed by 2019 trial)	Yes	Yes	Nil	-----	500	500	No	No		
			Kamal Dev	yes	CCA	Private tube well => Motor pupm	Yes (installed by 2019 trial)	Yes	Yes	Nil	-----	200	200		No		
			Bhushan	no	CCA	Project hydrant => Project water tank =>Motor pump	No. But materials for 4 kanals have been provided by BPMU	Yes	Yes	Drip. BPMU shall install for 4 kanal.	1600	400	400		No		
	9 sub-projects	**3 EOs**	**22 farmers (8 preceding + 14 new)**							**Total (m2)**	**6400**	**9600**	**9600**				

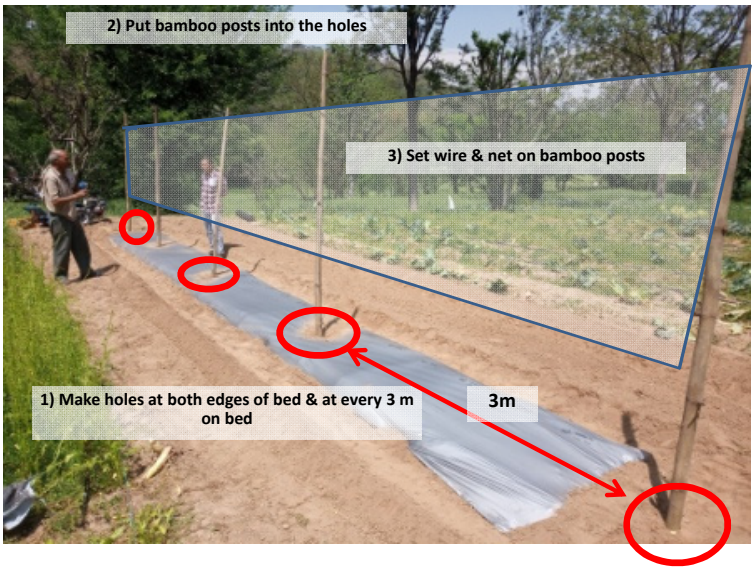
Sheet B : Procurement plan - items & q'ty, cost share, deadline of procurement - BPMU Bilaspur

								New cucumber area	800	800	2000	800	500	400	0	0	400			
								Total cucumber area	800	800	2000	800	500	600	2200	800	1100			
								Nos. of farmers	2	2	5	2	1	2	4	1	3			
	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty		LIS Kahali	LIS Parohi	LIS Domehar	LIS Ghandir	LIS Swara	LIS Noa	LIS Nalwar Kotlu	LIS Chhiber Ballu	LIS Fogog	Deadline for installation /delivery	Purchase from	Responsible EO
By BPMU																						
Watering	Drip irrigation system	1	set	various	Rs/set		13 set		2	2	5	2	0	1	0	0	1	end March	DENESH	
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		0 unit													
Bed preparation	Mulching sheet	342	m	8	Rs/m	62,244	7781 m		684	684	1710	684	--- (poly house)	513	1881	684	941	10-Mar		
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	5,400	216 kg		18	18	45	18	11	14	50	18	25			
Bamboo staking	Steel wire	6	kg	100	Rs/kg	8,550	86 kg		12	12	30	12	8	6	0	0	6			
Bamboo staking	Plastic mesh net	342	m	10	Rs/m	74,080	7408 m		684	684	1710	684	428	413	1481	584	741			
* Seedling production	Low poly-tunnel (pipe frame + poly sheet), 1.5 x 4m	1	set/farmer	5000	Rs/set	BPMU stock	2 set		---	2	---	---	---	---	---	---	---	15-Mar	BPMU has 4 sets in store	
Pest control	Fungicide	1	package	250	Rs/pack	6,000	24 package		2	2	5	2	1	2	6	2	3	as needed		
Pest control	Insecticide	1	package	250	Rs/pack	6,000	24 package		2	2	5	2	1	2	6	2	3	as needed		
					(a)	162,274														
By TCP																			**Delivery method of TCP procure items**	
* Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	2,800	14 unit		2	2	5	2	1	1	0	0	1	10-Mar		
* Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	8,500	5 unit		1	1	1	1	1	0	0	0	0			
* Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	3,500	14 unit		2	2	5	2	1	1	0	0	1	20-Mar		
* Seedling production	Shade net for low poly-tunnel, W2 m x L5m	5	m/farmer	70	Rs/m	4,900	70 m		10	10	25	10	--- (poly house)	5	5	0	5	15-Mar	TCP deliver goods to BPMU office at end of Feb., and BPMU deliver them to farmers.	
* Seedling production	Clip to fix shade net on poly-tunnel	10	pc/farmer	15	Rs/pc	2,400	160 pc		20	20	50	20	0	10	10	0	30			
Seedling production	Plastic pot (about 400ml)	400	pots	0.57	Rs/pot	5,486	9600 pots		800	800	2000	800	500	600	2200	800	1100			
Seedling production	Cocopeat	1	block	150	Rs/block	3,900	26 block		2	2	5	2	2	2	6	2	3			
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	5,200	26 pack		2	2	5	2	2	2	6	2	3			
* Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	20,800	52 unit		8	8	20	8	4	0	0	0	4	20-May	TCP deliver goods to BPMU office at middle /end of April, and BPMU deliver them to farmers.	
* Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0 unit		0	0	0	0	0	0	0	0	0			
					(b)	57,486														
By Farmers																				
Bed preparation	FYM	1	truck	1500	Rs/truck	36,000	24 truck		2	2	5	2	1	2	6	2	3	10-Mar		
Bamboo staking	Bamboo post	126	post	10	Rs/pot	30,240	3024 post		252	252	630	252	158	189	693	252	347			
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	9,600	120 bundle		10	10	25	10	6	8	28	10	14	20-Mar		
* Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	8,800	22 set		2	2	5	2	1	2	4	1	3			
* Bamboo staking	Nail	1.0	kg		Rs/kg	0	24 kg		2.0	2.0	5.0	2.0	1.3	1.5	5.5	2.0	2.8			
* Seedling production	Vermin compost	40	liter			0	0 liter											15-Mar		
					(c)	84,640														
					(a)+(b)+(c)	304,400														

Sheet C : Cultivation schedule - Bilaspur

Works	1	2	3	4	5	6	7	8	9	10	11	12
Harvesting of wheat				XX	*10-20 April*							
Cucumber												
Field preparation												
Plowing			X									
Bed making, Mulch sheets			XX			*Bed making should be finished before end of March.*						
Bamboo staking			X	XX XX		*Staking should be finished before end of April*						
Sowing in pots												
Other sub-projects	**Late March**		**XX**									
Nalwar Kotlu	**Mid March**		**X**									
Transplanting	**about 30 days after sowing**			**X XX**								
Pest control												
Watering												
Fertilizing												
Training, Leaf-removing												
Harvesting, Selling												
Cleanup												
Cauliflower												
Sowing in pots	**Early July**						**X**					
Transplanting	**Early Aug**							**X**				
Pest control												
Watering												
Fertilizing												
Harvesting, Selling												
Cleanup												
Removing mulch sheets												

	Farm works	**Method**	**Remarks**
Field Preparation			
	Plowing	By 4 wheel tractor	Do it in/before middle of March
	Apply FYM	1 truck /kanal	
	Apply NPK	12:32:16, 9kg per kanal, Apply only on beds	
	Bed making	By tiller with ridger & by manual, 80cm width	Bed making should be finished before end of March
	Set drip tubes on beds		Next work of prepare bamboo staking require time.
	Cover with mulch sheets	By manual	Farmer should allot abundant time for preparing bamboo staking.
	Install bamboo posts	3m interval	Staking should be ready when transplanting takes place; i.e. Finish it before end of April
	Set wires, mesh net	Set mesh net on upper side	If no proper staking, harvest can be decreased in large amounts.
Sowing in pots (Cucumber)		350 seedlings/kanal, Add extra 10%.	
	Prepare potting soil	Soil : Cocopeat : Vermin compost = 1.5 : 1 : 0.5	
	Prepare place to keep pots	Sunny place especially morning hours, Use a shade-net during daytime	
	Sowing	1 seed per pot	
	Watering,	By water can	
Transplanting (Cucumber)		90cm interval	



Bilaspur - Target date of Cucumber sowing

Sub-project	EO	Sowing		Transplanting	
LIS Kahali	Vikram Singh	??-March	EO guidance	??-April	EO guidance
LIS Parohi	Vikram Singh	??-March	EO guidance	??-April	EO guidance
LIS Domehar	Anoop Kumar	??-March	EO guidance	??-April	EO guidance
LIS Ghandir	Vikram Singh	??-March	EO guidance	??-April	EO guidance
LIS Swara	Anoop Kumar	??-March	EO guidance	??-April	EO guidance
LIS Noa	Anoop Kumar	??-March	EO guidance	??-April	EO guidance
LIS Nalwar Kotlu	Amit Sharma	??-March	??	??-April	??
LIS Chhiber Ballu	Vikram Singh	??-March	??	??-April	??
LIS Fogog	Amit Sharma	??-March	??	??-April	??

★ EO shall discuss with farmers to set a exact date for sowing in advance.

★ BPMU shall determine the necessity of on-site guidance by EO for Nalwar K. Chibber B. and Fogog.

Sheet D : Target time of sowing & transplanting

As of 28 Jan. 2020, after the meeting

Target times are set;

- by Farmers of sub-projects participated the 2019 trial (marked *) with BPMU/TCP assistance for production planning [A]
- by TCP for new sub-projects.

Seedlings are ready to transplant at about 30 days after sowing

BPMU	Sub-Project			Cucumber		Cauliflower		
				Sowing	Transplanting	Sowing	Transplanting	
Hamirpur	H-1006	LIS Majhot		Late March	Late April	Early July	Early Aug	
	H-1035	LIS Dharnasi						
	H-1052	LIS Diot-1						
	H-1015	LIS Kirwin						
	H-3014	LIS Beha						
		LIS Manjru	*	Late March	Late April	Early July	Early Aug	
		LIS Guriah	*	Mid Jan (in poly house)	Early March	Early July	Early Aug	Section 1: 600m2
				Mid March	Mid April			Section 2: 1800m2
Sarkaghat	S-1093	LIS Karadi Kandyol		Late March	Late April	Late June	Late July	
	S-M-1042	FIS Ropri to Khanvod		Late March	Late April	Late June	Late July	
	S-1100	LIS Ukhala	*	5-10 April	1-5 May	Late June	27-31 July (Last week of July)	
		LIS Khanote		Late March	Late April	Late June	Late July	
	S-1117	LIS Damella	*	Late March	Late April			
Una		LIS Berian		Late March	Late April	Early July	Early Aug	
		LIS Krishna Nagar						
Dehra	D-1007	FIS Ketal Kuhal		Late March	Late April	Early July	Early Aug	
Bilaspur		LIS Kahali		Late March	Late April	Early July	Early Aug	
		LIS Parohi						
		LIS Domehar						
		LIS Ghandir						
		LIS Swara						
		LIS Noa						
		LIS Nalwar Kotlu	*	Mid March	Mid April	Early July	1-5 Aug	
		LIS Chhiber Ballu	*			Early July	Early Aug	Section 1??
						Mid July	Mid Aug	Section 2??
		LIS Fogog	*	End March - Beginning April	End April - Beginning May	Early July	Early Aug	

LIS Ukhala : Suggest the farmers to push forward sowing time to Late March

Sheet E : Training plan - BPMU Bilaspur

Pre-demonstration to EOs (TOT)

Purpose:	TOT. To let EOs gain the knowledge / skill of farm works for field preparation. After this training, EOs should be ready to conduct a demonstration to farmers by themselves.
Participants :	All EOs work on this activity (about 10 persons)
Instructor:	TCP Expert
Venue :	Diot-1, Hamirpur
Date :	2nd of March (Monday)
Contents:	Practical training of farm works for Field Preparation
Note:	Come with a working cloth!!

Demonstration to new farmers by EOs

	<1st time>	<2nd time>
Purpose:	To let farmers gain the knowledge / skill of farm works for field preparation.	
Participants :	All (13) new farmers	
Instructor:	EOs (TCP Expert shall assist EOs)	
Venue :	Nalwar Kotlu	Domehar
Date :	5th of March	7th of March
Sub-projects	Nalwar Kotlu Noa, Kahali, Parohi Chibber Ballu	Domehar Fogog, Swar, Ghandir

Contents:

1) Explain the farm works to do & deadline, items to be prepared by farmers (* A paper should be delivered)
2) Demonstrate all works of Field Preparation; except plowing by 4-wheel tractor
   - Plowing (* To be done by farmer before the demonstration)
   - Apply FYM
   - Apply NPK
   - Cover with mulch sheets
   - Set wires and mesh net
   - Bed making
   - Set drip tubes
   - Install bamboo posts
3) Instruct the preparation for sowing (* Technical manual should be delivered)

On-site guidance to farmers by TCP (OJT of EOs)

Purpose: Instruct farm works to farmers on-site. Check the field/crop condition and provide a instruction to improve. EOs shall learn what to be checked in the field and what to instruct farmers. EOs shall carry out same instruction / field check by themselves at other sub-projects.

	Time	Place
Check 1- Seedlings, Bed making	4-Apr	As per request of BPMU
Check 2 - Transplaned seedlings, Staking	2-May	As per request of BPMU
Check 3	20-May	As per request of BPMU
Check 4	June	As per request of BPMU
Check 5	July	As per request of BPMU
Check 6	Aug	As per request of BPMU
Check 7	Sep	As per request of BPMU
Check 8	Oct	As per request of BPMU

*Notes : Sub-project where problem is seen has higher priority to go for checking & giving guidance.

On-site guidance to new farmers by EO

EO shall provide on-site training for:

Subjects	Time
1) Operation & maintenance of drip irrigation system	before transplanting
2) Safe use of agri-chemical	when needed
3)	

Date of On-site guidance by TCP (OJT to EOs)

BPMU	Demonstration *1st week of March*		Sowing cucumber *4th week of March*		Transplanting *about 30 days after sowing*	
Sarkaghat	6-Mar Fri	Karadi Kandyol	28-Mar Sat	Ropri to Khanvod	24-Apr Mon	Ropri to Khanvod
Hamirpur	3-Mar Tue	Majhot	24-Mar Tue	Beha	21-Apr Tue	Kirwin
Dehra			27-Mar Fri	Ketal Kuhal	27-Apr Fri	Ketal Kuhal
Una	9-Mar Mon	Berian	25-Mar Wed	Berian, Krishna Nagar	22-Apr Wed	Berian, Krishna Nagar
Bilaspur	5-Mar Thu	Nalwar Kotlu	---		---	
[D1-1(6)] Baijnath	---	---	31-Mar Tue	Raghulu	29-Apr Wed	Raghulu

Sheet F:
Tentative idea on
Use of "WhatsApp" in the activity
to Communication with farmers, to Monitor the progress of farm work/crop conditions, etc.
BPMU Bilaspur

How do you use "WhatsApp" now ?
Dose BMPU Bilaspur have an agreed (established) system ?
What are benefits to use "WhatApp" ?
What are no-good for EOs / Farmers to use "WhatApp" ?

At BPMU Bilaspur, now, "WhatsApp" is not used by EOs positively to communicate with farmers. No group is formed by EOs & famers.

1. Benefits expected

Farmer will see a farm work finished by other farmers.

==> It must push him to do a work on-time.

==> It can be an example of work. If he see a good example, quality of work (such as bed making, staking) may maintained / go up.

EOs are easy to know the progress of farm works, current condition of crops

2. No-good points expected

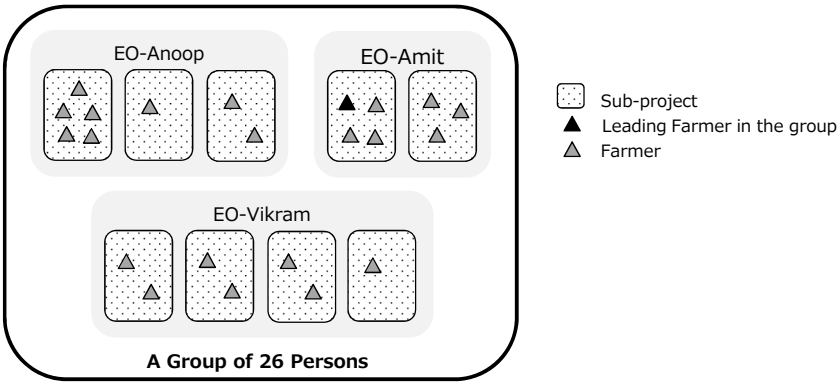
If farmer see a bad example, quality of work may go down.

==> Select a best/adavanced farmer(s) as [Leading Farmer], and let him/her to send a photo ahead to other farmers.

3. EOs idea on usage of "WhatsApp" in this activity - BPMU Bilaspur as of 28 Jan. 2020

9 sub-projects
22 farmers (8 preceding + 14 new)
3 EOs

- ✓ Form one group to cover all 22 farmer and 3 EOs, also include BPM (total 26 person)
- ✓ No sub-groups by each EOs
- ✓ Leading Farmer can be Ms. Bavita-Nalwar Kotlu and Mr. Bhushan-Fogog.



4. Hot-line system by TCP/SPMU and all EOs (Proposed idea of TCP)

Purpose: If a problem emerge hard to solve by EOs; such as damage of crop by un-known insect, EO report it to TCP/SPMU. And TCP/SPMU provide a countermeasure / come to field to check.

Information goes to EOs of other BPMU, and EO can take a pre-caution measure / prompt problem solving.

Sheet G : WBS - BPMU Bilaspur

As of 28 Jan. 2020

Cultivation Schedule
Preparation of beds & staking
< Cucumber >
< Cauliflower >

	Start Date	End Date	Responsible EO	1	2	3	4	5	6	7	8
						★ sowing	▲ transplanting		Harvest	★	▲
1 Preparatory works - Procurement by BPMU											
Finalize the Q'ty of items				X	X						
- Discuss with Krishan Lal - Chibber Ball about cropping plan for drip irrigation field (800m2) after harvesting cauliflowers now in the field.	ASAP	ASAP		X	X						
Request BPM to select shops/suppliers for each item.				X							
Get quotations - 3 quotation per item					X						
Decide the supplier & Make orders					X						
Arrange a storage / storing space					X						
Delivery to BPMU by TCP					XX						
Delivery to farmers by BPMU						XX	*Finish before 10-March*				
Procurements by TCP											
Procurements by Farmers											
2 Preparatory works - Installing drip irrigation											
Designing by BPMU & service provider											
Installation by service provider							*Finish all sites before end of March !!*				
Give a clear explanation about requirements to service provider at site, when service provider visit the field for designing & estimation.	EO			DONE							
Itemize the farmer's work to do before installation at site Done or not ?	EO										
Check the made-design by service provider	EO			DONE							
Approval by BPM, Approval by DPM	BPM			On-going							
Discuss and fix the schedule of installation work	EO				X						
Make sure that farmer is at home when installation take place.	EO										
Supervise the installation	EO										
Inspect the installed system. Supervise a commissioning test	EO					X X X					
Inform the schedule of installation work to TCP					X						
3 Ensure on-time & proper field preparation by farmers											
Ensure the on-time procurement by Farmers											
Inform the items to be prepared by farmers and deadline in advance, in paper; at the time of demostration	5-Mar	5-Mar	EO	Demonstration		X					
Ensure the on-time field work by Farmers											
Discuss with farmers and set exact date to do the works - Plowing, Start/finish bed making, Start staking; at the time of demostration	5-Mar	5-Mar	EO			X					
4 Kick off a "Monitoring by Whatup "											
Discussion by EOs & BPM to finalized a system/details		End-Mar	EO, BPM		X X X						
Explain to farmers what they have to do.	5-Mar	5-Mar	EO								
Teach how to use "WhatsApp", if possible.	5-Mar	5-Mar	EO								
5 Preparation for the Demonstration to be held on 9-March											
Ask farmer - Can he provide a empty field (min. 100m2) for the Demonstration to be held on 5-March.											
Lunch											

Schedule of On-site guidance by TCP - All Activities

as at 07 Feb 2020

1) Assistance to make aproduction plan
2) Extension of Cucumber + Early cauliflower
3) Early cucumber in polyhouse
4) Support to Chatredi farmer
5) Trial - Underground drain
6) Consignment cultivation at Kandi Nalah

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Demonstration	1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	
		2)	2)		2)	2)		3) Cucumber polyhouse Check (帰路立ち寄り) Bilaspur Chibber Ballu
		Pre-demonstration	Demonstration		Demonstration	Demonstration	DC meeting	
		Hamirpur	Hamirpur		Bilaspur	Sarkaghat		
		Diot-1	Majhot		Nawar Kotlu	Karadi Kandyol		
	8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	
		2)			3)	4)		3) Cucumber polyhouse Check (帰路立ち寄り) Sarkghat Ukhala
		Demonstration			Check	Demo/guidance		
		Una			Hamirpur	Nurpur		
		Berian			Neir Bahg, Others	Chatredi		
	15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	
							6)	
							Check	
							Mandi	
							Kandi Nalah	
Sowing cucumber	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	
			2)	2)		2)	2)	4) Sowing cucumber Nurpur
			Sowing	Sowing		Sowing	Sowing	
			Hamirpur	Una		Dehra	Sarkaghat	
			Beha	Berian, Krishna N		Ketal Kuhal	Ropri to K.	
	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	
			5)	2)		2)	2)	
			Sowing	Check-1		Check-1	Check/Assist-1	
			Baijnath	Hamirpur		Una	Bilaspur	
			Raghulu	Dharnasi, Diot-1		Berian, Krishna N	As per rquest	
	5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	
		2)		2)				4) Sowing coriander Nurpur
		Check-1	DC meeting	Check-1				
		Sarkaghat		Dehra				
		Karadi Kandyol		Ketal Kuhal				
	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	
					5)	5)	5)	
					Install underground drainage, Bed making			
					Baijnath	Baijnath	Baijnath	
					Raghulu	Raghulu	Raghulu	
Transplanting	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	
			2)	2)		2)		
			Transplanting	Transplanting		Transplanting		
			Hamirpur	Una		Sarkaghat		
			Kirwin	Berian, Krishna N		Ropri to K.		
Transplanting	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May	
		2)		5)	2)	2)	2)	4) Transplanting Nurpur
		Transplanting		Transplanting	Check	Check	Check/Assist-2	
		Dehra		Baijnath	Hamirpur	Una	Bilaspur	
		Ketal Kuhal		Raghulu		Berian, Krishna N	As per rquest	
	3-May	4-May	5-May	6-May	7-May	8-May	9-May	
		2)				2)		4) Check, Set frames Nurpur
		Check-2		DC meeting		Check		
		Sarkaghat				Dehra		
		Karadi Kandyol				Ketal Kuhal		
	10-May	11-May	12-May	13-May	14-May	15-May	16-May	
			5)					
			Check					
			Baijnath					
			Raghulu					
	17-May	18-May	19-May	20-May	21-May	22-May	23-May	
		2)	2)	2)	2)	2)		4) Check, Set sheets Nurpur
		Check	Check	Check/Assist-3	Check	Check		
		Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
			Berian, Krishna N	As per request		Ketal Kuhal		
	24-May	25-May	26-May	27-May	28-May	29-May	30-May	
			5)					
			Check					
			Baijnath					
			Raghulu					
	31-May	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	
				2)	2)			
				Check	Check			
				Hamirpur	Una			
					Berian, Krishna N			
	7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	
			2)	2)		5)		4) Check Nurpur
		DC meeting	Check	Check		Check		
			Sarkaghat	Dehra		Baijnath		
				Ketal Kuhal		Raghulu		
	14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	
	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	
						5)		
						Sowing		
						Baijnath		
						Raghulu		
Sowing cauliflower	28-Jun	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	
		2)			2)	2)		4) Sowing cauliflower Nurpur
		Sowing			Sowing	Sowing		
		Hamirpur			Sarkaghat	Dehra		
						Ketal Kuhal		
	5-Jul	6-Jul	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	
				2)		5)		
			DC meeting	Sowing		Check		
				Una		Baijnath		
				Berian, Krishna N		Raghulu		
	12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	
		2)		2)	2)	2)	2)	4) Check Nurpur
		Check		Check/Assist-4	Check	Check	Check	
		Hamirpur		Bilaspur	Sarkaghat	Dehra	Una	
				As per request		Ketal Kuhal	Berian, Krishna N	
	19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	
Transplanting	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	
		5)				2)		
		Transplanting				Transplanting		
		Baijnath				Hamirpur		
		Raghulu						
Transplanting	2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	
		2)		2)	2)			4) Transplanting Nurpur
		Transplanting		Transplanting	Transplanting	DC meeting		
		Una		Sarkaghat	Dehra			
		Berian, Krishna N			Ketal Kuhal			

Operating Plan

for

Extension of Cucumber + Early Cauliflower cultivation

by use of mulching sheet & drip irrigation (2020)

BPMU Dehra

January 2020

Prepared by JICA TCP & BPMU

Note

This paper is prepared to assure an error-free and on-time launch of this extension activity by BPMUs and TCP.

This paper covers the:
Essential information for planning such as target sub-projects, farmers & field area, available irrigation facility/machinery, Procurement plan, Cultivation schedule and target time of sowing, TOT plan, Use of "WhatsApp" and WBS for preparatory works. And overall schedule of on-site guidance by TCP until early-August is attached for reference.

This paper does not describe the:
Procurement plan and TOT plan for cauliflower cultivation, and associated works to carry out in/after July such as field visiting by farmers of other sub-projects in harvest time, crop-wise reports preparation, review/wrap-up meeting, etc.

Sheet A : Summary sheet of sites for 2020-activity "Extension of Cucumber + Early Cauliflower [D-2(1)]"

BPMU DEHRA

	Sub-project		EO in charge	Farmer's name	Did the trial in 2019	CCA or not	Current situation (Availability)				Required Installation	Field area (m2) to install drip irrigation	Field area (m2) for Cucumber	Field area (m2) for Cauliflower	Procurement of tiller	Procurement of low poly tunnel	Support by BPMU/TCP	Remarks
							Water source	Drip irrigation	Tiller (small)	Low poly tunnel								
New sites	D-1007	FIS Ketal Kuhal	Ms Parika	Ram Singh	no	CCA	i) River => Pond => Motor pump ii) River => Open channel	No. But farmer has used materials removed from DOA poly houses. Tubes are 30cm.	yes. BCS GRATIA-135	No. But farmer have one poly-house for nursery purpose.	Drip; Utilize the used materails as much as possible. Installtion by BPMU (Service provider).	800	800	800	No	No	Cost support:: 100% - Drip irrigation 100% - Material excluding the items to be procured by farmers Technical support: On-site guidance	

Sheet B : Procurement plan - items & q'ty, cost share, deadline of procurement - BPMU Dehra

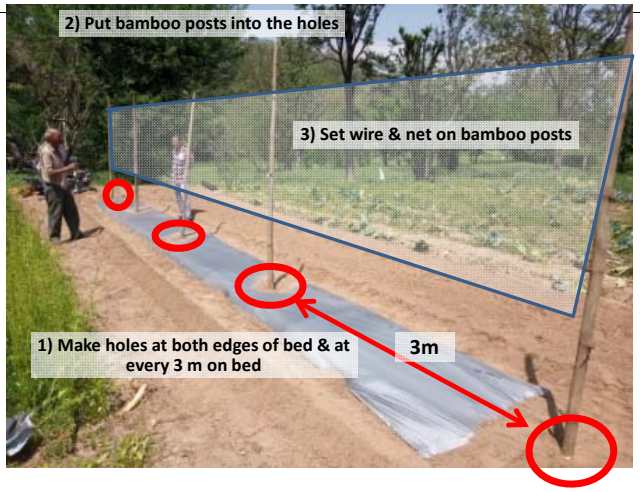
								Field area	800			
								Nos. of farmers	1			
By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty		Ketal Kuhal	Deadline for installation /delivery to farmers	Procure from	Responsible EO
Watering	Drip irrigation system	1	set	various	Rs/set		1 set		1	end March	CAPTAIN Poly Plast	
Watering	Motor pump, ?? Hp	0	unit		Rs/unit		0 unit		0			
Bed preparation	Mulching sheet	342	m	8	Rs/m	5,472	684 m		684	10-Mar		
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	0	0 kg		by farmer			
Bamboo staking	Steel wire	6	kg	100	Rs/kg	0	0 kg		by farmer			
Bamboo staking	Plastic mesh net, 15 x 15 cm mesh	342	m	10	Rs/m	6,840	684 m		684			
Pest control	Fungicide	1	package	250	Rs/pack	0	0 package		by farmer	as needed		
Pest control	Insecticide	1	package	250	Rs/pack	0	0 package		by farmer	as needed		
					(a)	12,312						
By TCP										**Delivery method of TCP-procure items**		
* Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	200	1 unit		1	TCP hand-over the items to EO on 02-March at Hamirpur; on the day for TOT pre-demonstration, and BPMU deliver them to farmer.		
* Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	1,700	1 unit		1			
* Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	0	0 unit		0			
* Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 4m)	1	unit/farmer	5000	Rs/unit	0	0 unit		0			
* Seedling production	Shade-net for low poly-tunnel, W2.0 m x L5m	5	m/farmer	70	Rs/m	0	0 m		0	TCP deliver the items to the sub-project on the day for sowing (27 March)		
* Seedling production	Clip to fix shade-net on poly-tunnel	10	pc/farmer	15	Rs/pc	0	0 pc		0			
Seedling production	Plastic pot for cucumber (about 400ml)	400	pots	0.57	Rs/pot	457	800 pots		800			
Seedling production	Cocopeat	1	block	150	Rs/block	300	2 block		2			
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	400	2 pack		2			
* Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	1,600	4 unit		4	TCP deliver the items to the sub-project before end of April		
* Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0 unit		--			
					(b)	4,657						
By Farmers												
Bed preparation	FYM	1	truck	1500	Rs/truck	3,000	2 truck		2	10-Mar		
Bamboo staking	Steel pipe post	126	post	10	Rs/pot	2,520	252 post		252	30-Mar		
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	800	10 bundle		10			
* Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	400	1 set		1			
* Bamboo staking	Nail	1.0	kg		Rs/kg	0	2 kg		2.0			
* Seedling production	Vermin compost	40	liter			0	0 liter			15-Mar		
					(c)	6,720						
					(a)+(b)+(c)	23,689						

Sheet C : Cultivation schedule - Dehra

Works	1	2	3	4	5	6	7	8	9	10	11	12
Harvesting of wheat												
Cucumber												
Field preparation												
Plowing			X									
Bed making, Mulch sheets			XX									
Bamboo staking				XX XX								
Sowing in pots	**Late March**		**XX**									
Transplanting	**Late April**			**XX**								
Pest control												
Watering												
Fertilizing												
Training, Leaf-removing												
Harvesting, Selling												
Cleanup												
Cauliflower												
Sowing in pots	**Early July**						**XX**					
Transplanting	**1th - 5th of August**							**X**				
Pest control												
Watering												
Fertilizing												
Harvesting, Selling												
Cleanup												
Removing mulch sheets												

Technical notes:

Farm works	**Method**	**Remarks**
Field Preparation		
Plowing	By 4 wheel tractor	Do it in/before middle of March
Apply FYM	1 truck /kanal	
Apply NPK	12:32:16, 9kg per kanal, Apply only on beds	
Bed making	By tiller with ridger & by manual, 80cm width	Bed making should be finished before end of March
Set drip tubes on beds		Next work of prepare bamboo staking require time.
Cover with mulch sheets	By manual	Farmer should allot abundant time for preparing bamboo staking.
Install bamboo posts	3m interval	Staking should be ready when transplanting takes place; i.e. Finish it before end of April.
Set wires, mesh net	Set mesh net on upper side	If no proper staking, harvest can be decreased in large amounts.
Sowing in pots (Cucumber)	350 seedlings/kanal, Add extra 10%.	
Prepare potting soil	Soil : Cocopeat : Vermin compost = 1.5 : 1 : 0.5	
Prepare place to keep pots	Sunny place especially morning hours, Use a shade-net during daytime	
Sowing	1 seed per pot	
Watering,	By water can	
Transplanting (Cucumber)	90cm interval	



Dehra - Target date of Cucumber sowing

Sub-project	EO	**Sowing**		**Transplanting**	
Ketal Kuhal	Ms Parika	27-Mar	TCP guidance	27-Apr	TCP guidance

★ EO shall infrom farmer the target date for sowing in advance.

Sheet D : TOT plan - BPMU Dehra

Pre-demonstration to EOs (TOT)

Purpose: TOT. To let EOs gain the knowledge / skill of farm works for field preparation.
After this training, EOs should be ready to conduct a demonstration to farmers by themselves.
Participants : All EOs work on this activity (about 10 persons)
Instructor: TCP Expert
Venue : Diot-1, Hamirpur
Date : 2nd of March (Monday)
Contents: Practical training of farm works for Field Preparation

Demonstration to new farmers by EOs

Call off

Purpose: To let farmers gain the knowledge / skill of farm works for field preparation.
Participants : All new farmers
Instructor: EOs (TCP Expert shall assist EOs)
Venue : Majhot
Date : 3rd of March
Contents: 1) Explain the farm works to do & deadline, items to be prepared by farmers (* A paper should be delivered)
2) Demonstrate all works of Field Preparation; except plowing by 4-wheel tractor
Plowing (* To be done by farmer before the demonstration)
Apply FYM — Bed making
Apply NPK — Set drip tubes
Cover with mulch sheets — Install bamboo posts
Set wires and mesh net
3) Instruct the preparation for sowing (* Technical manual should be delivered)

Initially, it was planned that Dehra EO and Farmer (Ram Singh) to join the demonstration of BPMU Harmirpur to be held on 03-March at Majhot.
However, FIS Ketal Kuhal is far from Hamirpur and Ram Singh has some experiences in vegetable cultivation. Therefore it was decided that Dehra EO and Ram Singh will not attend the demonstration on 03-March. Dehra EO shall learn the works for field preparation very well in Pre-demonstration on 02-March and teach/assist Ram Singh.

On-site guidance to farmers by TCP (OJT of EOs)

Purpose: Instruct farm works to farmers on-site. Check the field/crop condition and provide a instruction to improve.
EOs shall learn what to be checked in the field and what to instruct farmers.
EOs shall carry out same instruction / field check by themselves at other sub-projects.

	Time		Place	
Sowing in pots, Check - Bed making	27-Mar	fixed	Ketal Kuhal	
Check 1- Seedlings, Bed making	8-Apr	fixed	Ketal Kuhal	7 -10 days after sowing
Transplanting	27-Apr	fixed	Ketal Kuhal	
Check 2	8-May	tentative	Ketal Kuhal	
Check 3	22-May	tentative	Ketal Kuhal	
Check 4	10-Jun	tentative	Ketal Kuhal	
Sowing in plug-trays	3-Jul	tentative	Ketal Kuhal	
Check 5 - Seedlings	17-Jul	tentative	Ketal Kuhal	
Transplanting	6-Aug	tentative	Ketal Kuhal	
Check 6	middle Aug	to set date in May	Ketal Kuhal	7 -10 days after sowing
Check 7	early Sep	to set date in May	Ketal Kuhal	
Check 8	middle Sep	to set date in May	Ketal Kuhal	
Check 9	early Oct	to set date in May	Ketal Kuhal	

On-site guidance to new farmers by EO

EO shall provide on-site training for:

Subjects	Time
1) Operation & maintenance of drip irrigation system	before transplanting
2) Safe use of agri-chemical	when needed
3)	

Date of On-site guidance by TCP (OJT for EOs)

BPMU	Demonstration *1st week of March*		Sowing cucumber *4th week of March*		Transplanting *about 30 days after sowing*	
Sarkaghat	6-Mar Fri	Karadi Kandyol	28-Mar Sat	Ropri to Khanvod	24-Apr Fri	Ropri to Khanvod
Hamirpur	3-Mar Tue	Majhot	24-Mar Tue	Beha	21-Apr Tue	Kirwin
Dehra	-------	------	27-Mar Fri	Ketal Kuhal	27-Apr Mon	Ketal Kuhal
Una	9-Mar Mon	Berian	25-Mar Wed	Berian, Krishna Nagar	22-Apr Wed	Berian, Krishna Nagar
Bilaspur	5-Mar Thu	Nalwar Kotlu	----	----	----	----
Baijnath	---	---	31-Mar Tue	Ragloo	29-Apr Wed	Ragloo

[D1-1(6)]

Sheet E : WBS for the Preparation works - BPMU Dehra

Cultivation Schedule

Preparation of beds & staking

< Cucumber > ★ sowing ▲ transplanting Harvest

< Cauliflower > ★

	Start Date	End Date	Responsible	1	2	3	4	5	6	7
1 Preparatory works - Procurement by BPMU										
Select shops/suppliers for each item.				X						
Get quotations - 3 quotation per item					X					
Decide the supplier & Make orders					X					
Delivery to farmers by BPMU						XX	*Finish before 10-March*			
Procurements by TCP										
Procurements by Farmers										
2 Preparatory works - Installing drip irrigation										
Designing by BPMU & service provider										
Installation by service provider							*Finish all sites before end of March !!*			
Give a clear explanation about requirements to service provider at site, when service provider visit the field for designing & estimation.			EO							
Itemize the farmer's work to do before installation at site			EO							
Check the made-design by service provider			EO							
Approval by BPM, Approval by DPM			BPM							
Discuss and fix the schedule of installation work			EO		X					
Make sure that farmer is at home when installation take place.			EO							
Supervise the installation			EO							
Inspect the installed system. Supervise a commissioning test			EO			X X X				
Inform the schedule of installation work to TCP					X					
3 Ensure on-time & proper field preparation by farmers										
Ensure the on-time procurement by Farmers										
Inform the items to be prepared by farmers and deadline in advance, in paper.			EO			X				
Ensure the on-time field work by Farmers										
Discuss with farmers and set exact date to do the works - Plowing, Start/finish bed making, Start staking; at the time of demostration			EO			X				

Schedule of On-site guidance by TCP - All BPMU As of 30 Jan. 2020

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
	1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	Demonstration
Work		Pre-demonstration	Demonstration		Demonstration	Demonstration	DC meeting	
BMPU		Hamirpur	Hamirpur&Dehra		Bilaspur	Sarkaghat		
Sub-project		Diot-1	Majhot					
	8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	
		Demonstration						
		Una						
		Berian						
	15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	
	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	Sowing cucumber
			Sowing	Sowing		Sowing	Sowing	
			Hamirpur	Una		Dehra	Sarkaghat	
			Beha			Ketal Kuhal		
	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	
			Sowing					
			Baijnath	Hamirpur		Una	Bilaspur	
			Ragloo	Dharnasi, Diot-1				
	5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	
			DC meeting					
		Sarkaghat		Dehra				
				Ketal Kuhal				
	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	
					Install underground drainage, Bed making			
					Baijnath	Baijnath	Baijnath	
					Ragloo	Ragloo	Ragloo	
	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	Transplanting
			Transplanting	Transplanting		Transplanting		
			Hamirpur	Una		Sarkaghat		
			Kirwin					
	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May	Transplanting
		Transplanting		Transplanting				
		Dehra		Baijnath	Hamirpur	Una	Bilaspur	
		Ketal Kuhal		Ragloo	Dharnasi, Diot-1			
	3-May	4-May	5-May	6-May	7-May	8-May	9-May	
				DC meeting				
		Sarkaghat				Dehra		
						Ketal Kuhal		
	10-May	11-May	12-May	13-May	14-May	15-May	16-May	
			Check					
			Baijnath					
			Ragloo					
	17-May	18-May	19-May	20-May	21-May	22-May	23-May	
		Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
						Ketal Kuhal		
	24-May	25-May	26-May	27-May	28-May	29-May	30-May	
			Check					
			Baijnath					
			Ragloo					
	31-May	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	
				Hamirpur	Una		Bilaspur	
	7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	
		DC meeting				Check		
			Sarkaghat	Dehra		Baijnath		
				Ketal Kuhal		Ragloo		
	14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	
	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	
						Sowing		
						Baijnath		
						Ragloo		
	28-Jun	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	Sowing cauliflower
		Sowing			Sowing	Sowing		
		Hamirpur			Sarkaghat	Dehra		
						Ketal Kuhal		
	5-Jul	6-Jul	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	
			DC meeting	Sowing		Check		
				Una		Baijnath		
						Ragloo		
	12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	
		Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
						Ketal Kuhal		
	19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	
	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	
		Transplanting				Transplanting		
		Baijnath				Hamirpur		Transplanting
		Ragloo						
	2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	Transplanting
		Transplanting		Transplanting	Transplanting	DC meeting		
		Una		Sarkaghat	Dehra			
					Ketal Kuhal			

Operating Plan

for

Extension of Cucumber + Early Cauliflower (2020)

January 2020

Prepared by JICA TCP & BPMU

Note

This paper is prepared to assure an error-free and on-time launch of this extension activity by BPMUs and TCP.

This paper covers the:
Essential information for planning such as target sub-projects, farmers & field area, available irrigation facility/machinery, Procurement plan, Cultivation schedule and target time of sowing, TOT plan, Use of "WhatsApp" and WBS for preparatory works. And overall schedule of on-site guidance by TCP until early-August is attached for reference.

This paper does not describe the:
Procurement plan and TOT plan for cauliflower cultivation, and associated works to carry out in/after July such as field visiting by farmers of other sub-projects in harvest time, crop-wise reports preparation, review/wrap-up meeting, etc.

Sheet A : Summary sheet of sites for 2020-activity "Extension of Cucumber + Early Cauliflower [D-2(1)]"

BPMU HAMIRPUR

	Sub-project		EO in charge	Farmer's name	Did the trial in 2019	CCA or not	Current situation (Availability)				Required Installation	Field area (m2) to install drip irrigation	Field area (m2) for Cucumber	Field area (m2) for Cauliflower	Procurement of tiller	Procurement of low poly tunnel	Support by BPMU/TCP	Remarks
							Water source	Drip irrigation	Tiller (small)	Low poly tunnel								
New sites	H-1006	LIS Majhot	Nitika	Rajender		CCA	Project hydrant via personal water tank	no	yes	yes	Drip	300	<=	<=	---	no	Cost support:: 90% - Drip irrigation 100% - Material excluding the items to be procured by farmers Technical support: On-site guidance	
				Omkar Chand		CCA	Project hydrant	no		yes	Drip	300	<=	<=		no		
	H-1035	LIS Dharnasi	Nitika	Rajneesh (Pres.)		CCA	Project hydrant	no	no	yes	Drip	200	<=	<=	--- No BPMU budget	no		Area id small; let farmer do bed making by manual.
	H-1052	LIS Diot-1	Himani	Sunny		CCA	Project hydrant via project water tank	no	yes	yes	Drip, Motor pupm	600	<=	<=	---	no		Power supply to a pump by farmer
	H-1015	LIS Kirwin	Jyoti	Jai Sign (Motivator)		not CCA	Rain catchment + tap water via personal water tank at higher level	no	yes	no	Drip	400	<=	<=	---	yes		Water deliver gate at water tank has to be improved (cemented).
	H-3014	LIS Beha	Jyoti	Parshptam (Pres.)		CCA	Project hydrant	no	no	no	Drip	400	<=	<=	--- No BPMU budget	yes		Look for a possibility to borrow from sub-project nearby.
				Desh Raji (Motivator)		CCA	Project hydrant	no		yes	Drip	400	<=	<=		no		
				Rajneesh (Sec.)		CCA	Project hydrant via project? water tank	no		yes	Drip	400	<=	<=		no		
Preceding sites		Manjru	Himani	Prem	yes	CCA	Personal tube well	yes. 200m2	yes	yes	no	---	200	<=	---	no	Same as new sites	
				Krishan (Motivator)	yes	CCA	Project hydrant	yes. 200m2		yes	no	---	200	<=		no		
		Guriah	Himani	V. K. Sharma (PD)	yes	CCA	Project hydrant	yes. 2400m2	yes (KVA)	---	no	---	2400	<=	---	no		
				Devraj		CCA	Project hydrant	yes. about 300m2		yes. poly-house; under a tree	no	=---	300	<=		To determine later; before sowing cauliflower.		
											Total (m2)	3000	6100	6100				

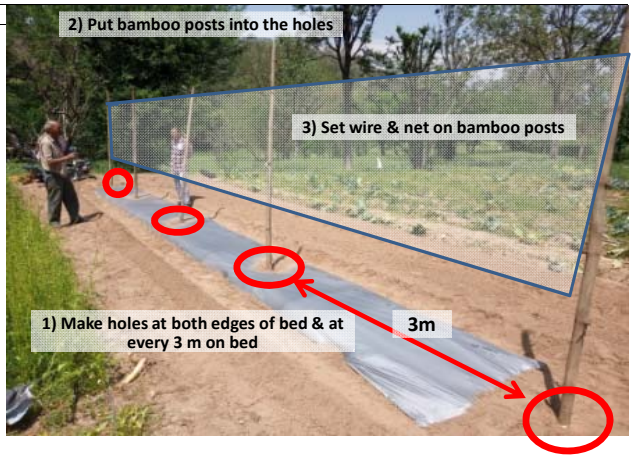
Sheet B : Procurement plan - items & q'ty, cost share, deadline of procurement - BPMU Hamirpur

														12	6100			
							Field area	600	200	600	400	1200	400	2700	Deadline for installation /delivery to farmers	Procure from	Responsible EO
							Nos. of farmers	2	1	1	1	3	2	2			
By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty	LIS Majhot	LIS Dharnasi	LIS Diot-1	LIS Kirwin	LIS Beha	LIS Manjru	LIS Guriah			
Watering	Drip irrigation system	1	set	various	Rs/set		8 set	300 x 2	200 x 1	600 x 1	400 x 1	400 x 3	--	--	end March	CAPTAIN Poly Plast	
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		1 unit	--	--	1	--	--	--	--		CAPTAIN Poly Plast	
Bed preparation	Mulching sheet	342	m	8	Rs/m	41,724	5216 m	513	171	513	342	1026	342	2309	10-Mar		
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	3,431	137 kg	14	5	14	9	27	9	61			
Bamboo staking	Steel wire	6	kg	100	Rs/kg	9,150	92 kg	9	3	9	6	18	6	41			
Bamboo staking	Plastic mesh net, 15 x 15 cm mesh	342	m	10	Rs/m	52,155	5216 m	513	171	513	342	1026	342	2309			
Pest control	Fungicide	1	package	250	Rs/pack	3,813	15 package	2	1	2	1	3	1	7	as needed		
Pest control	Insecticide	1	package	250	Rs/pack	3,813	15 package	2	1	2	1	3	1	7	as needed		
					(a)	114,085											
By TCP																Delivery method of TCP-procure item	
* Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	1,600	8 unit	2	1	1	1	3	--	--	10-Mar	TCP deliver goods to BPMU office at end of Feb., and BPMU deliver them to farmers.	
* Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	6,800	4 unit	1	0	1	1	1	--	--			
* Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	2,000	8 unit	2	1	1	1	3	--	--	20-Mar		
* Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 3m)	1	unit/farmer	5000	Rs/unit	10,000	2 unit	0	0	0	1	1	0	0	15-Mar	Delivery to sub-projects by supplier at end of Feb./early March.	
* Seedling production	Shade-net for low poly-tunnel, W2.0 m x L4m	4	m/farmer	70	Rs/m	2,800	40 m	8	4	4	4	12	8	--		TCP deliver goods to BPMU office at end of Feb., and BPMU deliver them to farmers.	
* Seedling production	Clip to fix shade-net on poly-tunnel	10	pc/farmer	15	Rs/pc	1,500	100 pc	20	10	10	10	30	20	--			
Seedling production	Plastic pot for cucumber (about 400ml)	400	pots	0.57	Rs/pot	3,486	6100 pots	600	200	600	400	1200	400	2700			
Seedling production	Cocopeat	1	block	150	Rs/block	2,288	15 block	2	1	2	1	3	1	7			
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	3,050	15 pack	2	1	2	1	3	1	7			
* Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	12,800	32 unit	8	4	4	4	12	--	--	20-May	TCP deliver goods to BPMU office at middle/end of April, and BPMU deliver them to farmers.	
* Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0 unit	--	--	--	--	--	--	--			
					(b)	33,523											
By Farmers																	
Bed preparation	FYM	1	truck	1500	Rs/truck	22,875	15 truck	2	1	2	1	3	1	7	10-Mar		
Bamboo staking	Bamboo post	126	post	10	Rs/pot	19,215	1922 post	189	63	189	126	378	126	851	30-Mar		
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	6,100	76 bundle	8	3	8	5	15	5	34			
* Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	3,200	8 set	2	1	1	1	3	--	--			
* Bamboo staking	Nail	1.0	kg		Rs/kg	0	8 kg	1.5	0.5	1.5	1.0	3.0	--	--			
* Seedling production	Vermin compost	40	liter			0	0 liter								15-Mar		
					(c)	51,390											
					(a)+(b)+(c)	198,998											

Sheet C : Cultivation schedule - Hamirpur

Works	1	2	3	4	5	6	7	8	9	10	11	12
Harvesting of wheat				XX *10-20 April*								
Cucumber												
Field preparation												
Plowing			X									
Bed making, Mulch sheets			XX									
Bamboo staking				XX XX								
Sowing in pots	**Late March**		**XX**									
Transplanting	**Late April**			**XX**								
Pest control												
Watering												
Fertilizing												
Training, Leaf-removing												
Harvesting, Selling												
Cleanup												
Cauliflower												
Sowing in pots	**Early July**						**XX**					
Transplanting	**1th - 5th of August**							**X**				
Pest control												
Watering												
Fertilizing												
Harvesting, Selling												
Cleanup												
Removing mulch sheets												

	Farm works	**Method**	**Remarks**
Field Preparation			
	Plowing	By 4 wheel tractor	Do it in middle of March
	Apply FYM	1 truck /kanal	
	Apply NPK	12:32:16, 9kg per kanal, Apply only on beds	
	Bed making	By tiller with ridger & by manual, 80cm width	Bed making should be finished before end of March
	Set drip tubes on beds		Next work of prepare bamboo staking require time.
	Cover with mulch sheets	By manual	Farmer should allot abundant time for preparing bamboo staking.
	Install bamboo posts	3m interval	Staking should be ready when transplanting takes place; i.e. Finish it before end of April.
	Set wires, mesh net	Set mesh net on upper side	If no proper staking, harvest can be decreased in large amounts.
Sowing in pots (Cucumber)		350 seedlings/kanal, Add extra 10%.	
	Prepare potting soil	Soil : Cocopeat : Vermin compost = 1.5 : 1 : 0.5	
	Prepare place to keep pots	Sunny place especially morning hours, Use a shade-net during daytime	
	Sowing	1 seed per pot	
	Watering,	By water can	
Transplanting (Cucumber)		90cm interval	



Hamirpur - Target date of Cucumber sowing

Sub-project	EO	Sowing		Transplanting	
Majhot	Nitika	26-Mar	EO guidance	23-Apr	EO guidance
Dharnasi	Nitika	25-Mar	EO guidance	22-Apr	EO guidance
Kirwin	Jyoti	25-Mar	EO guidance	21-Apr	TCP guidance
Beha	Jyoti	24-Mar	TCP guidance	22-Apr	EO guidance
Diot-1	Himani	25-Mar	EO guidance	22-Apr	EO guidance
Manjru	Himani	26-Mar	EO guidance	23-Apr	EO guidance
Guriah	Himani	Mid Mar	--	Mid Apr	--

★ Date for EO guidances shown in the above are tentative target,
EO shall discuss with farmers to finalize the date for sowing in advance.

Sheet D : Target time of sowing & transplanting

As of 20 Jan. 2020

Target times are set;
- by Farmers of sub-projects participated the 2019 trial (marked *) with BPMU/TCP assistance for production planning [A]
- by TCP for new sub-projects.

Seedlings are ready to transplant at about 30 days after sowing

BPMU	Sub-Project			Cucumber		Cauliflower		
				Sowing	Transplanting	Sowing	Transplanting	
Hamirpur	H-1006	LIS Majhot		Late March	Late April	Early July	Early Aug	
	H-1035	LIS Dharnasi						
	H-1052	LIS Diot-1						
	H-1015	LIS Kirwin						
	H-3014	LIS Beha						
		LIS Manjru	*	Late March	Late April	Early July	Early Aug	
		LIS Guriah	*	Mid Jan (in poly house)	Early March	Early July	Early Aug	Section 1: 600m2
				Mid March	Mid April			Section 2: 1800m2
Sarkaghat	S-1093	LIS Karadi Kandyol		Late March	Late April	Late June	Late July	
	S-M-1042	FIS Ropri to Khanvod		End March - Beginning April	End April - Beginning May	Late June	Late July	
	~~S-M-1062~~	~~FIS Lingari to Chid Badhanu~~						
	S-1100	LIS Ukhala	*	5-10 April	1-5 May	Late June	27-31 July (Last week of July)	
	S-1117	LIS Damella	*					
Una		LIS Berian		Late March	Late April	Early July	Early Aug	
		LIS Krishna Nagar						
Dehra	D-1007	FIS Ketal Kuhal		Late March	Late April	Early July	Early Aug	
Bilaspur		LIS Kahali						
		LIS Parohi						
		LIS Domehar						
		LIS Ghandir						
		LIS Swara						
		LIS Noa	*					
		LIS Nalwar Kotlu	*	Mid March	Mid April	Early July	1-5 Aug	
		LIS Chhiber Ballu	*	End Jan (in poly house)	Mid March	Early July	Early Aug	Section 1: 300m2
				End March	Mid April	Mid July	Mid Aug	Section 2: 500m2
		LIS Fogog	*	End March - Beginning April	End April - Beginning May	Early July	Early Aug	

Sheet E : Training plan

Pre-demonstration to EOs (TOT)

Purpose: TOT. To let EOs gain the knowledge / skill of farm works for field preparation.
After this training, EOs should be ready to conduct a demonstration to farmers by themselves.
Participants : All EOs work on this activity (about 10 persons)
Instructor: TCP Expert
Venue : Diot-1, Hamirpur
Date : 2nd of March (Monday)
Contents: Practical training of farm works for Field Preparation

Demonstration to new farmers by EOs

Purpose: To let farmers gain the knowledge / skill of farm works for field preparation.
Participants : All (8) new farmers
Instructor: EOs (TCP Expert shall assist EOs)
Venue : Majhot
Date : 3rd of March
Contents: 1) Explain the farm works to do & deadline, items to be prepared by farmers (* A paper should be delivered)
2) Demonstrate all works of Field Preparation; except plowing by 4-wheel tractor

Plowing (* To be done by farmer before the demonstration)	
Apply FYM	Bed making
Apply NPK	Set drip tubes
Cover with mulch sheets	Install bamboo posts
Set wires and mesh net	

3) Instruct the preparation for sowing (* Technical manual should be delivered)

On-site guidance to farmers by TCP (OJT of EOs)

Purpose: Instruct farm works to farmers on-site. Check the field/crop condition and provide a instruction to improve.
EOs shall learn what to be checked in the field and what to instruct farmers.
EOs shall carry out same instruction / field check by themselves at other sub-projects.

	Time		Place	
Sowing in pots, Check - Bed making	24-Mar	fixed	Beha	
Check 1- Seedlings, Bed making	1-Apr	fixed	Dharnasi, Diot-1	1 week after sowing
Transplanting	21-Apr	tentative	Kirwin	
Check 2	30-Apr	tentative	Dharnasi, Diot-1	
Check 3	18-May	tentative	Dharnasi, Diot-1	
Check 4	3-Jun	tentative	Dharnasi, Diot-1	
Check 5	middle June	if necessary	Dharnasi, Diot-1	
Sowing in plug-trays	29-Jun	tentative	To be determined in June	
Check 6- Seedlings	13-Jul	tentative	Dharnasi, Diot-1	
Transplanting	31-Jul	tentative	To be determined in June	
Check 7	middle Aug	to be determined in May	Dharnasi, Diot-1	1 week after sowing
Check 8	early Sep	to be determined in May	Dharnasi, Diot-1	
Check 9	middle Sep	to be determined in May	Dharnasi, Diot-1	
Check 10	early Oct	to be determined in May	Dharnasi, Diot-1	

*Notes : "Check" are to be basically made at Dharnasi & Diot-1in half-day. And all EOs should join the work always.
However, sub-project(s) to go for check can be altered by the condition of crop, etc.
Sub-project where problem is seen has higher priority to go for check.

On-site guidance to new farmers by EO

Date: EO shall determine the time for:
Subjects: 1) Operation & maintenance of drip irrigation system
2) Safe use of agri-chemical, if necessary
3)

Date of On-site guidance by TCP (OJT to EOs)

BPMU	Demonstration *1st week of March*			Sowing cucumber *4th week of March*			Transplanting *about 30 days after sowing*		
Sarkaghat	6-Mar	Fri	Karadi Kandyol	28-Mar	Sat	Ropri to Khanvod	24-Apr	Fri	Ropri to Khanvod
Hamirpur	3-Mar	Tue	Majhot	24-Mar	Tue	Beha	21-Apr	Tue	Kirwin
Dehra				27-Mar	Fri	Ketal Kuhal	27-Apr	Mon	Ketal Kuhal
Una	9-Mar	Mon	Berian	25-Mar	Wed	Berian, Krishna Nagar	22-Apr	Wed	Berian, Krishna Nagar
Bilaspur	5-Mar	Thu	?	?		?	?		
[D1-1(6)] Baijnath	---		---	31-Mar	Tue	Raghulu	29-Apr	Wed	Raghulu

Instruct to prepare materials & hired labor -- 3/31
Drainage making -- 4/16,17,18
Bed making -- 4/18
* Move to the site 4/16, Back to Hamirpur 4/19 (sun)
* No work during 4/10-4/15 due to Holidays + Sat, Sun

Sheet F :

Use of "WhatsApp" in the Extension Service
to Communication with farmers, to Monitor the progress of farm work/crop conditions, etc.

1. Benefits expected

Farmer will see a farm work finished by other farmers.

==> It must push him to do a work on-time.

==> It can be an example of work. If he see a good example, quality of work (such as bed making, staking) may maintained/go up.

EOs are easy to know the progress of farm works, current condition of crops

2. No-good points expected

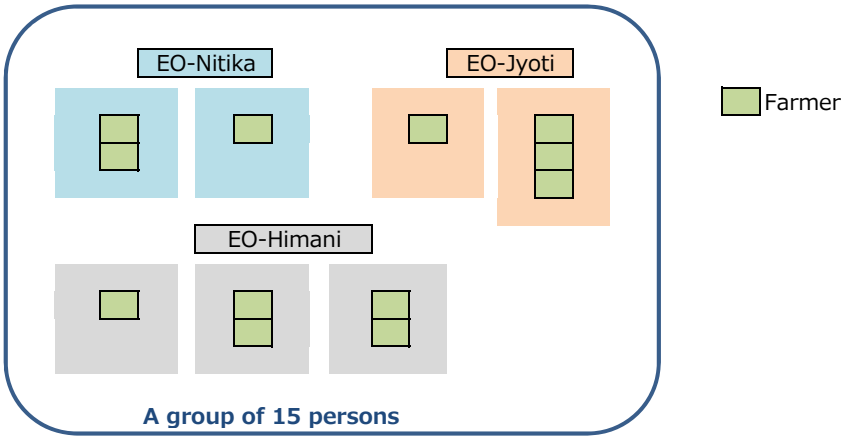
If farmer see a bad example, quality of work may go down.

==> Select a best farmer as [Leading Farmer], and let him to send a photo ahead to other farmers.

3. EOs idea on usage of "WhatsApp" in this activity - BPMU Hamirpur

12 farmers in 7 sub-projects
3 EOs

✓ Form one group to cover all 12 farmer and 3 EOs
✓ No sub-groups by each EOs



- A farmer will know more about other farmers than making a group by each EO
- If a farmer send one photo per week, each member receive 48 photos/month (=12 farmers x 1 photo x 4 weeks). Is it not too much ?

4. Hot-line system (group) by TCP/SPMU and all EOs of 5 BPMUs

If a problem hard to solve by EOs emerge; such as damage of crop by un-known cause, EO report it to TCP/SPMU. And TCP/SPMU provide a countermeasure / come to field to check.

Report of a problem & given countermeasure goes to EOs of other BPMUs, and EOs can take a precaution / solve same problem promptly.

Sheet G : WBS for preparatory works

Cultivation Schedule
Preparation of beds & staking
< Cucumber >
< Cauliflower > ★ sowing ▲ transplanting ★ ▲

	Start	End	Responsible	Output		1	2	3	4	5	6	7	8
1 Preparatory works - Procurement by BPMU									*Finish before 10-March*				
Finalize the Q'ty of items													
- Ask the field size to farmers again.	20-Jan	24-Jan	EOs			X							
- Check the possession of low poly-tunnel to each farmer.	20-Jan	24-Jan	EOs			X							
- Inquire BPM about budget for the materials for Guriah (PD).	27-Jan	27-Jan	EO with TCP			X							
Inform to BPM to select shops/suppliers for each item.	27-Jan	27-Jan	Nitika with TCP			X							
Get quotations - 3 quotation per item	2-Feb	7-Feb	EOs				X						
Decide the supplier & Make orders	7-Feb	7-Feb	BPM				X						
Delivery to BPMU		29-Feb					XX						
Delivery to sub-projects by seller		10-Mar						XX					
Delivery to farmers by BPMU		10-Mar	EOs					XX					
Procurements by TCP													
Procurements by Farmers													
2 Preparatory works - Installing drip irrigation													
Designing by BPMU & service provider													
Installation by service provider									*Finish all sites before end of March !!*				
Ask BPM about current status/progress of designing work	27-Jan	27-Jan	Nitika with TCP										
Inform BPM the time schedule (deadline) of installation work.	27-Jan	27-Jan	Nitika with TCP										
Give a clear explanation about requirements to service provider at site, if possible			EOs				XX						
Check the made-design by service provider, in case it has already made.			EOs				XX						
Approval & Order of works by BPM			BPM				X						
Discuss and fix the schedule of installation work			EOs				X						
*** 1st installation should be Majhot or Dharnasi or Diot-1 ***													
Make sure that farmer is at home when installation take place.			EOs										
Supervise the installation			EOs										
Inspect the installed system. Supervise a commissioning test			EOs					X X X					
Inform the schedule of installation work to TCP			Nitika				X						
Arrange to dispatch TCP Expert to assist the supervision work at 1st sub-project			TCP			X	X						
Assist EO's supervision at site (one day only, Majhot or Dharnasi or Diot-1)			TCP				X						
< LIS Kirwin, Jai Sign (Motivator) >													
Instruct to improve (cement the inside and put proper cover on top) the water deliver gate at water tank.	Early Feb	Early Feb	Jyoti				X						
Cement the inside of water deliver gate & set a proper cover	Early Feb	Mid Feb	Farmer				X						
Check the improvement made by farmer	Mid Feb	Mid Feb	Jyoti				X						
Show TCP photos of the improved gate	Mid Feb	Mid Feb	Jyoti				X						
3 Ensure on-time & proper field preparation by farmers													
Ensure the on-time procurement by Farmers													
Inform the items to be prepared by farmers and deadline in advance, i paper	3-Mar	3-Mar	EOs			Demonstration		X					
Ensure the on-time field preparation by Farmers													
< LIS Beha >													
Look for a possibility to borrow a tiller from sub-project(s) nearby.	1-Feb	29-Feb	Jyoti										
Discuss with Beha farmers to arrange a truck to carry tiller.	1-Mar	10-Mar	Jyoti										
4 Kick off a "Monitoring by WhatsApp "													
Explain to the farmers "when" "how" to take photos, and how to send it t the group members	3-Mar	3-Mar	EOs					X					
Explain to PD about an idea of [Leading farmer] and request him to sen photos ahead to other farmers.	3-Mar	3-Mar	EO					X					

	Start	End	Responsible	Output		1	2	3	4	5	6	7	8

Schedule of On-site guidance by TCP - All BPMU As of 28 Jan. 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat	
1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	Demonstration
Work	Pre-demonstration	Demonstration		Demonstration	Demonstration	DC meeting	
BMPU	Hamirpur	Hamirpur		Bilaspur	Sarkaghat		
Sub-project	Diot-1	Majhot					
8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	
	Demonstration						
	Una						
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	Sowing cucumber
		Sowing	Sowing		Sowing	Sowing	
		Hamirpur	Una		Dehra	Sarkaghat	
		Beha			Ketal Kuhal		
29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	
		Sowing					
		Baijnath	Hamirpur		Una	Bilaspur	
		Raghulu	Dharnasi, Diot-1				
5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	
		DC meeting					
	Sarkaghat		Dehra				
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	
				Install underground drainage, Bed making			
				Baijnath	Baijnath	Baijnath	
				Raghulu	Raghulu	Raghulu	
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	Transplanting
		Transplanting	Transplanting		Transplanting		
		Hamirpur	Una		Sarkaghat		
		Kirwin					
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May	Transplanting
	Transplanting		Transplanting				
	Dehra		Baijnath	Hamirpur	Una	Bilaspur	
	Ketal Kuhal		Raghulu	Dharnasi, Diot-1			
3-May	4-May	5-May	6-May	7-May	8-May	9-May	
			DC meeting				
	Sarkaghat				Dehra		
10-May	11-May	12-May	13-May	14-May	15-May	16-May	
		Check					
		Baijnath					
		Raghulu					
17-May	18-May	19-May	20-May	21-May	22-May	23-May	
	Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
24-May	25-May	26-May	27-May	28-May	29-May	30-May	
		Check					
		Baijnath					
		Raghulu					
31-May	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	
			Hamirpur	Una		Bilaspur	
7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	
	DC meeting				Check		
		Sarkaghat	Dehra		Baijnath		
					Raghulu		
14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	
21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	
					Sowing		
					Baijnath		
					Raghulu		
28-Jun	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	Sowing cauliflower
	Sowing	Sowing	Sowing	Sowing	Sowing		
	Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
5-Jul	6-Jul	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	
		DC meeting			Check		
					Baijnath		
					Raghulu		
12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	
	Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	
26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	
	Transplanting				Transplanting		
	Baijnath				Hamirpur		Transplanting
	Raghulu						
2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	Transplanting
	Transplanting	Transplanting	Transplanting	Transplanting	DC meeting		
	Una	Bilaspur	Sarkaghat	Dehra			

Operating Plan

for

Extension of Cucumber + Early Cauliflower cultivation

by use of mulching sheet & drip irrigation (2020)

BPMU Sarkaghat

January 2020

Prepared by JICA TCP & BPMU

Note

This paper is prepared to assure an error-free and on-time launch of this extension activity by BPMUs and TCP.

This paper covers the:
Essential information for planning such as target sub-projects, farmers & field area, available irrigation facility/machinery, Procurement plan, Cultivation schedule and target time of sowing, TOT plan, Use of "WhatsApp" and WBS for preparatory works. And overall schedule of on-site guidance by TCP until early-August is attached for reference.

This paper does not describe the:
Procurement plan and TOT plan for cauliflower cultivation, and associated works to carry out in/after July such as field visiting by farmers of other sub-projects in harvest time, crop-wise reports preparation, review/wrap-up meeting, etc.

Sheet A : Summary sheet of sites for 2020-activity "Extension of Cucumber + Early Cauliflower [D-2(1)]"

Revised on 07 Feb. 2020

BPMU SARKAGHAT

	Sub-project		EO in charge	Farmer's name	Did the trial in 2019	CCA or not	Current situation (Availability)				Required Installation	Field area (m2) to install drip irrigation	Field area (m2) for Cucumber	Field area (m2) for Cauliflower	Procurement of tiller	Support by BPMU	Remarks
							Water source	Drip irrigation	Tiller (small)	Low poly tunnel							
New sites	S-1093	LIS Karadi Kandyol	Minisha	R. Kumar		CCA	Project hydrant	Yes. Farmer has a drip system in other field. 400m2	Yes	No	Drip system; To shift in the target field (BPMU bear the cost for shift and make arrangement)	200	200	200	---	BPMU support 90% of costs, for both drip installation and materials. Farmer pay 10%.	Confirm the valve on hydrant. Surface drainage system is essential for cauliflower.
	S-M-1042	FIS Ropri to Khanvod	Sunita	Krishan		CCA	Project hydrant	Yes. Installed by BPMU, but tubes are 60cm interval, 200m2	Yes	No	No installation. *Abandon the idea of replacing tubes; 60cm to 30cm interval.*	0	200	200	---		
				B R Kaundal		CCA	Project hydrant	Yes. Installed by BPMU, but tubes are 60cm interval, 200m2		No		0	200	200	---		
Preceding sites	S-1100	LIS Ukhala	Sunita	Amar Nath (President)	yes	CCA	Project hydrant	Yes (installed by 2019 trial), 800m2	Yes (KVA)	No	Nil	--	500	0	---	Same as above.	Farmer intends to grow only cucumber; it means mulching sheets are no necessary.
				Amar Nath (Poly-house owner)	yes	CCA	Project hydrant	Yes (installed by 2019 trial), 200m2		No	Nil	--	200	200	---		
				Om Prakash	yes	CCA	Project hydrant	Yes (installed by 2019 trial), 200m2		No	Nil	--	200	200	---		
				Ishwar		CCA	Project hydrant	No		No	Drip system	150	150	150	---		
		LIS Khanote	Minisha	Sunil		No	Personal tube well	Yes about 400m2. Farmer wants to extend the area another about 200m2	Yes	No	Farmer will arrange main pipe (about 11m long) by using 20ft HDPE water pipes with coupling; cut and connect them. Also farmer will arrange control valves & nipples at his cost.	200	600	600	---		When farmer prepare main pipe, TCP shall arrange 1 roll (300m) tube for 200m2.
	S-1117	LIS Damella	Minisha	Sohan Lal		CCA	Private irrigation system; share-used; River=>Pump=>Tank=>Pipe/Gravity=>Field	Yes (installed by 2019 trial)	Yes	Yes	Nil	--	400	400	---		
				Pardeep		CCA		Yes (installed by 2019 trial)		Yes	Nil	--	400	400	---		
				Ramesh		CCA		Yes (installed by 2019 trial)		Yes	Nil	--	200	200	---		
				Gurdev		CCA		Yes (installed by 2019 trial)		Yes	Nil	--	400	400	---		
		5 sub-projects	**2 EOs**	**12 Farmer (Preceding 3 + New 9)**							**Total (m2)**	**550**	**3650**	**3150**			

Sheet B : Procurement plan - items & q'ty, cost share, deadline of procurement - BPMU Sarkaghat

Revised on 07 Feb. 2020

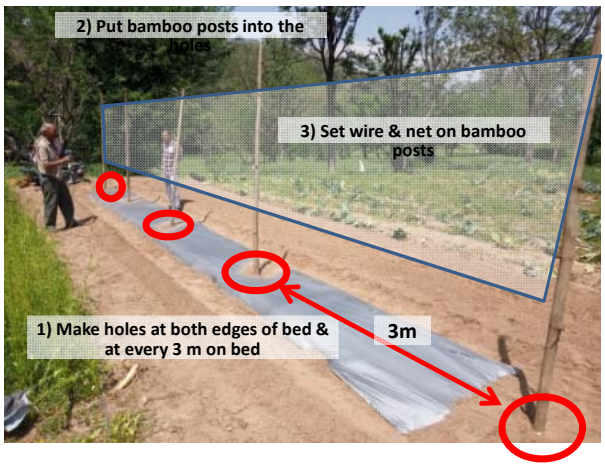
								Field area	200	400	1050	600	1400			
								Nos. of farmers	1	2	4	1	4			
	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty		LIS Karadi Kandyol	FIS Ropri to Khanvod	LIS Ukhala	LIS Khanote	LIS Damella	Deadline for installation /delivery	Purchase from	Responsible EO
By BPMU																
Watering	Drip irrigation system (new installation)	1	set	various	Rs/set		1 set		0	0	1	0	0	end March		
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		0 unit		0	0	0	0	0			
Bed preparation	Mulching sheet	342	m	8	Rs/m	24,966	3121 m		171	342	898	513	1197	10-Mar		
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	2,053	82 kg		5	9	24	14	32			
Bamboo staking	Steel wire	6	kg	100	Rs/kg	2,100	21 kg		3	6	3	9	0			
Bamboo staking	Plastic mesh net	342	m	10	Rs/m	24,208	2421 m		171	342	598	513	797			
Pest control	Fungicide	1	package	250	Rs/pack	2,281	9 package		1	1	3	2	4	as needed		
Pest control	Insecticide	1	package	250	Rs/pack	2,281	9 package		1	1	3	2	4	as needed		
					(a)	57,889										
By TCP															**Delivery method of TCP-procure items**	
* Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	800	4 unit		1	2	1	0	0	10-Mar	TCP deliver goods to BPMU office at end of Feb., and BPMU deliver them to farmers.	
* Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	6,800	4 unit		1	1	0	1	1			
* Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	1,250	5 unit		1	2	1	1	0	20-Mar		
* Seedling production	Low poly-tunnel (pipe frame only)	1	unit/farmer	5000	Rs/unit	35,000	7 unit		1	2	4	0	0		Delivery to sub-projects by supplier at end of Feb./early March.	
* Seedling production	Shade net for low poly-tunnel, W2 m x L5m	5	m/farmer	70	Rs/m	2,800	40 m		5	10	20	5	0			
* Seedling production	Clip to fix shade net on poly-tunnel	10	pc/farmer	15	Rs/pc	1,050	70 pc		10	20	40	0	0	15-Mar	TCP deliver goods to BPMU office at end of Feb., and BPMU deliver them to farmers.	
Seedling production	Plastic pot (about 400ml)	400	pots	0.57	Rs/pot	2,086	3650 pots		200	400	1050	600	1400			
Seedling production	Cocopeat	1	block	150	Rs/block	1,369	9 block		1	1	3	2	4			
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	1,825	9 pack		1	1	3	2	4			
* Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	8,000	20 unit		4	8	4	4	0	20-May	TCP deliver goods to BPMU office at middle/end of April, and BPMU deliver them to farmers.	
* Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0 unit		0		0	0	0			
					(b)	60,979										
By Farmers																
Bed preparation	FYM	1	truck	1500	Rs/truck	13,688	9 truck		1	1	3	2	4	10-Mar		
Bamboo staking	Bamboo post	126	post	10	Rs/pot	11,498	1150 post		63	126	331	189	441	20-Mar		
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	3,650	46 bundle		3	5	13	8	18			
* Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	3,200	8 set		1	1	1	2	3			
* Bamboo staking	Nail	1.0	kg		Rs/kg	0	9 kg		0.5	1.0	2.6	1.5	3.5			
* Seedling production	Vermin compost	40	liter			0	0 liter							15-Mar		
					(c)	32,035										
					(a)+(b)+(c)	150,904										

Sheet C : Cultivation schedule - Sarkaghat

Works	1	2	3	4	5	6	7	8	9	10	11	12
Harvesting of wheat				XX	*End April - Early May*							
Cucumber												
Field preparation												
Plowing			X									
Bed making, Mulch sheets			XX			*Bed making should be finished before end of March.*						
Bamboo staking			X	XX XX		*Staking should be finished before wheat harvest.*						
Sowing in pots												
Ropri to Khanvod	**Late March**		X									
Ukhala, Khanote, Karadi Kandyol, Damella	**Late March**		X									
Transplanting	about 30days after sowing			XX								
Pest control												
Watering												
Fertilizing												
Training, Leaf-removing												
Harvesting, Selling												
Cleanup												
Cauliflower												
Sowing in pots	**Late June**					X						
Transplanting	**Late July**						X					
Pest control												
Watering												
Fertilizing												
Harvesting, Selling												
Cleanup												
Removing mulch sheets												

Technical notes:

Farm works	Method	Remarks
Field Preparation		
Plowing	By 4 wheel tractor	Do it in middle of March
Apply FYM	1 truck /kanal	
Apply NPK	12:32:16, 9kg per kanal, Apply only on beds	
Bed making	By tiller with ridger & by manual, 80cm width	Bed making should be finished before end of March
Set drip tubes on beds		Next work of prepare bamboo staking require time.
Cover with mulch sheets	By manual	Farmer should allot abundant time for preparing bamboo staking.
Install bamboo posts	3m interval	Staking should be ready when transplanting takes place; i.e. Finish it before wheat harvest
Set wires, mesh net	Set mesh net on upper side	If no proper staking, harvest can be decreased in large amounts.
Sowing in pots (Cucumber)	350 seedlings/kanal, Add extra 10%.	
Prepare potting soil	Soil : Cocopeat : Vermin compost = 1.5 : 1 : 0.5	
Prepare place to keep pots	Sunny place especially morning hours, Use a shade-net during daytime	
Sowing	1 seed per pot	
Watering,	By water can	
Transplanting (Cucumber)	90cm interval	



Sarkaghat - Target date of Cucumber sowing

Sub-project	EO	Sowing		Transplanting	
LIS Karadi Kandyol	Minisha	29-Mar	EO guidance	25-Apr	EO guidance
FIS Ropri to Khanvod	Sunita	28-Mar	TCP guidance	24-Apr	TCP guidance
LIS Ukhala	Sunita	Late Mar		Late Apr	
LIS Khanote	Minisha	30-Mar	EO guidance	26-Apr	EO guidance
LIS Damella	Minisha	Late Mar		Late Apr	

★ EO should discuss with farmers to set a exact date for sowing in advance.

★ TCP will instruct drip-tube replacment work at FIS Ropri to Khanvod when sowing cucumber in late March.

Sheet D : Training plan - BPMU Sarkaghat

Pre-demonstration to EOs (TOT)

Purpose: TOT. To let EOs gain the knowledge / skill of farm works for field preparation.
After this training, EOs should be ready to conduct a demonstration to farmers by themselves.
Participants : All EOs work on this activity (about 10 persons)
Instructor: TCP Expert
Venue : Diot-1, Hamirpur
Date : 2nd of March (Monday)
Contents: Practical training of farm works for Field Preparation
Note: Come with a working cloth!!

Demonstration to new farmers by EOs

Purpose: To let farmers gain the knowledge / skill of farm works for field preparation.
Participants : All (5) new farmers
Instructor: EOs (TCP Expert shall assist EOs)
Venue : Karadi Kandyol Field for demo. : Any empty field near the poly-house.
Date : 6th of March
Contents: 1) Explain the farm works to do & deadline, items to be prepared by farmers (* A paper should be delivered)
2) Demonstrate all works of Field Preparation; except plowing by 4-wheel tractor
Plowing (* To be done by farmer before the demonstration)
Apply FYM — Bed making
Apply NPK — Set drip tubes
Cover with mulch sheets — Install bamboo posts
Set wires and mesh net
3) Instruct the preparation for sowing (* Technical manual should be delivered)

On-site guidance to farmers by TCP (OJT of EOs)

Purpose: Instruct farm works to farmers on-site. Check the field/crop condition and provide a instruction to improve.
EOs shall learn what to be checked in the field and what to instruct farmers.
EOs shall carry out same instruction / field check by themselves at other sub-projects.

	Time		Place	
Sowing in pots, Check - Bed making	28-Mar	fixed	Ropri to Khanvod	
Check 1- Seedlings, Bed making	6-Apr	fixed	Karadi Kandyol	1 week after sowing
Transplanting	24-Apr	fixed	Ropri to Khanvod	
Check 2	4-May	fixed	Karadi Kandyol	
Check 3	middle May		Karadi Kandyol	
Check 4	early June		Karadi Kandyol	
Check 5	middle June		Karadi Kandyol	
Sowing in plug-trays	2-Jul	tentative	To be determined in June	
Check 6- Seedlings	middle July		Karadi Kandyol	
Transplanting	5-Aug	tentative	To be determined in June	
Check 7	middle Aug		Karadi Kandyol	1 week after sowing
Check 8	early Sep		Karadi Kandyol	
Check 9	middle Sep		Karadi Kandyol	
Check 10	early Oct		Karadi Kandyol	

*Notes : "Check" are to be basically made at Karadi Kandyol in half-day. And all EOs should join the work always.
However, sub-project(s) to go for check can be altered by the condition of crop, etc.
Sub-project where problem is seen has higher priority to go for checking & giving guidance.

On-site guidance to new farmers by EO

EO shall provide on-site training for:

Subjects	Time
1) Operation & maintenance of drip irrigation system	before transplanting
2) Safe use of agri-chemical	when needed
3)	

Date of On-site guidance by TCP (OJT to EOs) (updated)

BPMU	**Demonstration** *1st week of March*		**Sowing cucumber** *4th week of March*		**Transplanting** *about 30 days after sowing*	
Sarkaghat	6-Mar Fri	Karadi Kandyol	28-Mar Sat	Ropri to Khanvod	24-Apr Fri	Ropri to Khanvod
Hamirpur	3-Mar Tue	Majhot	24-Mar Tue	Beha	21-Apr Tue	Kirwin
Dehra	-------	------	27-Mar Fri	Ketal Kuhal	27-Apr Mon	Ketal Kuhal
Una	9-Mar Mon	Berian	25-Mar Wed	Berian, Krishna Nagar	22-Apr Wed	Berian, Krishna Nagar
Bilaspur	5-Mar Thu	Nalwar Kotlu	----	----	----	----
[D1-1(6)] Baijnath	---	---	31-Mar Tue	Ragloo	29-Apr Wed	Ragloo

Sheet E : WBS for preparatory works - BPMU Sarkaghat

As of 21 Jan. 2020 Revised (added the works) by TCP, 03 Feb. 2020

Cultivation Schedule

Preparation of beds & staking ←→

< Cucumber > ★ ▲ Harvest

< Cauliflower > sowing transplanting ★

	Sub-project	Start	End	Responsible	1	2	3	4	5	6	7
1 Preparatory works - Procurement by BPMU								*Finish before 10-March*			
Finalize the Q'ty of items			3-Feb			X					
- Check the tiller model and Send photos to TCP	Karadi Kandyol		28-Jan	Minisha	X						
- Ask farmer (Amar Nath (President), Ukhala) his plan for 2020 area for cucumber and cauliflowe	Ukhala		24-Jan	Sunita	X						
- Confirm farmers' production plan by using drip irrigation fo 2020; kinds of crop and area, cropping schedule	Damella		31-Jan	Minisha	X						
** TCP Output-2 says that Farmers plan to grow Cucumber and Tomato + Early cauliflower*											
Pre-Inform to BPM a draft list of items to procure, and deadline.				Sunita	X						
Request BPM to select shops/suppliers for each item.				Sunita	X						
Get quotations - 3 quotation per item						X					
Decide the supplier & Make orders						X					
Delivery to BPMU						XX					
Delivery to farmers by BPMU							XX				
Procurements by TCP											
Procurements by Farmers											
2 Preparatory works - Installing drip irrigation											
Designing by BPMU & service provider								*Finish all sites before end of March !!*			
Installation by service provider											
Ask BPM about current status/progress of designing work		21-Jan	22-Jan	Sunita	X						
Inform BPM the time schedule (deadline) of installation work.		21-Jan	22-Jan	Sunita	X						
Ask/discuss with BPM about supply of drip tubes to Ropri to Khanvod (400m2) and Khanote (200m2)		21-Jan	22-Jan	Sunita	X						
Inform the result of discussion with BMP to TCP			31-Jan	Sunita	X						
Give a clear explanation about requirements to service provider a site	Ukhala			Sunita		XX					
Itemize the farmer's work to do before installation at site				EOs		XX					
Check the made-design by service provider				EO, BPM		XX					
Approval & Order of works by BPM, DPM				BPM		X					
Discuss and fix the schedule of installation work				EO		X					
Make sure that farmer is at home when installation take place.				EO							
Supervise the installation (Ukhala), Shifting (Kradi K), Setting tubes (Khanote)				EO							
Inspect the installed system. Supervise a commissioning test							X X X				
Assist the supervision by TCP (Amit)	Ukhala			TCP Amit			X				
Inform the schedule of installation work at Ukhala to TCP	Ukhala			Sunita		X					
(*Installation should be 2nd or 3rd week of March)											
3 Ensure on-time & proper field preparation by farmers											
Ensure the on-time procurement by Farmers											
Inform the items to be prepared by farmers and deadline i advance, in paper		6-Mar	6-Mar	EOs	Demonstration		X				
Ensure the on-time field work by Farmers											
Discuss with farmers and set exact date to do the works - Plowing, Start/finish bed making, Start staking; at the time of demonstration		6-Mar	6-Mar	EOs			X				
4 Kick off a "Monitoring by WhatsApp"											
Discussion by EOs & BPM to finalized a system/details			end-Feb	EO, BPM		X X X					
**Check "Sheet F - Idea of BPMU Bilaspur"; a example for your discussion*											
Explain to farmers what they have to do.		6-Mar	6-Mar	EO							
Teach how to use "WhatsApp", if possible.		6-Mar	6-Mar	EO							
5 Preparation for the Demonstration											
Ask farmer - Can he provide a empty field (min. 100m2) for the Demonstration to be held on 6-March.	Karadi Kandyol		28-Jan	Minisha							
6 Others											
Suggest farmers to sow cucumber in late March; not 5-10 April.	Ukhala		24-Jan	Sunita							

Sheet F:

Tentative idea on Use of "WhatsApp" in the activity to Communication with farmers, to Monitor the progress of farm work/crop conditions, etc.

BPMU Bilaspur

For reference

How do you use "WhatsApp" now ?
Dose BMPU Bilaspur have an agreed (established) system ?
What are benefits to use "WhatsApp" ?
What are no-good for EOs / Farmers to use "WhatsApp" ?

At BPMU Bilaspur, now, "WhatsApp" is not used by EOs positively/systemically to communicate with farmers.
No group is formed by EOs & famers.

1. Benefits expected

Farmer will see a farm work finished by other farmers.

==> It must push him to do a work on-time.

==> It can be an example of work. If he see a good example, quality of work (such as bed making, staking) may maintained / go up.

EOs are easy to know the progress of farm works, current condition of crops

2. No-good points expected

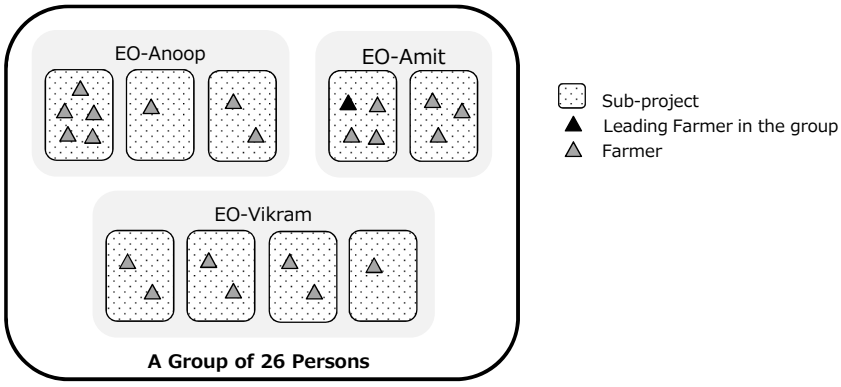
If farmer see a bad example, quality of work may go down.

==> Select a best/advanced farmer(s) as [Leading Farmer], and let him/her to send a photo ahead to other farmers.

3. EOs idea on usage of "WhatsApp" in this activity - BPMU Bilaspur as of 28 Jan. 2020

9 sub-projects
22 farmers (8 preceding + 14 new)
3 EOs

- ✓ Form one group to cover all 22 farmer and 3 EOs, also include BPM (total 26 person)
- ✓ No sub-groups by each EOs
- ✓ Leading Farmer can be Ms. Bavita-Nalwar Kotlu and Mr. Bhushan-Fogog.



4. Hot-line system by TCP/SPMU and all EOs (Proposed idea of TCP)

Purpose: If a problem emerge hard to solve by EOs; such as damage of crop by un-known insect, EO report it to TCP/SPMU. And TCP/SPMU provide a countermeasure / come to field to check.

Information goes to EOs of other BPMU, and EO can take a pre-caution measure / prompt problem solving.

Sheet : Target time of sowing & transplanting

As of 30 Jan. 2020

Target times are set;

- by Farmers of sub-projects participated the 2019 trial (marked *) with BPMU/TCP assistance for production planning [A]
- by TCP for new sub-projects.

Seedlings are ready to transplant at about 30 days after sowing

BPMU	Sub-Project			Cucumber		Cauliflower		
				Sowing	Transplanting	Sowing	Transplanting	
Hamirpur	H-1006	LIS Majhot		Late March	Late April	Early July	Early Aug	
	H-1035	LIS Dharnasi						
	H-1052	LIS Diot-1						
	H-1015	LIS Kirwin						
	H-3014	LIS Beha						
		LIS Manjru	*	Late March	Late April	Early July	Early Aug	
		LIS Guriah	*	Mid Jan (in poly house)	Early March	Early July	Early Aug	Section 1: 600m2
				Mid March	Mid April			Section 2: 1800m2
Sarkaghat	S-1093	LIS Karadi Kandyol		Late March	Late April	Late June	Late July	
	S-M-1042	FIS Ropri to Khanvod		Late March	Late April	Late June	Late July	
	S-1100	LIS Ukhala	*	5-10 April	1-5 May	Late June	27-31 July (Last week of July)	
		LIS Khanote		Late March	Late April	Late June	Late July	
	S-1117	LIS Damella	*	Late March	Late April			
Una		LIS Berian		Late March	Late April	Early July	Early Aug	
		LIS Krishna Nagar						
Dehra	D-1007	FIS Ketal Kuhal		Late March	Late April	Early July	Early Aug	
Bilaspur		LIS Kahali		Late March	Late April	Early July	Early Aug	
		LIS Parohi						
		LIS Domehar						
		LIS Ghandir						
		LIS Swara						
		LIS Noa						
		LIS Nalwar Kotlu	*	Mid March	Mid April	Early July	1-5 Aug	
		LIS Chhiber Ballu	*			Early July	Early Aug	Section 1??
						Mid July	Mid Aug	Section 2??
		LIS Fogog	*	End March - Beginning April	End April - Beginning May	Early July	Early Aug	

LIS Ukhala : Suggest the farmers to push forward sowing time to Late March

Popular season of Cucumber cultivation for commercial purpose with irrigation = Transplanting in mid-Feb., Harvest from end-March to end- May

LIS Kahali : Farmers are busy with tomato transplanting during end-March to early-April.

LIS Chhiber Ballu : Need to discuss with farmer about cucumber cultivation (plan for use of drip field) after harvesting cauliflower in Feb-March.
Also allot the field into 2 sections or not.

Schedule of On-site guidance by TCP - All BPMU (updated) 1/31/20

Sun	Mon	Tue	Wed	Thu	Fri	Sat	
1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	Demonstration
Work	Pre-demonstration	Demonstration		Demonstration	Demonstration	DC meeting	
BMPU	Hamirpur	Hamirpur		Bilaspur	Sarkaghat		
Sub-project	Diot-1	Majhot		Nawar Kotlu	Karadi Kandyol		
8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	
	Demonstration						
	Una						
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	Sowing cucumber
		Sowing	Sowing		Sowing	Sowing	
		Hamirpur	Una		Dehra	Sarkaghat	
					Ketal Kuhal	Ropri to K.	
29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	
		Sowing	Check-1		Check-1	Check-1	
		Baijnath	Hamirpur		Una	Bilaspur	
		Raghulu	Dharnasi, Diot-1				
5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	
	Check-1	DC meeting	Check-1				
	Sarkaghat		Dehra				
	Karadi Kandyol						
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	
				Install underground drainage, Bed making			
				Baijnath	Baijnath	Baijnath	
				Raghulu	Raghulu	Raghulu	
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	Transplanting
		Transplanting	Transplanting		Transplanting		
		Hamirpur	Una		Sarkaghat		
					Ropri to K.		
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May	Transplanting
	Transplanting		Transplanting				
	Dehra		Baijnath	Hamirpur	Una	Bilaspur	
	Ketal Kuhal		Raghulu				
3-May	4-May	5-May	6-May	7-May	8-May	9-May	
	Check-2		DC meeting				
	Sarkaghat				Dehra		
	Karadi Kandyol						
10-May	11-May	12-May	13-May	14-May	15-May	16-May	
		Check					
		Baijnath					
		Raghulu					
17-May	18-May	19-May	20-May	21-May	22-May	23-May	
	Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
24-May	25-May	26-May	27-May	28-May	29-May	30-May	
		Check					
		Baijnath					
		Raghulu					
31-May	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	
			Hamirpur	Una			
7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	
	DC meeting				Check		
		Sarkaghat	Dehra		Baijnath		
					Raghulu		
14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	
21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	
					Sowing		
					Baijnath		
					Raghulu		
28-Jun	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	Sowing cauliflower
	Sowing			Sowing	Sowing		
	Hamirpur			Sarkaghat	Dehra		
5-Jul	6-Jul	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	
		DC meeting	Sowing		Check		
			Una		Baijnath		
					Raghulu		
12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	
	Hamirpur		Bilaspur	Sarkaghat	Dehra	Una	
19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	
26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	
	Transplanting				Transplanting		
	Baijnath				Hamirpur		Transplanting
	Raghulu						
2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	Transplanting
	Transplanting		Transplanting	Transplanting	DC meeting		
	Una		Sarkaghat	Dehra			

Operating Plan

for

Extension of Cucumber + Early Cauliflower cultivation

by use of mulching sheet & drip irrigation (2020)

BPMU Una

January 2020

Prepared by JICA TCP & BPMU

Note

This paper is prepared to assure an error-free and on-time launch of this extension activity by BPMUs and TCP.

This paper covers the:
Essential information for planning such as target sub-projects, farmers & field area, available irrigation facility/machinery, Procurement plan, Cultivation schedule and target time of sowing, TOT plan, Use of "WhatsApp" and WBS for preparatory works. And overall schedule of on-site guidance by TCP until early-August is attached for reference.

This paper does not describe the:
Procurement plan and TOT plan for cauliflower cultivation, and associated works to carry out in/after July such as field visiting by farmers of other sub-projects in harvest time, crop-wise reports preparation, review/wrap-up meeting, etc.

Sheet A : Summary sheet of sites for 2020-activity "Extension of Cucumber + Early Cauliflower [D-2(1)]"

BPMU UNA

	Sub-project		EO in charge	Farmer's name	Did the trial in 2019	CCA or not	Current situation (Availability)				Required Installation	Field area (m2) to install drip system	Field area (m2) for Cucumber	Field area (m2) for Cauliflower	Procurement of tiller	Procurement of low poly tunnel	Support by BPMU	Remarks
							Water source	Drip irrigation	Tiller (small)	Low poly tunnel								
New sites	U-1127	LIS Berian	Pooja Sharma	Sh. Surender Singh	no	CCA	Project water => Water tank (pit) =>Motor pump. Both farmer use same water tank	No	No	Own project poly house and use it together	Drip system	400	400	400	No. Bed making by manual	No	Cost support:: 90% - Drip irrigation, Some % (to be determined later) for materials excluding the items to be procured by farmers Technical support: On-site guidance	Look for a tiller to borrow (BCS730/740 is the best) in the Sub-project; for the demonstration.
				Vishal Thakur	no	CCA		No	No		Drip system	200	200	200		No		
	U-1110	LIS Krishna Nagar		Ravi Dutt	no	not	To be checked later	No. But farmer has materials provided by DOA (60cm tubes); enough for 400m2	Yes	Own DOA poly house	Drip system. BPMU bear the cost of installation by using available materials; max. 400m2	400	400	400	No	No		
				Sh. Shiv Nandan	no	not	To be checked later	No	Yes	Own DOA poly house	Drip system	200	200	200	No	No		If necessary, provide a low poly tunnel for cauliflower nursery. (Determine it later)
				Sh. Trilok Singh	no	not	To be checked later	No	No. But shared use among KVA	Yes	Drip system	300	300	300	No	No		
		2 sub-projects	**1 EO**	**5 Farmer (all new)**							**Total (m2)**	**1500**	**1500**	**1500**				

Sheet B : Procurement plan - items & q'ty, cost share, deadline of procurement - BPMU Una

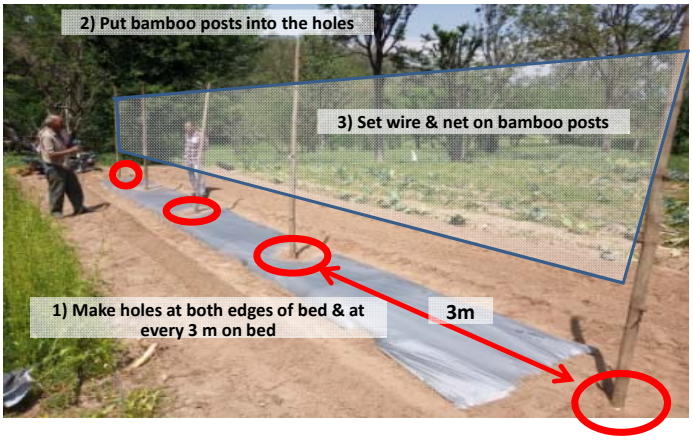
								Field area	600	900			
								Nos. of farmers	2	3			
	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty		LIS Berian	LIS Krishna Nagar	Deadline for installation /delivery	Purchase from	Responsible EO
By BPMU													
Watering	Drip irrigation system	1	set	various	Rs/set		5 set		2	3	end March		
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		0 unit		0	0			
Bed preparation	Mulching sheet	342	m	8	Rs/m	10,260	1283 m		513	770			
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	844	34 kg		14	20	10-Mar		
Bamboo staking	Steel wire	6	kg	100	Rs/kg	2,250	23 kg		9	14			
* Harvesting, Selling	Platform digital scale, 50kg	1	unit/sub-project	6,000	Rs/unit	12,000	2 unit		1	1	20-May		
Pest control	Fungicide	1	package	250	Rs/pack	938	4 package		2	2	as needed		
Pest control	Insecticide	1	package	250	Rs/pack	938	4 package		2	2	as needed		
					(a)	27,229							
By TCP												**Delivery method of TCP-procure items**	
* Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	1,000	5 unit		2	3	10-Mar		
* Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	1,700	1 unit		---	1			
* Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	1,250	5 unit		2	3	20-Mar		
Bamboo staking	Plastic mesh net	342	m	10	Rs/m	12,825	1283 m		513	770			
* Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 4m)	1	unit/farmer	5000	Rs/unit	0	0 unit		0	0		TCP deliver goods to BPMU office at end of Feb., and BPMU deliver them to farmers.	
* Seedling production	Shade net for low poly-tunnel, W2 m x L5m	5	m/farmer	70	Rs/m	350	5 m		0	5			
* Seedling production	Clip to fix shade net on poly-tunnel	10	pc/farmer	15	Rs/pc	150	10 pc		0	10	15-Mar		
Seedling production	Plastic pot (about 400ml vol)	400	pots	0.57	Rs/pot	857	1500 pots		600	900			
Seedling production	Cocopeat	1	block	150	Rs/block	563	4 block		1.5	2.3			
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	750	4 pack		2	2			
* Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	8,000	20 unit		8	12	20-May	TCP deliver goods to BPMU office before end of April.	
					(b)	27,445							
By Farmers													
Bed preparation	FYM	1	truck	1500	Rs/truck	5,625	4 truck		1.5	2.3	10-Mar		
Bamboo staking	Bamboo post	126	post	10	Rs/pot	4,725	473 post		189	284			
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	1,500	19 bundle		8	11	20-Mar		
* Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	2,000	5 set		2	3			
* Bamboo staking	Nail	1.0	kg		Rs/kg	0	4 kg		1.5	2.3			
* Seedling production	Vermin compost	40	liter			0	0 liter				15-Mar		
					(c)	13,850							
					(a)+(b)+(c)	68,523							

Sheet C : Cultivation schedule - Una

Works	1	2	3	4	5	6	7	8	9	10	11	12
Harvesting of wheat				XX *10-20 April*								
Cucumber												
Field preparation												
Plowing			X									
Bed making, Mulch sheets			X X			*Bed making should be finished before 25-March.*						
Bamboo staking			X	X	XX	*Staking should be started 25-March and finish it by the end of April.*						
Sowing in pots	Late March		**25-Mar** X									
Transplanting	Late April			**22-Apr** X								
Pest control												
Watering												
Fertilizing												
Training, Leaf-removing												
Harvesting, Selling												
Cleanup												
Cauliflower												
Sowing in pots	**Early July**					30-Jun X						
Transplanting	**Early Aug**						3-Aug X					
Pest control												
Watering												
Fertilizing												
Harvesting, Selling												
Cleanup												
Removing mulch sheets												

Technical notes:

Farm works	Method	Remarks
Field Preparation		
Plowing	By 4 wheel tractor	Do it before 15-March
Apply FYM	1 truck /kanal	
Apply NPK	12:32:16, 9kg per kanal, Apply only on beds	
Bed making	By tiller with ridger & by manual, 80cm width	Bed making should be finished before 25-March.
Set drip tubes on beds		Next work of prepare bamboo staking require time.
Cover with mulch sheets	By manual	Farmer should allot abundant time for preparing bamboo staking.
Install bamboo posts	3m interval	Staking should be ready when transplanting takes place; i.e. Finish it before end of April.
Set wires, mesh net	Set mesh net on upper side	If no proper staking, harvest can be decreased in large amounts.
Sowing in pots (Cucumber)	350 seedlings/kanal, Add extra 10%.	
Prepare potting soil	Soil : Cocopeat : Vermin compost = 1.5 : 1 : 0.5	
Prepare place to keep pots	Sunny place especially morning hours, Use a shade-net during daytime	
Sowing	1 seed per pot	
Watering,	By water can	
Transplanting (Cucumber)	90cm interval	



Una - Target date of Cucumber sowing

Sub-project	EO	Sowing		Transplanting	
LIS Berian	Pooja Sharma	25-Mar	TCP guidance	22-Apr	TCP guidance
LIS Krishna Nagar					

★ EO should infrom farmers the target date for sowing in advance.

Sheet D : Training plan - BPMU Una

Pre-demonstration to EOs (TOT)

Purpose:	TOT. To let EOs gain the knowledge / skill of farm works for field preparation.
	After this training, EOs should be ready to conduct a demonstration to farmers by themselves.
Participants :	All EOs work on this activity (about 10 persons)
Instructor:	TCP Expert
Venue :	Diot-1, Hamirpur
Date :	2nd of March (Monday)
Contents:	Practical training of farm works for Field Preparation
Note:	Come with a working cloth!!

Demonstration to new farmers by EOs

Purpose:	To let farmers gain the knowledge / skill of farm works for field preparation.
Participants :	All (5) new farmers
Instructor:	EOs (TCP Expert shall assist EOs)
Venue :	Berian
Date :	9th of March (Monday)
Contents:	1) Explain the farm works to do & deadline, items to be prepared by farmers (* A paper should be delivered)
	2) Demonstrate all works of Field Preparation; except plowing by 4-wheel tractor

Plowing (* To be done by farmer before the demonstration)

Apply FYM	Bed making
Apply NPK	Set drip tubes
Cover with mulch sheets	Install bamboo posts
Set wires and mesh net	

3) Instruct the preparation for sowing (* Technical manual should be delivered)

On-site guidance to farmers by TCP (OJT of EOs)

Purpose: Instruct farm works to farmers on-site. Check the field/crop condition and provide a instruction to improve.
EOs shall learn what to be checked in the field and what to instruct farmers.
EOs shall carry out same instruction / field check by themselves at other sub-projects.

	Time		Place	
Sowing in pots, Check - Bed making	25-Mar	fixed	Berian, Krishna Nagar	
Check 1- Seedlings, Bed making	3-Apr	fixed	Berian, Krishna Nagar	1 week after sowing
Transplanting	22-Apr	fixed	Berian, Krishna Nagar	
Check 2	1-May	tentative	Berian, Krishna Nagar	
Check 3	19-May	tentative	Berian, Krishna Nagar	
Check 4	4-Jun	tentative	Berian, Krishna Nagar	
Check 5	middle June	if necessary	Berian, Krishna Nagar	
Sowing in plug-trays	8-Jul	tentative	Berian, Krishna Nagar	
Check 6- Seedlings	18-Jul	tentative	Berian, Krishna Nagar	
Transplanting	3-Aug	tentative	Berian, Krishna Nagar	
Check 7	middle Aug	to set date in May	Berian, Krishna Nagar	1 week after sowing
Check 8	early Sep	to set date in May	Berian, Krishna Nagar	
Check 9	middle Sep	to set date in May	Berian, Krishna Nagar	
Check 10	early Oct	to set date in May	Berian, Krishna Nagar	

On-site guidance to new farmers by EO

EO shall provide on-site training for:

Subjects	Time
1) Operation & maintenance of drip irrigation system	before transplanting
2) Safe use of agri-chemical	when needed
3)	

Date of On-site guidance by TCP (OJT for EOs)

BPMU	Demonstration *1st week of March*		Sowing cucumber *4th week of March*		Transplanting *about 30 days after sowing*	
Sarkaghat	6-Mar Fri	Karadi Kandyol	28-Mar Sat	Ropri to Khanvod	24-Apr Fri	Ropri to Khanvod
Hamirpur	3-Mar Tue	Majhot	24-Mar Tue	Beha	21-Apr Tue	Kirwin
Dehra	-------	------	27-Mar Fri	Ketal Kuhal	27-Apr Mon	Ketal Kuhal
Una	9-Mar Mon	Berian	25-Mar Wed	Berian, Krishna Nagar	22-Apr Wed	Berian, Krishna Nagar
Bilaspur	5-Mar Thu	Nalwar Kotlu	----	----	----	----
[D1-1(6)] Baijnath	---	---	31-Mar Tue	Ragloo	29-Apr Wed	Ragloo

Sheet E:

Use of "WhatsApp" in the activity to Communication with farmers, to Monitor the progress of farm work/crop conditions, etc.

BPMU Una

How do you use "WhatsApp" now ?
Dose BMPU have an agreed (established) system ?
What are benefits to use "WhatApp" ?
What are no-good for EOs / Farmers to use "WhatApp" ?

At BPMU Una, now, "WhatsApp" is not used by EOs positively/systematic to communicate with farmers.
No group is formed by EOs & famers.

1. Benefits expected

Farmer will see a farm work finished by other farmers.

==> It must push him to do a work on-time.

==> It can be an example of work. If he see a good example, quality of work (such as bed making, staking) may maintained / go up.

EOs are easy to know the progress of farm works, current condition of crops

2. No-good points expected

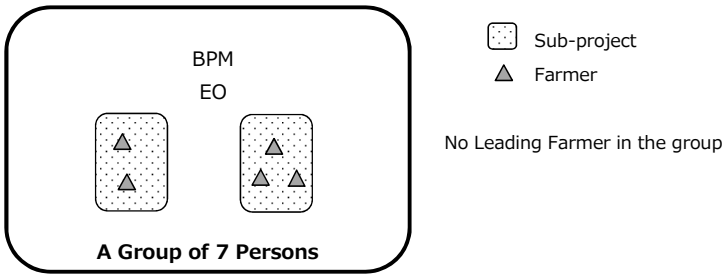
If farmer see a bad example, quality of work may go down.

==> Select a best/adavanced farmer(s) as [Leading Farmer], and let him/her to send a photo ahead to other farmers.

3. EOs idea on usage of "WhatsApp" in this activity - BPMU Una as at 30 Jan. 2020

2 sub-projects
5 farmers (all new)
1 EO

- ✓ Form one group to cover all 5 farmer and responsible EO, also include BPM (total 7 persons)
- ✓ No sub-groups by each EOs
- ✓ Since all farmers are new to the works/cropping system, no setting of Leading Farmer



4. Hot-line system by TCP/SPMU and all EOs in 5 BPMU (Proposed idea of TCP)

Purpose: If a problem emerge hard to solve by EOs; such as damage of crop by un-known insect, EO report it to TCP/SPMU. And TCP/SPMU provide a countermeasure / come to field to check.

Information goes to EOs of other BPMU, and EO can take a pre-caution measure / prompt problem solving.

Sheet F : WBS - BPMU Una

As of 31 Jan. 2020

Cultivation Schedule

Preparation of beds & staking

< Cucumber > ★ ▲ Harvest

< Cauliflower > sowing transplanting ★ ▲

	Start Date	End Date	Responsible	1	2	3	4	5	6	7	8
1 Preparatory works - Procurement by BPMU											
Finalize the Q'ty of items Completed		31-Jan		X							
Delivery to BPMU by TCP					XX						
Delivery to farmers by BPMU						XX	*Finish before 10-March*				
Procurements by TCP											
Procurements by Farmers											
2 Preparatory works - Installing drip irrigation											
Designing by BPMU & service provider											
Installation by service provider							*Finish all sites before end of March !!*				
Give a clear explanation about requirements to service provider at site, when service provider visit the field for designing & estimation.			EO								
Itemize the farmer's work to do before installation at site			EO								
Check the made-design by service provider			EO								
Approval by BPM, Approval by DPM			BPM								
Discuss and fix the schedule of installation work			EO		X						
Make sure that farmer is at home when installation take place.			EO								
Supervise the installation			EO, BPM								
Inspect the installed system. Supervise a commissioning test			EO, BPM			X X X					
Inform the schedule of installation work to TCP			EO		X						
3 Ensure on-time & proper field preparation by farmers											
Ensure the on-time procurement by Farmers											
Inform the items to be prepared by farmers and deadline in advance, in paper; at the time of demostration	9-Mar	9-Mar	EO	Demonstration		X					
Ensure the on-time field work by Farmers											
Discuss with farmers and set exact date to do the works - Plowing, Start/finish bed making, Start staking; at the time of demostration	9-Mar	9-Mar	EO			X					
4 Kick off a "Monitoring by Whatup "											
Discussion by EOs & BPM to finalized a system/details		end-Mar	EO, BPM		X X X						
Explain to farmers what they have to do.	9-Mar	9-Mar	EO								
Teach how to use "WhatsApp", if possible.	9-Mar	9-Mar	EO								
5 Preparation for the Demonstration to be held on 9-March											
Ask farmer - Can he provide a empty field (min. 100m2) for the Demonstration to be held on 9-March.?											
Lunch											
Check a possibility to borrow a tiller (BCS730/740 is the best) in sub-project Berian	Now	mid-Feb									

Schedule of On-site guidance by TCP - All BPMU 1/31/20

Sun	Mon	Tue	Wed	Thu	Fri	Sat	
1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	Demonstration
Work	Pre-demonstration	Demonstration		Demonstration	Demonstration	DC meeting	
BMPU	Hamirpur	Hamirpur		Bilaspur	Sarkaghat		
Sub-project	Diot-1	Majhot		Nawar Kotlu	Karadi Kandyol		
8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	
	Demonstration						
	Una						
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	Sowing cucumber
		Sowing	Sowing		Sowing	Sowing	
		Hamirpur	Una		Dehra	Sarkaghat	
					Ketal Kuhal	Ropri to K.	
29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	
		Sowing	Check-1		Check-1	Check-1	
		Baijnath	Hamirpur		Una	Bilaspur	
		Raghulu					
5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	
	Check-1	DC meeting	Check-1				
	Sarkaghat		Dehra				
	Karadi Kandyol						
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	
				Install underground drainage, Bed making			
				Baijnath	Baijnath	Baijnath	
				Raghulu	Raghulu	Raghulu	
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	Transplanting
		Transplanting	Transplanting		Transplanting		
		Hamirpur	Una		Sarkaghat		
					Ropri to K.		
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May	Transplanting
	Transplanting		Transplanting				
	Dehra		Baijnath	Hamirpur	Una	Bilaspur	
	Ketal Kuhal		Raghulu				
3-May	4-May	5-May	6-May	7-May	8-May	9-May	
	Check-2		DC meeting				
	Sarkaghat				Dehra		
	Karadi Kandyol						
10-May	11-May	12-May	13-May	14-May	15-May	16-May	
		Check					
		Baijnath					
		Raghulu					
17-May	18-May	19-May	20-May	21-May	22-May	23-May	
	Hamirpur	Una	Bilaspur	Sarkaghat	Dehra		
24-May	25-May	26-May	27-May	28-May	29-May	30-May	
		Check					
		Baijnath					
		Raghulu					
31-May	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	
			Hamirpur	Una			
7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	
	DC meeting				Check		
		Sarkaghat	Dehra		Baijnath		
					Raghulu		
14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	
21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	
					Sowing		
					Baijnath		
					Raghulu		
28-Jun	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	Sowing cauliflower
	Sowing			Sowing	Sowing		
	Hamirpur			Sarkaghat	Dehra		
5-Jul	6-Jul	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	
		DC meeting	Sowing		Check		
			Una		Baijnath		
					Raghulu		
12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	
	Hamirpur		Bilaspur	Sarkaghat	Dehra	Una	
19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	
26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	
	Transplanting				Transplanting		
	Baijnath				Hamirpur		Transplanting
	Raghulu						
2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	Transplanting
	Transplanting		Transplanting	Transplanting	DC meeting		
	Una		Sarkaghat	Dehra			

Sheet : Target time of sowing & transplanting

As of 30 Jan. 2020

Target times are set;

- by Farmers of sub-projects participated the 2019 trial (marked *) with BPMU/TCP assistance for production planning [A]
- by TCP for new sub-projects.

Seedlings are ready to transplant at about 30 days after sowing

BPMU	Sub-Project			Cucumber		Cauliflower		
				Sowing	Transplanting	Sowing	Transplanting	
Hamirpur	H-1006	LIS Majhot		Late March	Late April	Early July	Early Aug	
	H-1035	LIS Dharnasi						
	H-1052	LIS Diot-1						
	H-1015	LIS Kirwin						
	H-3014	LIS Beha						
		LIS Manjru	*	Late March	Late April	Early July	Early Aug	
		LIS Guriah	*	Mid Jan (in poly house)	Early March	Early July	Early Aug	Section 1: 600m2
				Mid March	Mid April			Section 2: 1800m2
Sarkaghat	S-1093	LIS Karadi Kandyol		Late March	Late April	Late June	Late July	
	S-M-1042	FIS Ropri to Khanvod		Late March	Late April	Late June	Late July	
	S-1100	LIS Ukhala	*	5-10 April	1-5 May	Late June	27-31 July (Last week of July)	
		LIS Khanote		Late March	Late April	Late June	Late July	
	S-1117	LIS Damella	*	Late March	Late April			
Una		LIS Berian		Late March	Late April	Early July	Early Aug	
		LIS Krishna Nagar						
Dehra	D-1007	FIS Ketal Kuhal		Late March	Late April	Early July	Early Aug	
Bilaspur		LIS Kahali		Late March	Late April	Early July	Early Aug	
		LIS Parohi						
		LIS Domehar						
		LIS Ghandir						
		LIS Swara						
		LIS Noa						
		LIS Nalwar Kotlu	*	Mid March	Mid April	Early July	1-5 Aug	
		LIS Chhiber Ballu	*			Early July	Early Aug	Section 1??
						Mid July	Mid Aug	Section 2??
		LIS Fogog	*	End March - Beginning April	End April - Beginning May	Early July	Early Aug	

Popular season of Cucumber cultivation for commercial purpose with irrigation = Transplanting in mid-Feb., Harvest from end-March to end- May

LIS Ukhala : Suggest the farmers to push forward sowing time to Late March

LIS Kahali : Farmers are busy with tomato transplanting during end-March to early-April.

LIS Chhiber Ballu : Need to discuss with farmer about cucumber cultivation (plan for use of drip field) after harvesting cauliflower in Feb-March.
Also allot the field into 2 sections or not.

Cropping pattern (Land use)

Mr. _____ Field area : _____ Sub-project :

Rainfall

Year	Name of Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Cucumber												
	Cauliflower												
2020													
2021													
2022													

Planning of Cropping time & Work schedule for Year 2020

Sub-project :

Faring works of other crops													
	Wheat - harvesting												
	Wheat - threshing												
	Maize - sowing												
	Maize - harvesting												
	Field preparation - plowing												
	Works to make	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cucumber	Sowing seeds												
	Transplanting												
	Start harvesting												
	End harvesting												
	Field preparation - FYM												
	Field preparation - Plow												
	Prepare for sowing seeds												
	Bed making												
	Bamboo staking												
	Hire labors												
Cauliflower	Sowing seeds												
	Transplanting												
	Start harvesting												
	End harvesting												
	Prepare for sowing seeds												
	Hire labors												
	Works to make	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Remove mulching sheet												
	Apply FYM & fertilizer												
	Sowing seeds												
	Transplanting												
	Start harvesting												
	End harvesting												
	Prepare for sowing seeds												
	Hire labors												

Planning of Cropping time & Work schedule for Year 2020
<< Example >>

			Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Faring works of other crops																																					
	Wheat - harvesting												XX																								
	Wheat - threshing													XX																							
	Maize - sowing																	XX																		
	Maize - harvesting																									XX										
	Field preparation - Plow														XX														X	X						
	Works to make		Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Cucumber	Sowing seeds	April 15 and 25											X	X																						
	Transplanting	May 5 and 15													X	X																				
	Start harvesting	June 10-15																X	X																	
	End harvesting	August 15																						X												
	Field preparation - FYM										X																									
	Field preparation - Plow										X																									
	Prepare for sowing seeds											X																								
	Bed making												XX	XX																						
	Bamboo staking													XX	XX	XX	X																			
	Hire labors													X	X	X																				
Cauliflower	Sowing seeds	July 5 and 7																		XX																
	Transplanting	July 25 and 29																			XX															
	Start harvesting	October 5																											X							
	End harvesting	October 20																												X						
	Prepare for sowing seeds																		X																	
	Hire labors																																			
	Works to make		Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Cauliflower 2nd	Remove mulching sheet																														X					
	Apply FYM & fertilizer																														X					
	Sowing seeds	October 10 and 12																											X	X						
	Transplanting	November 1 and 3																														X				
	Start harvesting	January 5	X																																	
	End harvesting	January 20			X																															
	Prepare for sowing seeds																												X							
	Hire labors																																			

Estimation of Labor cost

Crop	Works to hire labor	✔	Quantity	Unit price	Price
Cucumber					
	Field preparation - FYM				
	Field preparation - Plow				
	Nursery raising				
	Transplanting				
	Bed making				
	Bamboo staking				
	Daily care :weeding, training, watering, etc.				
	Harvesting				
Cauliflower					
	Nursery raising				
	Transplanting				
	Daily care :weeding, training, watering, etc.				
	Harvesting				
	Field preparation - FYM				
	Field preparation - Plow				
	Nursery raising				
	Transplanting				
	Bed making				
	Daily care :weeding, training, watering, etc.				
	Harvesting				

JICA TCP Trial in 2019 - Cucumber in August and Califlower in October

This sheet was copied from "20190927_Result of cucumber in 2019.xlsx"
Price of mulching sheet is changed from Rs.2800 to Rs.3500/roll.
Cost for plastic mesh net (Rs.1000/roll) is added.

Items & costs for 400m2 area (1 kanal)

Bed layout Field size (assumption) 20m x 20m, 1m walk space at both ends, Bed 80cm width + 30cm walk space
==> 18 beds with length 18m in 400m2 = Total bed length is 324m in 400m2 (1 kanal)

1. Cucumber

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal	Memo
Bed preparation	Mulching sheet	342	m	8	Rs/m	2	1,368	1.2m wide x 400m/roll, Rs.3500/roll 2 uses for cucumber & cauliflower/ year x 1 year = 2 uses
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225	
	FYM	1	truck	1500	Rs/truck	2	750	2 uses for cucumber & cauliflower, per 1 year
Seedling production	Plastic pot	400	pots	0.40	Rs/pot	1	160	Rs.200/kg for 500 pots
	Cocopeat	1	block	150	Rs/block	1	150	
	Seed of cucumber	1	pack	200	Rs/pack	1	200	
Staking materials	Bamboo post	126	post	10	Rs/pot	4	315	7 posts/ 1 bed 1 use for cucumber/year x 4 years
	Steel wire	6	kg	100	Rs/kg	4	150	324m = 6kg/ kanal 1 use for cucumber /year x 4 years
	Plastic mesh net	342	m	10	Rs/m	5	684	1m wide x 100m/roll, Rs.1000/roll 1 use for cucumber/year x 5 years
	Plastic rope	5	bundle	80	Rs/bundle	1	400	
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250	100g/ package
	Insecticide	1	package	250	Rs/pack	1	250	100ml/ package
Labour cost	Bed preparation + mulching	4	person*day	400	Rs/day	2	800	Rs.50/person/h x 8h/day = Rs.400/person/day 2 uses for cucumber & cauliflower for 1 bed
	Nursery raising	1	person*day	400	Rs/day	1	400	
	Intercultural operations	4	person*day	400	Rs/day	1	1,600	
	Harvesting	40	person*h/day	50	Rs/h	1	2,000	1 person for 1hour /day is required. Harvesting: every 2 days for period 80 days => 80 days/2 = 40 days
Total cost/ kanal							**9,702**	
Total cost/ kanal, without Labour cost							**4,902**	

2. Cauliflower

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal	Memo
Bed preparation	Mulching sheet	342	m	8	Rs/m	2	1,368	1.2m wide x 400m/roll, Rs.3500/roll 2 uses for cucumber & cauliflower/ year x 1 year = 2 uses
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225	
	FYM	1	truck	1500	Rs/truck	2	750	2 uses for cucumber & cauliflower, per 1 year
Seedling production	Plug trays	22	trays	35	Rs/tray	4	193	1 use for cauliflower/year x 4 years
	Cocopeat	1	block	150	Rs/block	1	150	
	Seed of cauliflower	1	pack	400	Rs/pack	1	400	
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250	100g/ package
	Insecticide	1	package	250	Rs/pack	1	250	100ml/ package
Labour cost	Bed preparation + mulching	4	person*day	400	Rs/day	2	800	Rs.50/person/h x 8h/day = Rs.400/person/day 2 uses for cucumber & cauliflower for 1 bed
	Nursery raising	1	person*day	400	Rs/day	1	400	
	Intercultural operations	4	person*day	400	Rs/day	1	1,600	
	Harvesting	30	person*h/day	50	Rs/h	1	1,500	1 person for 1hour /day is required. Harvesting: every 2 days for period 60 days => 60 days/2 = 30 days
Total cost/ kanal							**7,886**	
Total cost/ kanal, without Labour cost							**3,586**	

Note : Farmers who has no poly-house shall use a low poly-tunnel (about Rs.5000/unit) with shade net/poly sheet for seedling production.
Cost for low poly-tunnel is not counted in above estimation.

Estimation of Expected sales & profit for Year 2020

Cucumber Field area : _____ m2

Expected (target) sales

Period			Expect price		Sales amount	Sales value
	--			Rs/kg	Kg	Rs
	--			Rs/kg	Kg	Rs
	--			Rs/kg	Kg	Rs
	--			Rs/kg	Kg	Rs
					Total	

Costs, Materials	Rs	/kanal x	/400m2 =		Rs
Costs, Hired labor					Rs
Expected profit					Rs

Early Cauliflower Field area : _____ m2

Expected (target) sales

Period			Expect price		Sales amount	Sales value
1-Oct	--	10-Oct	40	Rs/kg	Kg	Rs
11-Oct	--	20-Oct	30	Rs/kg	Kg	Rs
21-Oct	--	31-Oct	20	Rs/kg	Kg	Rs
1-Nov	--	15-Nov	15	Rs/kg	Kg	Rs
					Total	

early October	*0.5 kg/piece*
middle October	*0.8 kg/piece*
late October	*1 kg/piece*

Costs, Materials	Rs	/kanal x	/400m2 =		Rs
Costs, Hired labor					Rs
Expected profit					Rs

_____ Field area : _____ m2

Expected (target) sales

Period			Expect price		Sales amount	Sales value
	--			Rs/kg	Kg	Rs
	--			Rs/kg	Kg	Rs
	--			Rs/kg	Kg	Rs
	--			Rs/kg	Kg	Rs
					Total	

Costs, Materials	Rs	/kanal x	/400m2 =		Rs
Costs, Hired labor					Rs
Expected profit					Rs

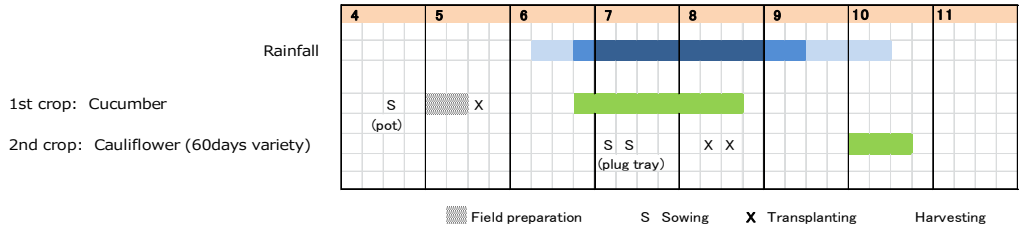
Expected profit, Total	**Total**	Rs

Date of sowing & transplanting in 2019 season

Cucumber		Sarkaghta	Bilaspur				Hamirpur	
		Ukhala	Fogog	Chibber Ballu	Nalwar Kotlu	Noa	Manjru	Gurriah
Sowing	plan	15 - 20 April	15 - 20 April	15 - 20 April	15 - 20 April	15 - 20 April	15 - 20 April	
	actual	15, 29 April	24 - 29 April		16 - 25 April	16 April	26 - 27 April	
Transplanting	plan	15 May	15 May	15 May	15 May	15 May	15 May	
	actual	7, 14 May	13, 20 May		12, 18 May	8 May	22 May	

Cauliflower		Sarkaghta	Bilaspur				Hamirpur	
		Ukhala	Fogog	Chibber Ballu	Nalwar Kotlu	Noa	Manjru	Gurriah
Sowing	plan	5-7 July	12-15 July	12-15 July	12-15 July	12-15 July	12-15 July	
	actual							
Transplanting	plan	3-5 Aug	11-14 Aug	11-14 Aug	11-14 Aug	11-14 Aug	11-14 Aug	
	actual	15-20 July (other field) early Aug (trial field)		24 Aug - 4 Sep	2-7 Aug, 15-27 Aug		24 Aug	

Sowing & transplanting schedule Plan for 2019 season



Planning Stage	A_ Promotion of market-oriented production planning by farmers A-2_Assistance to make production plan for poly-house
Practical Stage	D_ Promotion of vegetable production aim to sell at time of higher-price D-2(2)_Early cucumber + other crops in poly house, 2020

Prepared on 25 March 2020

A-2_Assistance to make production plan for poly-house

1. Background

One poly-house has been installed at each sub-project by HPCDP. However, unfortunately many poly-houses are not well utilized. Some farmers continue to cultivate some crops in poly-houses in the same manner as open field. It is observed for farmers not to understand advantages of cultivation in poly-house. Under this situation, JICA TCP has planned a new activity to "assist to make a production plan for poly-house". This activity aims to create case examples of market-oriented / profitable cropping pattern in poly-house as well as to create case examples of technical support to farmers.

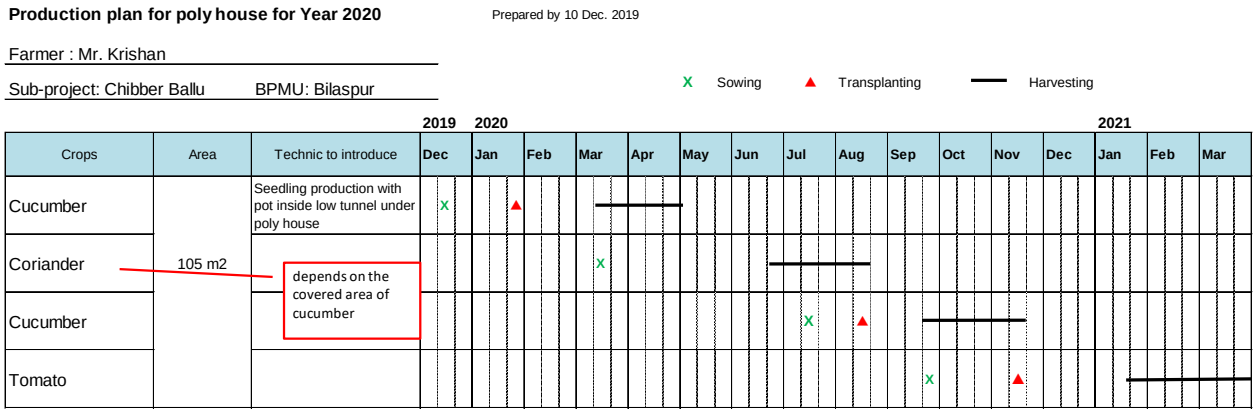
2. Planning

Planning of production plan by farmers with support of EOs and TCP

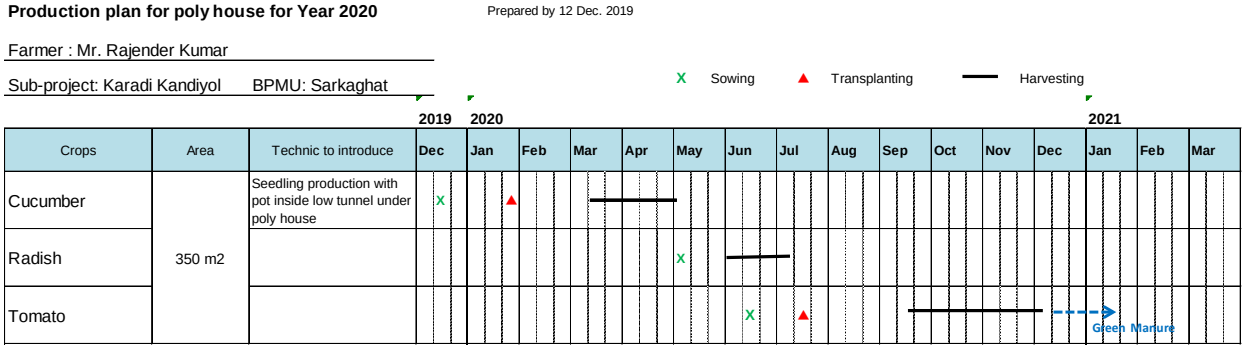
BPMU	Venue	Sub-project	Date
Bilaspur	BPMU office	Chibber Ballu	10, Dec. 2019
Sarkaghat	Ukhla	Ukhla, Khanot, Karadi Kandiyol	12, Dec. 2019
Hamirpur	SPMU office	Beha, Kirwin, Guhal	17, Dec 2019

3. Results *Photos of planning are shown in Annex.

- Bilaspur



- Sarkaghat



Production plan for poly house for Year 2020 Prepared by 12 Dec. 2019

Farmer : Mr. Amar Nath

Sub-project: Ukhla BPMU: Sarkaghat

X Sowing ▲ Transplanting ━ Harvesting

Crops	Area	Technic to introduce	2019 Dec	2020 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2021 Jan	Feb	Mar
Cucumber	105 m2	Seedling production with pot inside low tunnel under poly house	X	▲	━	━												
Radish								X	━	━								
Tomato									X	▲		━	━	━	→	Green Manure		

Production plan for poly house for Year 2020 Prepared by 12 Dec. 2019

Farmer : Mr. Sunil Kumar

Sub-project: Khanote BPMU: Sarkaghat

X Sowing ▲ Transplanting ━ Harvesting

Crops	Area	Technic to introduce	2019 Dec	2020 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2021 Jan	Feb	Mar
Cucumber	105 m2	Seedling production with pot inside low tunnel under poly house	X	▲	━	━												
Radish								X	━	━								
Tomato									X	▲		━	━	━	→	Green Manure		

- Hamirpur

Production plan for poly house for Year 2020 Prepared by 17 Dec. 2019

Farmer : Mr. Jai Singh

Sub-project: Kirwin BPMU: Hamirpur

X Sowing ▲ Transplanting ━ Harvesting

Crops	Area	Technic to introduce	2019 Dec	2020 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2021 Jan	Feb	Mar
Cucumber	105 m2	Seedling production with pot inside low tunnel under poly house	X	▲	━	━												
Radish								X	━	━								
Coriander								X	━	━								
Cucumber										X	▲		━	━				
or Tomato										X	▲		━	━				

Production plan for poly house for Year 2020 Prepared by 17 Dec. 2019

Farmer : Mr. Ashok Kumar

Sub-project: Guhar BPMU: Hamirpur

X Sowing ▲ Transplanting ━ Harvesting

Crops	Area	Technic to introduce	2019 Dec	2020 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2021 Jan	Feb	Mar
Cucumber	105 m2	Seedling production with pot inside low tunnel under poly house	X	▲	━	━												
Coriander								X	━	━								
Spinach								X	━	━								
Cauliflower										X	▲		━	━				

Production plan for poly house for Year 2020 Prepared by 17 Dec. 2019

Farmer : Mr. Desh Raj

Sub-project: Beha BPMU: Hamirpur

X Sowing ▲ Transplanting ━ Harvesting

Crops	Area	Technic to introduce	2019 Dec	2020 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2021 Jan	Feb	Mar
Cucumber	105 m2	Seedling production with pot inside low tunnel under poly house	X	▲	━	━	━											
Radish								X	━	━								
Coriander								X	━	━		━	━	━	━			
Cauliflower										X	▲		━	━	━			
or Cucumber										X	▲		━	━				
or Tomato										X	▲		━	━				

==========

D-2(2)_Early cucumber + other crops in poly house, 2020

Updated on 25, Feb, 2020

1. Sub-project

   Bilaspur: Chibber Ballu

   Sarkaghat: Ukhla, Khanote, Karadi Kandiyol

   Hamirpur: Beha, Kirwin, Guhal

   *Requested by BPMU *No planning with TCP. EOs are recommended to support farmers to make planning.*

   Sarkaghat: Ladheri Barin

   Hamirpur: Neri Bagh, Dharnasi

2. Support for early cucumber

   1) Techniques to be applied

   - Seedling production with pots
   - Nursery raising under low poly tunnel prepared with bamboo or iron frame, to remain temperature during Dec. to Jan.
   - Training with plastic rope and steel wire
   - Usage of drips for irrigation and fertilizer (water soluble) application

   2) Cultivation schedule (Planned)

BPMU	Sowing	Transplanting (Planned)	Harvesting (Target time)
Bilaspur	Mid Dec.	End January	Mid March - End April
Sarkaghat	Mid Dec.	End January	Mid March - End April
Hamirpur	Mid Dec.	End January	Mid March - End April

*Due to the growth of cucumber, transplanting was later than expectation in 2 weeks.

   3) Items and cost sharing

Items	Qty	Price	Total	Cost sharing
Seed (Variety: Multistar)	60 plants/bed x 5 beds =300 plants (seeds) Plus, 20 for extra => total 320 seeds	Rs. 7/seed	Rs. 2240	BPMU

Items	Qty	Price	Total	Cost sharing
Pot	1kg (for 320 pots)	Rs. 200/kg	Rs. 200	TCP
Plastic sheet	100m/2kg	Rs. 200/kg	Rs. 400	TCP
Fertilizer (NPK=19:19:19)	20kg*	Rs. 120/kg	Rs. 2400	Farmer
Insecticide	Imedacloprid: 100ml Mitecide: 100ml	Rs. 150/100ml Rs. 150/100ml	Rs. 300	BPMU
Fungicide	Redomil: 250g	Rs. 500/250g	Rs. 500	BPMU
		Total	Rs. 6040	

*Fertilizer is expected to be applied twice a week for 10 weeks and 1kg for one time.

4) Demonstration/ Monitoring

- On-site guidance on media preparation, preparation of low poly tunnel and sowing with pots for farmers with EOs

Bailaspur	at Chibber Ballu	21, Dec. 2019
Sarkaghat	at Ukhla	20 Dec. 2019
Hamirpur	at Kirwin	23 Dec. 2019

- On-site guidance/monitoring for transplanting with EOs

Hamirpur	at Kirwin	14 Feb. 2020

- Monitoring of growth

  At the same day of demonstration for D2-(1)_Extension of cucumber and early cauliflower in March

- Periodical monitoring (if necessary or urgent)

5) Cultivation schedule (Actual) *Get actual data from EOs through WhatsApp

BPMU	Sub-project	Sowing	Transplanting	Harvesting
Bilaspur	Chibber Ballu	21-22 Dec.	14 Feb.	Not yet
Sarkaghat	Ukhla	20-23 Dec.	8 Feb.	Not yet
	Khanot		4 Feb.	
	Karadi Kandiyol		17 Feb.	
	Ladheri Barin		16 Feb.	
Hamirpur	Beha	23-27 Dec.	17 Feb.	Not yet
	Kirwin		14 Feb.	
	Guhal		19 Feb.	
	Neri Bagh		11 Feb.	
	Dharnasi		15 Feb.	

*Reason why transplanting was delayed from planning: growth of plants was slow due to not proper management of low poly tunnel: remaining low poly sheet open for some hours

3. Support for other crops after early cucumber

- Basically, technical and financial supports are not planned from JICA TCP side, because farmers have experiences of vegetable cultivation.
- Reminding of production plans after early cucumber in DCs meeting on 7th March
- Reminding of production plans after early cucumber to EOs by WhatsApp in mid. April

*As for Chibber Ballu, planning includes coriander cultivation from mid. March, but it depends on the covered area with cucumber. Necessary to confirm available area for coriander in Feb.

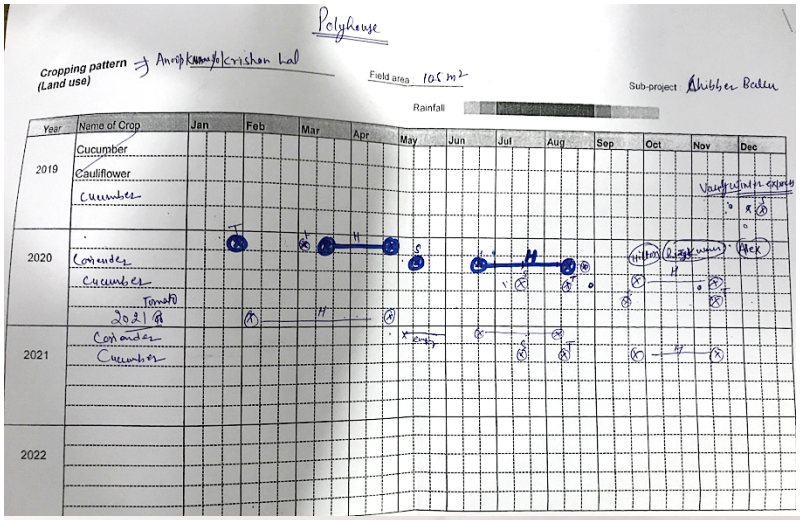
4. Monitoring and Evaluation

1) Monitoring by EOs *TCP will provide technical guidance only when getting strong request or urgent issue from EOs.

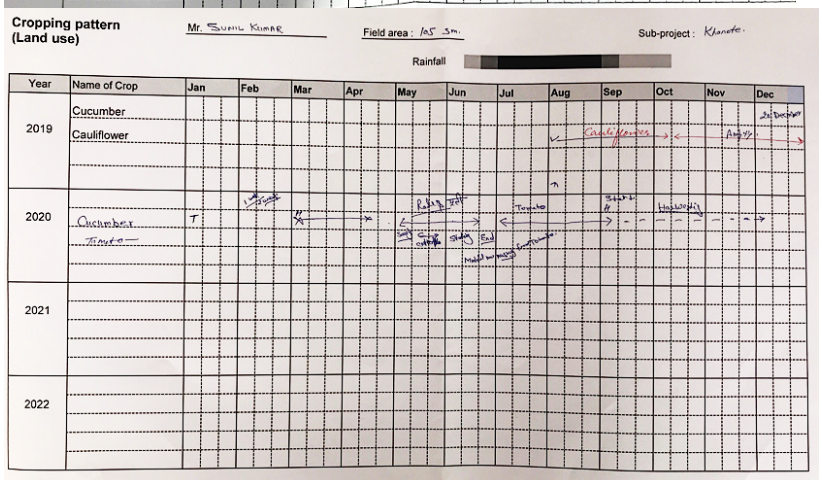
2) Collection of sales record for whole year *Instruct how to record to Hamirpur
3) Evaluation of activities : A-2 and D-2 (2)

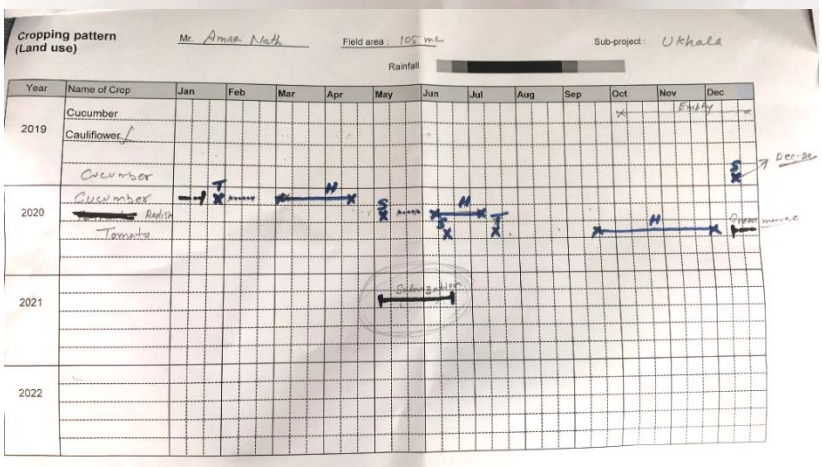
Annex: Photos of results of planning

Bilaspur

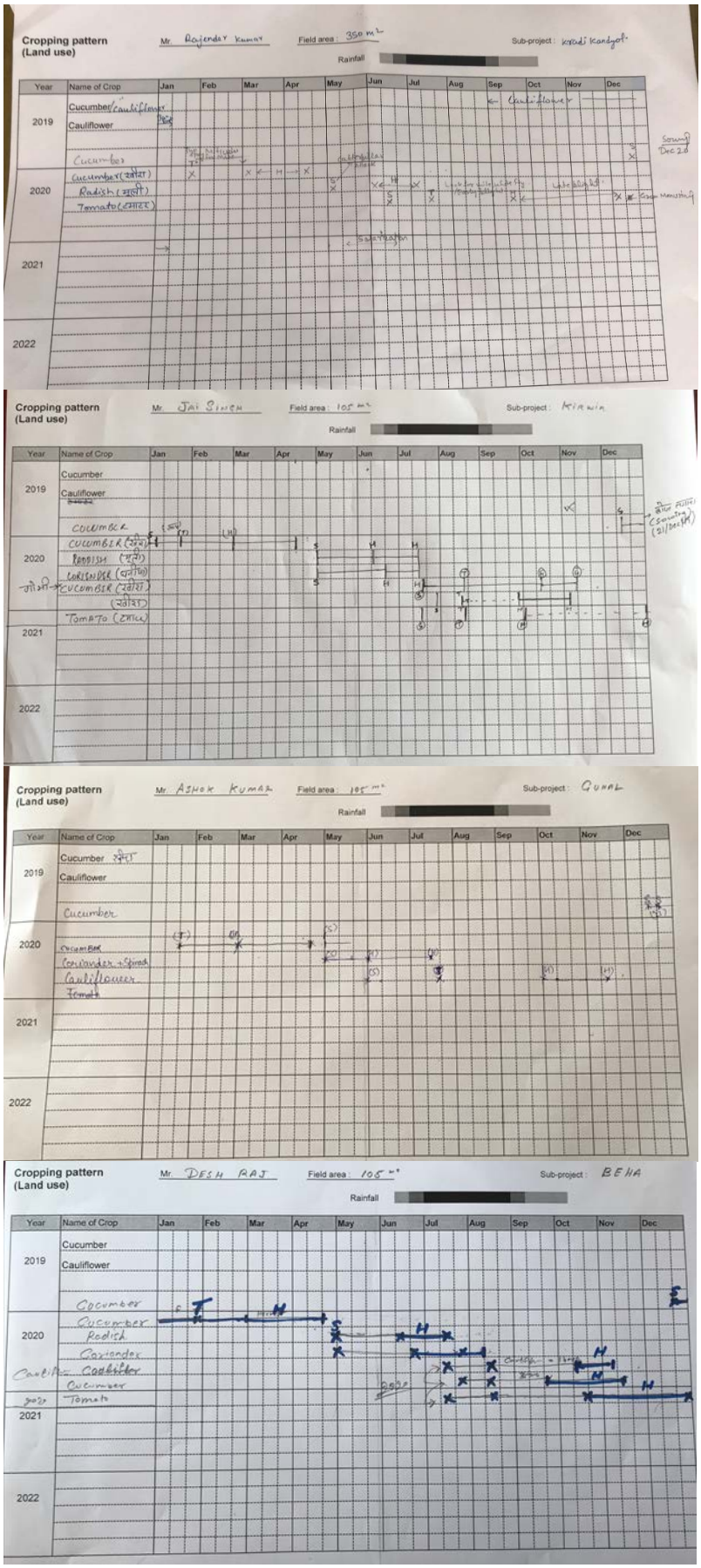


Sarkaghat





Hamirpur



Cropping pattern (Land use)

Mr. Rajender Kumar — Field area: 350 m² — Sub-project: Kandaghat

Rainfall

Year	Name of Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Cucumber/Cauliflower												
	Cauliflower												
2020	Cucumber												
	Cucumber (खीरा)												
	Radish (मूली)												
	Tomato (टमाटर)												
2021													
2022													

Cropping pattern (Land use)

Mr. Jai Singh — Field area: 105 m² — Sub-project: Kirmin

Rainfall

Year	Name of Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Cucumber												
	Cauliflower												
2020	CUCUMBER												
	CUCUMBER (खीरा)												
	RADISH (मूली)												
	CAULIFLOWER (फूलगोभी)												
	CUCUMBER (खीरा)												
	TOMATO (टमाटर)												
2021													
2022													

Cropping pattern (Land use)

Mr. Ashok Kumar — Field area: 105 m² — Sub-project: Gunal

Rainfall

Year	Name of Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Cucumber												
	Cauliflower												
	Cucumber												
2020	Cucumber												
	Coriander + Spinach												
	Cauliflower												
	Tomato												
2021													
2022													

Cropping pattern (Land use)

Mr. DESH RAJ — Field area: 105 m² — Sub-project: BEHA

Rainfall

Year	Name of Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Cucumber												
	Cauliflower												
2020	Cucumber												
	Radish												
	Coriander												
	Cauliflower												
	Cucumber												
	Tomato												
2021													
2022													

Title:	**Report on Exposure visit of poly house to advanced farmer in Hamirpur**
Date:	November 15, 2019, 10:00 AM-03:00 PM
Venue:	Badhera, Hamirpur (Amit Farm)
Participants	BPMU : Bilaspur-1, Nurpur- 1, Sarkaghat- 3 Hamirpur-2. Sub-projects : Bilaspur : Nalwar Kotlu- 5, Fagog-2, Chibber Ballu-1, Domehar- 2, Ghodi- 1. Nurpur : Chatredi- 3, Minjh Gram- 1 Sarkaghat :Ukhala- 2, Khanote- 1 Hamirpur : Kirwin- 1, Beha-1, Guhal-1 TCP – 2
Objectives:	By showing example of planned/well-managed use of poly houses, to let farmers have motivation to work on a better use of ploy-house.: • Get information about the timings of sowing and transplanting crops to harvest off-season. • Get information about the preparation of production plan. • Get information about crop rotation and proper management of crops in poly house.
Question/ interest/ comments of farmers	• Mr. Desh Raj, Beha, Hamirpur inquired about the height of tomato plants. He explained that last year he cultivated tomatoes in his poly-house but internodes so long and plants were lanky (so long). • Mr. Krishan chand, Chibber Ballu, Bilaspur inquired about that in cucumber after 5-6 fruits next 7-10 fruits getting dry and less yield. Same problem faced by Mr. Amar Nath, Ukhala, Mr. Sunil Sharma, Khanot and Mr. Arvind Thapa, Chatredi • By watching the status of crops in poly-houses at Badhera (Amit farm), Mr. Tilak Raj, Chatredi, Mr. Ashok, Guhal and Mr. Desh Raj, Beha informed that they are not making proper production plan for poly house and availability of good seeds is also a problem. • Mr. Rakesh, Nalwar Kotlu cultivated cucumber this year in his broken poly houses and sold his produce directly to consumers on the roadside. By watching the status of different crops in poly houses at regular intervals, he wants to renovate his poly houses and grow variety of vegetables and sell to consumers directly. He wants to assist to make production plant to grow vegetables in gaps. • Ms Babita, Nalwar Kotlu wants to have at least one poly-house and she will apply for DOA scheme with help of KVA president to build one poly-house of 105 m^2. No other farmers who have no poly-house now show interest to build his poly-house to cultivate off season vegetables. * *No BPMU's assistance to prepare & apply DOA scheme is requested.* • After watching the tomato crop in the poly-houses Mr. Pawan- Nalwar Kotlu (President), Mr. Anil Saini- Minjh Gram Mr. Desh Raj- Beha and Mr. Arvind Thapa- Chatredi explained that to harvest of tomatoes in rainy season there is no fruit setting (development) in May and June. Even they know the reason that it is because of high temperature in these months.

	• Mr. Sudhir, Ghodi explained that he got low price of cucumber in the month of April and May. It is because of arrival of cucumber is enough from open field. He is suggested that he should focus on cultivation of cucumber in off season when the arrival from open field is less. • EOs Mr. Vikram- Bilsapur, Ms. Manisha-Sarkaghat, Mr. Vikrant-Nurpur and Ms. Himani- Hamirpur asked about the timings and varieties of cucumber and tomato. They also requested TCP to assist them when (if) they are requested by farmers to make a plan for cultivation of crops in poly-house. ** Currently, EOs has no plan to make a cropping plan in poly-house for/with farmers.*

Time Schedule:

Time	Subjects
10:00	Depart from SPMU office for the Farm
11:00	All participant arrive at the Farm
11:15-11:45	Brief explanation about the Farm
11:45-13:30	Observation of poly-houses, Q & A (Technical guidance)
13:30-14:15	Lunch
14:15-14:45	Comments of participants, Q & A
14:45-15:00	Explanation about next support by TCP/BPMU, Closing

Attachment-2.4.26

Prepared on 23 March 2020

Result of Assistance to make a production plan for whole farm [A-4], Nalwar Kotlu - Bilaspur

1. Target farmer and farm field

   Ms. Babita, Sub-project Nalwar Kotlu, BPMU Bilaspur

   Total farm area 3950m^2 (open fields) include area for wheat and maize production

2. Background

   It is important for farmers to make production plan for their marketing farming in that they can understand their annual schedule of land use, harvested vegetables, labor intensive period and they can estimate income according to the plan. However, it is observed that farmers do not make (or do not know how to make) a plan so far. Under this situation, in response to the request of farmer, JICA TCP has assisted EOs of BPMU to prepare an annual production plan for whole farm of Ms. Babita.

3. Results

   Workshop-style meetings were held at her farm three times; on 24 Feb., 02 March and 16 March.

   Prepared annual production plan is shown in next page.

   Material support by BPMU / TCP is planned as follows:

   - For Cucumber & Cauliflower cultivation under D-2(1): Promotion of Cucumber & Early cauliflower cultivation by use of mulching sheet & drip irrigation (2020):
     As the result of planning, field area for D-2(1) has increased to 1200m^2 from 400 m2, and BPMU Bilaspur / TCP has updated the procurement plan (quantity of materials). Regarding additional installation of drip irrigation system, BPMU has allocated the budget for it.
   - For Tomato cultivation (300m^2) to transplant seedlings in early May (i.e. start in hot & dry time):
     Shade net to mitigate heat on young plants shall be provided by TCP.

Production plan for whole farm for Year 2020

Prepared by 16, March 2020

Farmer : Ms. Bavita

Sub-project: Nalwar Kotlu BPMU: Bilaspur

x Sowing ▲ Transplanting — Harvesting

Wheat & Maize

Crops		Area	Technic to introduce/ memo
Wheat (Plot-5)		300m2	
Wheat (Plot-6)		400m2	

Plot-1 600m2

Crops		Area	Technic to introduce/ memo
Garlic	1	500m2	
Garlic	1(1)	300 m2	
Okra	1(2)	300 m2	
pea	1(2)	300 m2	

Plot-2 500m2

Crops	Section	Area	Technic to introduce/ memo
Cucumber	2-	500 m2	Mulching, Drip irrigation, Staking and big size poly pots
Cucucmber	2(1)	300 m2	Mulching, Drip irrigation, Staking and big size poly pots
Cole crops-	2(2)	200 m2	Mulching, Drip irrigation, Staking and plug trays
Radish			Between two rows of cole crops
Cole crops	2(1)	300 m2	After removing bamboos, sheet and cleaning plow field and make plots
Radish			on the ridges prepared for cole crops

Plot-3 450m2

Crops		Area	Technic to introduce/ memo
Cauliflower	3(1)	150 m2	
Okra	3(1)	150 m2	
Pea	3(1)	150 m2	
Pea	3(2)	300 m2	
Tomato	3(2)	300 m2	Use of shade net
cole crops	3(2)	300 m2	in plots with furrow irrigation
Radish			in plots with furrow irrigation

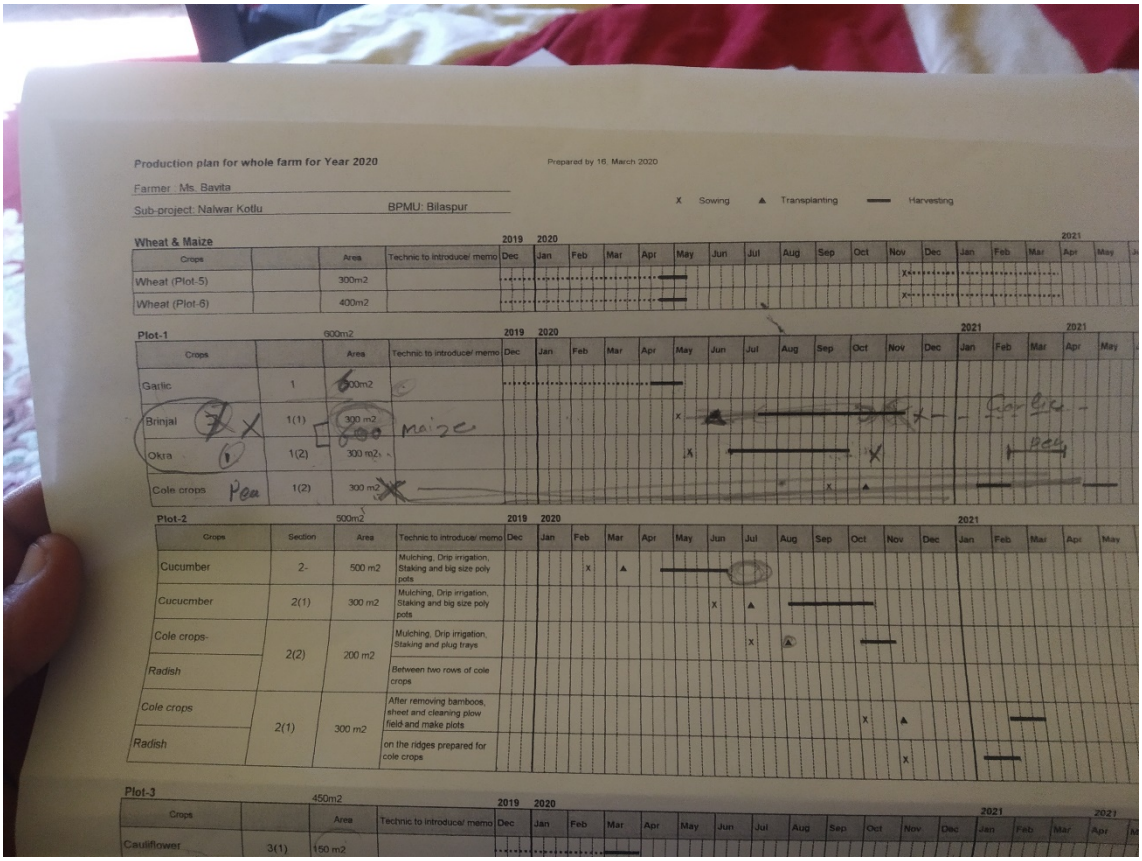
Plot-4 1000m2

Crops		Area	Technic to introduce/ memo
Pea	4-	300m2	
Cucumber	4(2)	100 m2	Mulching, Drip irrigation, Staking and big size poly pots
Cole crops	4(2)	100 m2	Mulching, Drip irrigation, Staking and plug trays
Bitter + Bottle gourd	4(3)	300 m2	
Pea	4(3)	300 m2	
Cucumber	4(4)	600 m2	Mulching, Drip irrigation, Staking
Cole crops		600 m2	Mulching, Drip irrigation, Staking and plug trays
Radish			Between two rows of cole crops

Plot-7 700 m2

Crops		Area	Technic to introduce/ memo
Brinjal			

Photos of Production Plan



Production plan for whole farm for Year 2020

Prepared by 16. March 2020

Farmer : Ms. Bavita

Sub-project: Nalwar Kotlu BPMU: Bilaspur

X Sowing ▲ Transplanting — Harvesting

Wheat & Maize

Crops		Area	Technic to introduce/ memo
Wheat (Plot-5)		300m2	
Wheat (Plot-6)		400m2	

Plot-1 600m2

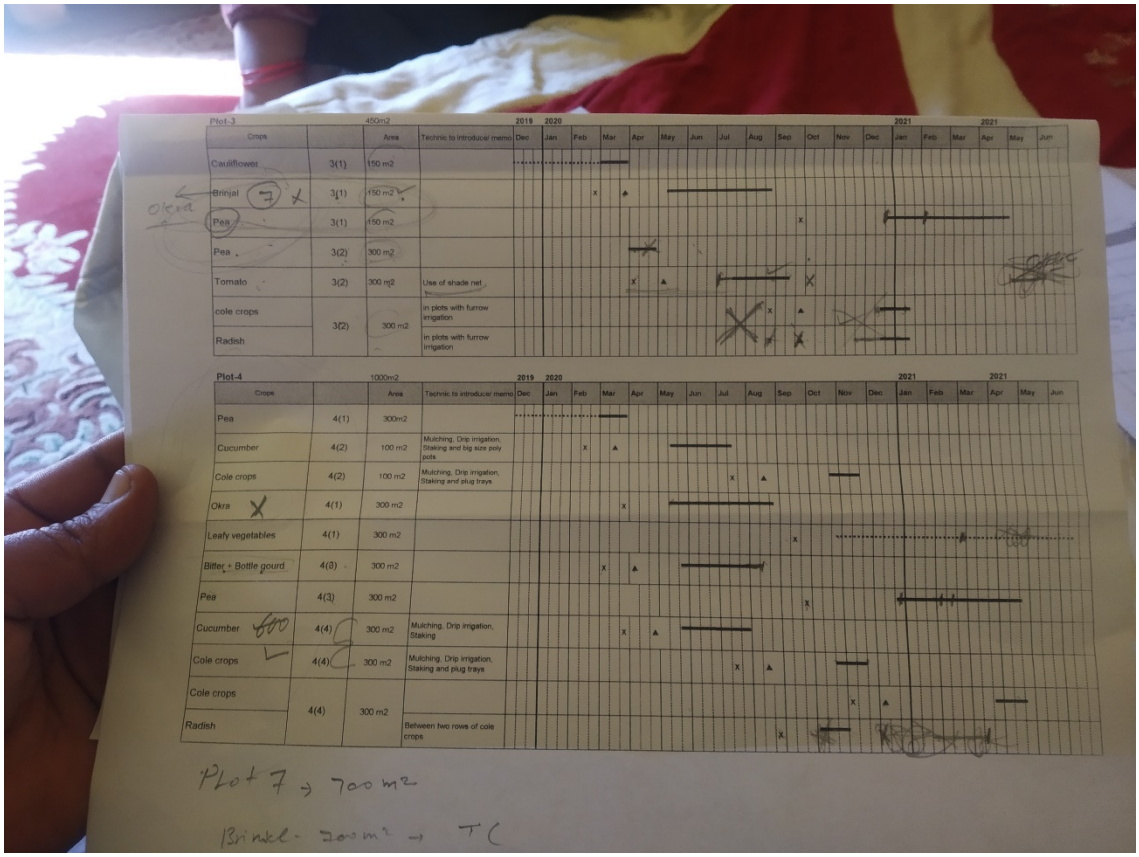
Crops		Area	Technic to introduce/ memo
Garlic	1	600m2	
Brinjal	1(1)	300 m2	Maize
Okra	1(2)	300 m2	
Cole crops Pea	1(2)	300 m2	

Plot-2 500m2

Crops	Section	Area	Technic to introduce/ memo
Cucumber	2-	500 m2	Mulching, Drip irrigation, Staking and big size poly pots
Cucumber	2(1)	300 m2	Mulching, Drip irrigation, Staking and big size poly pots
Cole crops-	2(2)	200 m2	Mulching, Drip irrigation, Staking and plug trays
Radish			Between two rows of cole crops
Cole crops	2(1)	300 m2	After removing bamboos, sheet and cleaning plow field and make plots
Radish			on the ridges prepared for cole crops

Plot-3 450m2

Crops		Area	Technic to introduce/ memo
Cauliflower	3(1)	150 m2	



Plot-3 450m2

Crops		Area	Technic to introduce/ memo
Cauliflower	3(1)	150 m2	
Brinjal	3(1)	150 m2	
Pea	3(1)	150 m2	
Pea	3(2)	300 m2	
Tomato	3(2)	300 m2	Use of shade net
cole crops	3(2)	300 m2	in plots with furrow irrigation
Radish			in plots with furrow irrigation

Plot-4 1000m2

Crops		Area	Technic to introduce/ memo
Pea	4(1)	300m2	
Cucumber	4(2)	100 m2	Mulching, Drip irrigation, Staking and big size poly pots
Cole crops	4(2)	100 m2	Mulching, Drip irrigation, Staking and plug trays
Okra	4(1)	300 m2	
Leafy vegetables	4(1)	300 m2	
Bitter + Bottle gourd	4(3)	300 m2	
Pea	4(3)	300 m2	
Cucumber	4(4)	300 m2	Mulching, Drip irrigation, Staking
Cole crops	4(4)	300 m2	Mulching, Drip irrigation, Staking and plug trays
Cole crops	4(4)	300 m2	
Radish			Between two rows of cole crops

Plot 7 → 700 m2

Brinkl- 700 m2 → TC

Result of the Assistance to make production plan [A] and
Plan of support activity for Year 2020 at Chatredi - BPMU Nurpur & TCP

Category: Support for putting a farmer-made production plan in operation
<Sub-title (tentative)> Support for very beginner farmer to start commercial production [D-2(3)]
26 Jan. 2020; Version 01-revised

1. Target farmers in sub-project Chatredi for assistance to make production plan

Name	Poly-houses	
Sansar Chand	105m2	1 unit, 105m2, 7m x 15m, DOA subsidy
Tilak Raj	105m2	1 unit, 105m2, 7m x 15m, HPCDP provided
Arvind Thapa	288m2	1 unit, 288m2, 12m x 24m, DOA subsidy

2. Background

Sub-project Chatredi is located at Yol; 10 minute drive to Dhalamsala town and there are Tibetan monasteries such as Gyuto Monastry, tourist spots such as Norbulingka Institute, and many tourist hotels at short distance. In this sub-project, only 3 farmers work on vegetable production for commercial purpose and all 3 farmers have a poly-house. Mode of crop production in the sub-project is wheat-maize/paddy and home garden vegetables production for home consumption purpose.

In 2019, TCP & BPMU made an intervention (assistance) to start a "Planned production of Pak-choi in poly-houses to sell to nearby Tibetan monastery" aimed at promoting exotic vegetable production in Nurpur as well as responding a request of these poly-house owners. In Jan-2020, TCP & BPMU held a meeting with 3 farmers to review the result in 2019 and plan the vegetable production for year 2020 in their poly-houses.
Through these interventions, it is comprehended that;
- In general, farmers' skill level (experience) is not enough to go for planned/intensive production yet. Conversely, planned/intensive production is too early to challenge for 1-2 years' experience farmers.
- Farmers have different interest/intention and it is not feasible to practice (to expect) a cooperative production. Farming plan & practice should be an individual one.
- Mr. Sansar and Mr. Arvind have no intention to do commercial production in open field.
- Mr. Talik is very beginner of vegetable cultivation. But he is in the situation to earn money for living from vegetable production. Thus, currently, Mr. Tilak is an only villager in the sub-project who serious about commercial vegetable production in open field.

In Jan-2020, after the production planning for 3 poly-houses for year 2020, TCP & BPMU assisted a production planning for Mr. Tilak's open fields.

3. BPMU & TCP support for Year 2020

1) Support on vegetable production in poly-houses; to carry out the farmer-made plan.

Name	Size	Material support	Technical support
Sansar Chand	105m2	Nil	Nil (no request from farmer)
Tilak Raj	105m2	Nil	On-site guidance (requested/essential)
Arvind Thapa	288m2	Nil	On-site guidance (requested)

* BPMU & TCP shall visit to check the poly-houses of Arvind and Sanar when come to Chatredi for on-site guidance to Tilak; although Sansar is not requesting.

Production plans in poly-house for Year 2020 are shown in ANNEX 1.

2) Support on vegetable production in open-fields; to carry out the farmer-made plan.

Name	Area	Material support	Technical support
Tilak Raj	400 m2	Drip irrigation, Water tank, Materials	On-site guidance (requested/essential)

4. Tilak's production plan for open fields

Although he has 9 plots (total 6 kanal by rough estimation) of farm fields, target area is limited to 4 plots (total about 400m2; 2 plots (300m2) are already used for vegetables) nearby his house because i) he is very beginner of vegetable cultivation, ii) available labour is he and wife only, iii) water intake from open-channel is different for other plots. Target crops are limited to i) he grew 1 or 2 times and plans to grow again in poly-house in year 2020, ii) easy to grow.

Production plan for open fields; for Year 2020 Prepared on 24 Jan. 2020

Farmer : Mr. Tilak

X Sowing ▲ Transplanting ▬ Harvesting

Crops	Plot # (area)	Technic to introduce	Year 2020 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year 2021 Jan	Feb	Mar
Cucumber	Plot-1 (150m2) & Plot-2 (150m2)	Mulch sheet & drip irrigation, Seedling production by pot (cucumber) & plug-tray (cauliflower)			X	▲		▬	▬	▬							
Cauliflower									X	▲		▬	▬				
Radish		Inter (mixed) cropping with cauliflower								X	▬						
Leafy vegetables or Radish													X	X	▬	▬	▬
Coriander	Plot-3 (40m2) & Plot-4 (50m2)	Rain protection by poly tunnel			X	X		▬	▬								
Cabbage		(No mulch sheet)								X	▲		▬	▲			▬
Radish											X	▬		X	▬		

5. BPMU& TCP support on Tilak's production plan for open fields

1) Material support and cost share

<table>
<tr><th colspan="2">Item & Q'ty</th><th>Cost share</th><th>Target time</th></tr>
<tr><td colspan="2">Installation of drip irrigation system for 150m2 (plot 1) and 150m2 (for plot 2); main pipe to plot 3</td><td>BPMU: 100% ??</td><td rowspan="3">Complete installation in Feb. 2020</td></tr>
<tr><td colspan="2">Installation of underground water tank; 9m3</td><td>Subsidy from soil conservation department : 50%
TCP : 45%, Farmer : 5%</td></tr>
<tr><td colspan="2">Installation of water intake from open ditch to water tank</td><td>TCP : 100%</td></tr>
<tr><td>Mulching sheet for 300m2</td><td>250 m</td><td rowspan="8">TCP : 100%</td><td rowspan="8">Delivery before mid. March</td></tr>
<tr><td>Plastic mesh net for 300m2</td><td>250 m</td></tr>
<tr><td>Tool - Rake, Hand auger, Ridger for tiller</td><td>1 each</td></tr>
<tr><td>Plastic pot (dia. 8cm)</td><td>300</td></tr>
<tr><td>Cocopeat</td><td>1 block</td></tr>
<tr><td>Seed of cucumber</td><td>1 pack</td></tr>
<tr><td>Fertilizer (NPK=12:32:16)</td><td>9 kg</td></tr>
<tr><td>Low poly-tunnel (pipe frame only) for 50m2 (plot 3) and 40m2 (plot4)</td><td></td><td rowspan="3">TCP shall determine the quantity before mid-Feb.</td><td>Before late March</td></tr>
<tr><td>Poly-sheet for low poly-tunnel, W2.0 m</td><td></td><td>Before early June</td></tr>
<tr><td>Clip to fix poly-sheet on poly-tunnel</td><td></td></tr>
</table>

* Farmer shall prepare on his account - FYM (for 400m2, 1 truck), Bamboo post (100), Steel wire (250m), Plastic rope, nails.

2) Technical support

Provide on-site guidance; schedule of on-site guidance by TCP shall be set later.

Provide guidance not only for open fields but also for his poly-house, too.

6. Immediate works to be made

BY BPMU:

- Explain Mr. Tilak about the subsidy from soil conservation department for underground water tank and his cost share, and then assist him to apply for it.
- Order the service provider of drip irrigation (KOTARI) to carry out a detail planning on site
- Let Mr. Tilak start looking for a good contractor for underground water tank

BY BPMU & TCP:

- Explain the requirements to the service provider of drip irrigation (KOTARI) when provider carries out a detail planning on site

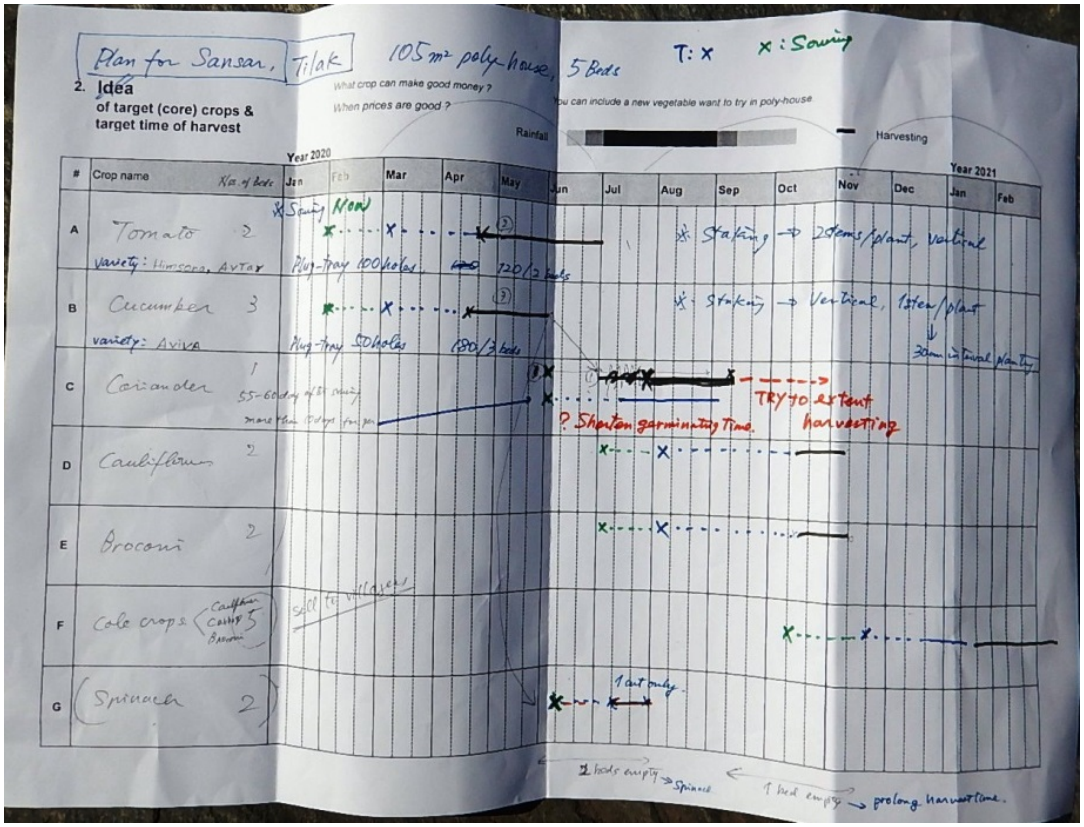
TCP:

- Design an intake-cum-filter pit
- Calculate the quantity of low poly-tunnel frame and others

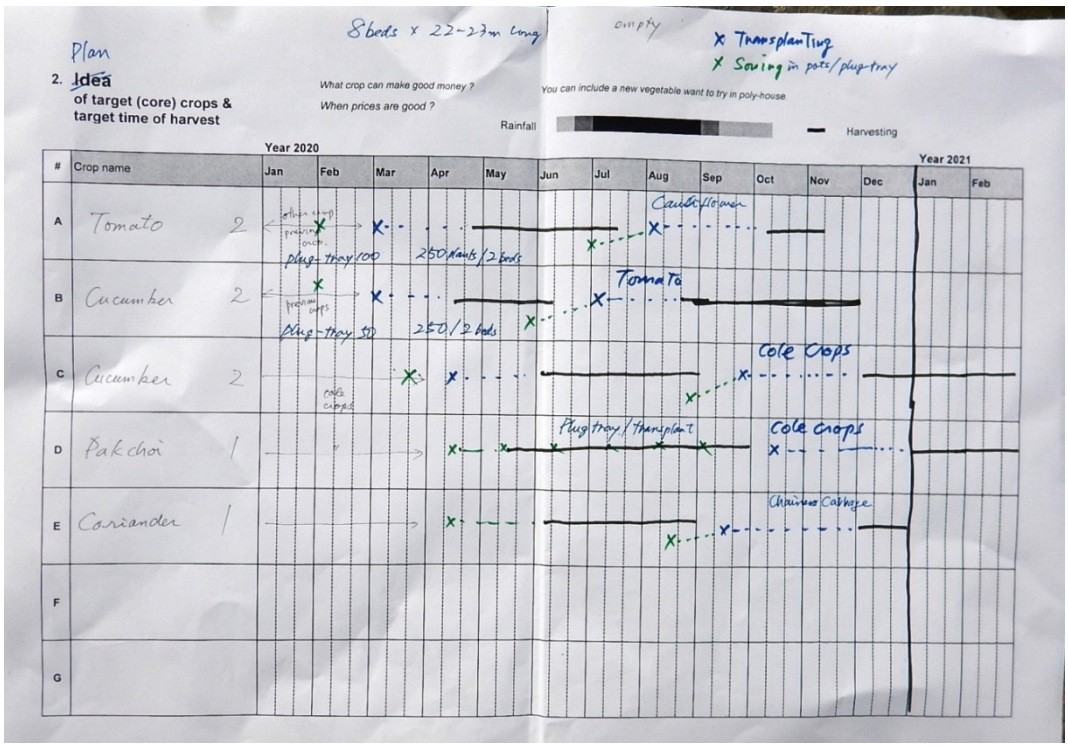
// end

ANNEX 1 : Production plans in poly-house for Year 2020 (Result of A-2)

Sansar Chand & Tilak Raj

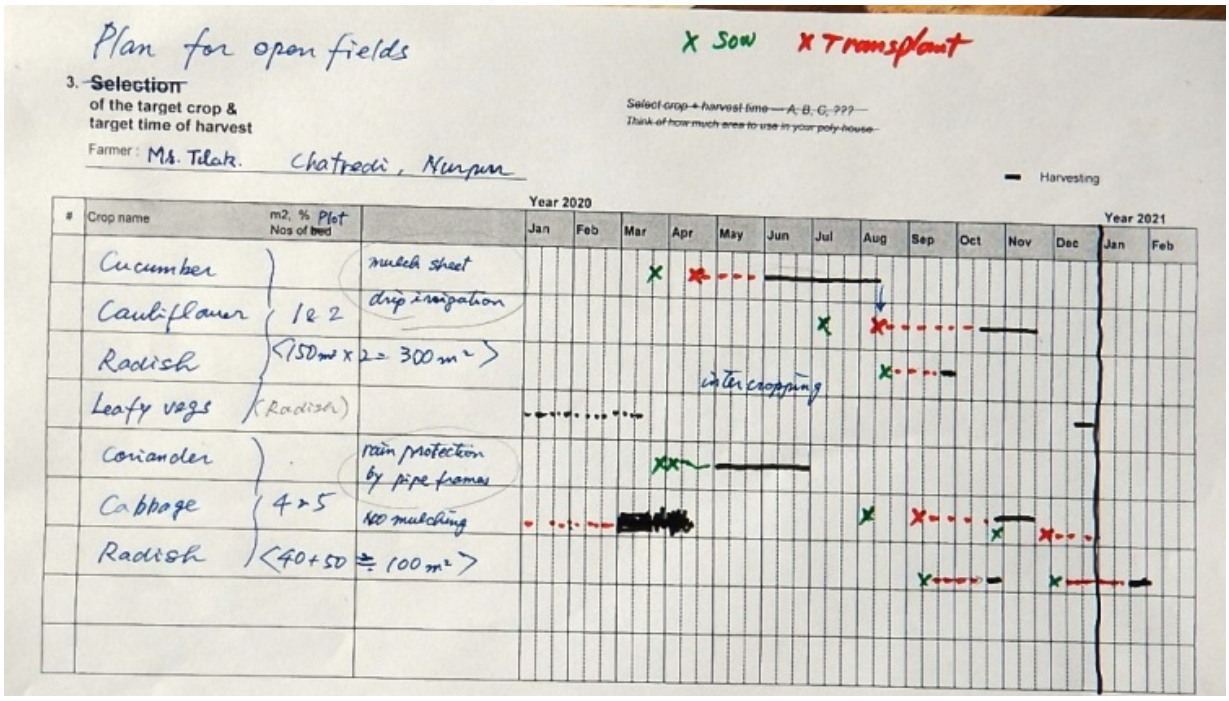


Arvind Thapa



* Arvind Thapa has cole crops in his poly-house now. He wanted to try a [2 times tomato cropping in same bed; to harvest in Feb-Mar and July-Nov]. However, it was too late to start it and he said he will try it next year.

ANNEX 2 : Tilak's production plan for open fields (Result of A-4)



Plan for open fields

X Sow X Transplant

3. ~~Selection~~ of the target crop & target time of harvest

~~Select crop + harvest time — A, B, C, ???~~
~~Think of how much area to use in your poly house~~

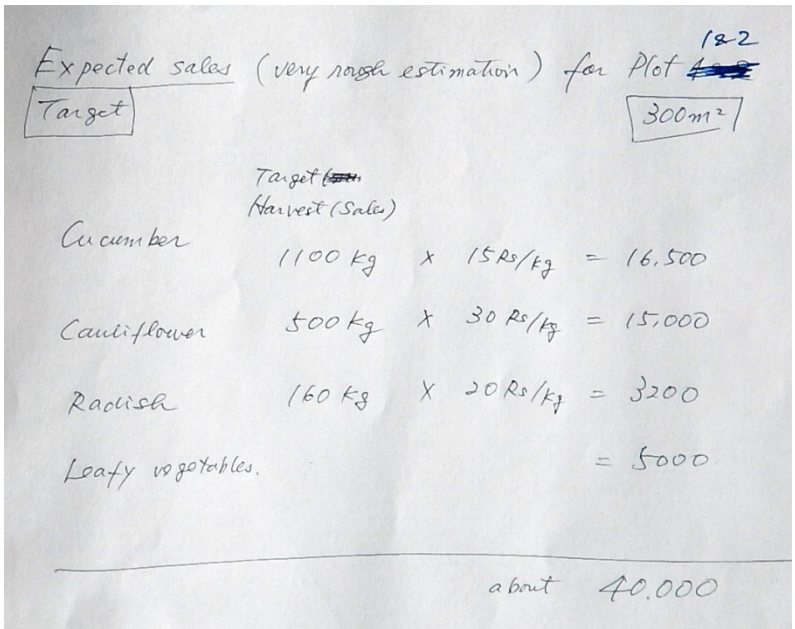
Farmer : Ms. Tilak. Chatredi, Nirpur

Harvesting

#	Crop name	m2, % Plot Nos of bed	
	Cucumber	1 & 2 <150m² x 2 = 300 m²>	mulch sheet, drip irrigation
	Cauliflower		
	Radish		
	Leafy vegs	(Radish)	intercropping
	Coriander	4 > 5 <40+50 ≒ 100 m²>	rain protection by pipe frames, NO mulching
	Cabbage		
	Radish		

Year 2020: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Year 2021: Jan Feb



Expected sales (very rough estimation) for Plot 1&2

Target

300m²

Target Harvest (Sales)

Cucumber	1100 kg	X 15 Rs/kg	=	16,500
Cauliflower	500 kg	X 30 Rs/kg	=	15,000
Radish	160 kg	X 20 Rs/kg	=	3200
Leafy vegetables.			=	5000
			about	40,000

ANNEX 3 : Photos of target fields

← Plot 1 *(This is not current state)*

Plot 3 *(These are not current state)*

↓

Plot 3 no photos

Plot 4 no photos

Current state of intake and open-channel and Place for underground water tank

//end

Execution results (data sheets): Promotion of Cucumber & Early cauliflower cultivation by use of mulching sheet & drip irrigation (2020, 2021 and 2022) [D-2(1)]

1. Sub-projects, Nos. of farmers and planned/actual cultivation area

Sub-projects, nos. of target farmers and actual cultivation area of cucumber and cauliflower are show in the table below. BPMU/sub-projects and farmers/cultivation areas which planned but did not implemented/achieved results were not included.

BPMU / Sub-project	Nos. of farmer (actual)	Actual cultivation area of cucumber (m2)	Actual cultivation area of cauliflower (m2)
Year 2020	**37**	**10,500**	**14,850**
Hamirpur	**8**	**2,800**	**3,400**
Majhot	1	100	100
Kirwin	1	200	200
Beha	1	200	200
Diot-1	1	600	400
Manjru	2	400	400
Guriah	2	1,300	2,100
Bilaspur	**17**	**4,800**	**7,700**
Kahali	2	0	800
Domehar	5	0	1600
Ghandir	1	400	400
Noa	2	800	600
Nalwar Kotlu	4	2,200	3,000
Chiber Ballu	1	800	500
Fogog	2	600	800
Sarkaghat	**12**	**2,900**	**3,750**
Karadi Kandyol	1	200	400
Ropri to Khanvod	2	400	400
Ukhala	4	900	950
Knanote	1	600	600
Damella	4	800	1,400
Year 2021	**38**	**17,750**	**18,500**
Hamirpur	**8**	**2,100**	**6,000**
Kirwin	1	300	300
Beha	1	200	200
Diot-1	1	600	600
Manjru	2	400	400
Guriah	2	600	1,000
Budhwin (DDA)	1	0	3,500
Bilaspur	**20**	**12,700**	**7,950**
Bakroa	1	800	800
Nalwar Kotlu	4	4,650	1,650
Fagog	2	1,000	1,000
Gandhir	1	800	400
Kahali	2	800	800
Chibber Ballu	2	1,400	800
Noa	3	1,100	800

BPMU / Sub-project	Nos. of farmer (actual)	Actual cultivation area of cucumber (m2)	Actual cultivation area of cauliflower (m2)
Domehar	2	950	500
Balhseena	1	400	400
Auhar (DDA)	1	400	400
Kalthun (DDA)	1	400	400
Sarkaghat	**10**	**2,950**	**4,550**
Karadi Kandyol	1	600	1,600
Ropri to Khanvod	1	400	400
Ukhala	5	950	1,150
Knanote	1	500	800
Damella	2	500	600
Year 2022	**8**	**2,650**	**3,520**
Hamirpur	**5**	**1,450**	**2,120**
LIS Jamli	1	250	650
LIS Ghodi	1	100	100
Dhangota (DOA)	1	500	500
Maharal (DOA)	1	400	270
Bhutiar (DOA)	1	200	600
Bilaspur	**3**	**1,200**	**1,400**
LIS Domehar	1	400	400
Vishanu (DOA)	1	600	800
Kalthun (DOA)	1	200	200
Accumulated total of Year 2020 - 2022	**83**	**30,900**	**36,870**

2. Detail of necessary items, prices and cost sharing

Detail of necessary items, prices and cost sharing among BPMUs, farmers and TCP are shown in Annex-1.

3. Cost per kanal

Cost per kanal is shown in the table below.

1. Cucumber

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal	Memo
Bed preparation	Mulching sheet	342	m	8	Rs/m	2	1,368	1.2m wide x 400m/roll, Rs.3500/roll 2 uses for cucumber & cauliflower/ year x 1 year = 2 uses
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	1	225	
	FYM	1	truck	1500	Rs/truck	2	750	2 uses for cucumber & cauliflower, per 1 year
Seedling production	Plastic pot	400	pots	0.40	Rs/pot	1	160	Rs.200/kg for 500 pots
	Cocopeat	1	block	150	Rs/block	1	150	
	Seed of cucumber	1	pack	200	Rs/pack	1	200	
Staking materials	Bamboo post	126	post	10	Rs/pot	4	315	7 posts/ 1 bed 1 use for cucumber/year x 4 years
	Steel wire	6	kg	100	Rs/kg	4	150	324m = 6kg/ kanal 1 use for cucumber /year x 4 years
	Plastic mesh net	342	m	10	Rs/m	5	684	1m wide x 100m/roll, Rs.1000/roll 1 use for cucumber/year x 5 years
	Plastic rope	5	bundle	80	Rs/bundle	1	400	
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250	100g/ package
	Insecticide	1	package	250	Rs/pack	1	250	100ml/ package
Labour cost	Bed preparation + mulching	4	person*day	400	Rs/day	2	800	Rs.50/person/h x 8h/day = Rs.400/person/day 2 uses for cucumber & cauliflower for 1 bed
	Nursery raising	1	person*day	400	Rs/day	1	400	
	Intercultural operations	4	person*day	400	Rs/day	1	1,600	
	Harvesting	40	person*h/day	50	Rs/h	1	2,000	1 person for 1hour /day is required. Harvesting: every 2 days for period 80 days => 80 days/2 = 40 days
Total cost/ kanal							**9,702**	
Total cost/ kanal, without Labour cost							**4,902**	

2. Cauliflower

Item		Qty/ kanal		Unit price (Rs)		No. of uses	Cost/ kanal	Memo
Bed preparation	Mulching sheet	342	m	8	Rs/m	2	1,368	1.2m wide x 400m/roll, Rs.3500/roll 2 uses for cucumber & cauliflower/ year x 1 year = 2 uses
	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/m	1	225	
	FYM	1	truck	1500	Rs/truck	2	750	2 uses for cucumber & cauliflower, per 1 year
Seedling production	Plug trays	22	trays	35	Rs/tray	4	193	1 use for cauliflower/year x 4 years
	Cocopeat	1	block	150	Rs/block	1	150	
	Seed of cauliflower	1	pack	400	Rs/pack	1	400	
Agro chemical	Fungicide	1	package	250	Rs/pack	1	250	100g/ package
	Insecticide	1	package	250	Rs/pack	1	250	100ml/ package
Labour cost	Bed preparation + mulching	4	person*day	400	Rs/day	2	800	Rs.50/person/h x 8h/day = Rs.400/person/day 2 uses for cucumber & cauliflower for 1 bed
	Nursery raising	1	person*day	400	Rs/day	1	400	
	Intercultural operations	4	person*day	400	Rs/day	1	1,600	
	Harvesting	30	person*h/day	50	Rs/h	1	1,500	1 person for 1hour /day is required. Harvesting: every 2 days for period 60 days => 60 days/2 = 30 days
Total cost/ kanal							**7,886**	
Total cost/ kanal, without Labour cost							**3,586**	

4. Installations of drip irrigation system by BPMU/DOA

Situation of installation of drip irrigation system is shown in the table below. Some installation were not completed due to lockdown by COVID-19 in Year 2020. Installation in Year 2022 were all done by district DOA.

BPMU/ Sub-project	Nos. of farmer	Approximate total area to be installed (m^2)	Situation of the installation works	
			All completed (m^2)	No works done (m^2)
Year 2020	**41**	**13,050**	**9,150**	**3,900**
Hamirpur	**8**	**3,000**	**2,200**	**800**
Majhot	2	600	0	600
Dharnasi	1	200	0	200
Kirwin	1	400	400	0
Beha	3	1,200	1,200	0
Diot-1	1	600	600	0
Bilaspur	**20**	**7,200**	**6,400**	**800**
Kahali	2	800	800	0
Parohi	2	800	800	0
Domehar	5	2,000	2,000	0

Ghandir	2	800	800	0
Swara	1	0	0	0
Noa	2	400	400	0
Nalwar Kotlu	4	800	0	800
Fogog	3	1,600	1,600	0
Sarkaghat	**7**	**550**	**550**	**0**
Karadi Kandyol	1	200	200	0
Ukhala	5	150	150	0
Knanote	1	200	200	0
Una	**5**	**1,500**	**0**	**1,500**
Berian	2	600	0	600
Krishna Nagar	3	900	0	900
Dehra	**1**	**800**	**0**	**800**
Ketal Kuhal	1	800	0	800
Year 2021	**3**	**4,300**	**4,300**	**0**
Hamirpur	**1**	**3,500**	**3,500**	**0**
Budhwin (DDA)	1	3,500	3,500	0
Bilaspur	**2**	**800**	**800**	**0**
Auhar (DDA)	1	400	400	0
Kalthun (DDA)	1	400	400	0
Sarkaghat	**0**	**0**	**0**	**0**
0	0	0	0	0
Year 2022	**9**	**5,450**	**3,290**	**2,160**
Hamirpur	**7**	**3,850**	**2,490**	**1,360**
LIS Amned	1	200	0	200
LIS Jhnikari	1	800	0	800
LIS Jamli	1	250	250	0
LIS Ghodi	1	600 ➔ 300	100	200
Dhangota	1	250 ➔ 500	500	0
Maharal	1	1000	840	160
Bhutiar	1	800	800	0
Bilaspur	**2**	**1,600**	**800**	**800**
Chibber Ballu	1	800	0	800
Vishanu	1	800	800	0

5. Pre-Demonstration and Demonstration of bed preparation, mulching and staking

Summary of Pre-Demonstration and Demonstration is shown in the table below. Pre-Demonstration were conducted for EOs of targeted BPMUs by TCP in Yaer2020. The contents were preparing bed and installing mulching sheet and plastic mesh nets and staking for cucumber cultivation. After the pre-demonstration, EOs conducted demonstrations for farmers to instruct them the techniques obtained in the Pre-demonstration.

Contents	Date	Venue	Participants
Year 2020			
Pre-Demonstration	March 4th, 2020	Diot-1 (Hamirpur)	TCP experts, EOs of targeted BPMU
Demonstration	March 9th, 2020	Krishna Nagar (Una)	TCP experts, EOs of Una, farmers
Demonstration	March 11th, 2020	Karadi Kandyol (Sarkaghat)	TCP experts, EOs of Sarkaghat, farmers
Demonstration	March 17th, 2020	Guriah (Hamirpur)	TCP experts, EOs of Hamirpur, farmers
Demonstration	March 18th, 2020	Nalwa Kotlu (Bilaspur)	TCP experts, EOs of Bilaspur, farmers
Year 2021			

Pre-Demonstration	-	-	-
Demonstration	March 16th, 2021	Makadi (Bilaspur)-	TCP expert, EOs of BPMU/DOA Bilaspur, farmers
Year 2022			
Pre-Demonstration	-	-	-
Demonstration	February 18th, 2022	Vishanu (Bilaspur)	TCP expert, EO of DOA Bilaspur, farmers
Demonstration	March 3rd, 2022	Dhangota (Hamirpur)	TCP expert, EOs of DOA Hamirpur, farmers
Demonstration	March 14th, 2022	Kalthun (Bilaspur)	TCP expert, EO of DOA Bilaspur, farmer
Demonstration	May 20th, 2022	Maharal (Hamirpur)	TCP expert, EO of DOA Hamirpur, farmers

Note: No Pre-Demonstration and Demonstration were conducted in 2021 because EOs already learned what/how to do in 2020 and they instructed to farmers individually.

6. Field Visit

Each field visit is held in 2020 and 2021 as follows and details are shown in Annex-2.

- In Khanot (BPMU Sakaghat) on October 17th, 2020
- In Guriah (BPMU Hamirpur) on October 19th, 2020
- In Domehar (BPMU Bilaspur) on October 22nd, 2020
- In Budwin (DDA Hamirpur) on October 28th, 2021
- In Auhar (DDA Bilspur) on November 10th, 2021

7. Result of cucumber and cauliflower cultivation

Target yield and profit based on the results of 2019 trial were as follows:

	Cucumber	Early cauliflower
Target yield	More than 2,400 Kg/kanal	1,200 Kg/kanal
Target profit	More than 34,000 Rs/kanal	24,000 Rs/kanal

Result of cucumber and cauliflower in 2020 and 2021 is shown in the table below.

Item	Unit	Year 2020				Year 2021			
		Hamirpur	Bilaspur	Sarkaghat	Average	Hamirpur	Bilaspur	Sarkaghat	Average
Cucumber									
Yield (ave)	Kg /kanal	1,506	2,295	1,918	**1,906**	2,023	1,483	1,735	**1,747**
Yield (max)		3,322	2,932	3,102	**3,119**	2,244	3,003	1,938	**2,395**
Yield (min)		584	1,805	1,068	**1,152**	1,842	367	1,620	**1,276**
Profit (ave)	Rs. /kanal	18,114	33,411	26,628	**26,051**	33,694	27,347	31,243	**30,761**
Profit (max)		44,470	41,292	56,276	**47,346**	39,659	57,191	35,258	**44,036**
Profit (min)		5,129	23,445	12,008	**13,527**	28,713	303	27,520	**18,845**
Selling Price	Rs	22	20	20	**21**	21	25	23	**23**

Item	Unit	Year 2020				Year 2021			
		Hamirpur	Bilaspur	Sarkaghat	Average	Hamirpur	Bilaspur	Sarkaghat	Average
Cauliflower									
Yield (ave)	Kg /kanal	810	790	683	**761**	820	757	801	**793**
Yield (max)		944	842	806	**864**	880	909	865	**885**
Yield (min)		692	696	570	**653**	726	546	698	**657**
Profit (ave)	Rs. /kanal	25,027	38,277	27,958	**30,421**	34,988	27,049	33,164	**31,733**
Profit (max)		42,495	44,061	35,015	**40,524**	38,698	31,688	38,748	**36,378**
Profit (min)		11,825	34,195	20,975	**22,332**	31,638	17,612	29,015	**26,088**
Selling Price	Rs	40	49	52	**47**	48	49	53	**50**

Note: result of cauliflower in 2021 is under collection

Result of cucumber and cauliflower in 2022 is shown in the table below.

Item	Unit	Year 2022		
		Hamirpur	Bilaspur	Average
Cucumber				
Yield (ave)	Kg /kanal	1,518	1,601	**1,560**
Yield (max)		1,805	1,824	**1,815**
Yield (min)		1,231	1,232	**1,232**
Profit (ave)	Rs. /kanal	28,322	30,864	**29,593**
Profit (max)		35,604	37,208	**36,406**
Profit (min)		21,040	20,548	**20,784**
Selling Price	Rs	22	22	**22**
Cauliflower				
Yield (ave)	Kg /kanal			
Yield (max)				
Yield (min)				
Profit (ave)	Rs. /kanal			
Profit (max)				
Profit (min)				
Selling Price	Rs			

Annex-1: Detail of necessary items, prices and cost sharing

Hamirpur								
By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty	
Watering	Drip irrigation system	1	set	various	Rs/set		8	set
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		1	unit
Bed preparation	Mulching sheet	342	m	8	Rs/m	41,724	5216	m
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	3,431	137	kg
Bamboo staking	Steel wire	6	kg	100	Rs/kg	9,150	92	kg
Bamboo staking	Plastic mesh net, 15 x 15 cm mesh	342	m	10	Rs/m	52,155	5216	m
Pest control	Fungicide	1	package	250	Rs/pack	3,813	15	package
Pest control	Insecticide	1	package	250	Rs/pack	3,813	15	package
					(a)	114,085		
By TCP								
Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	1,600	8	unit
Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	6,800	4	unit
Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	2,000	8	unit
Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 3m)	1	unit/farmer	5000	Rs/unit	10,000	2	unit
Seedling production	Shade-net for low poly-tunnel, W2.0 m x L4m	4	m/farmer	70	Rs/m	2,800	40	m
Seedling production	Clip to fix shade-net on poly-tunnel	10	pc/farmer	15	Rs/pc	1,500	100	pc
Seedling production	Plastic pot for cucumber (about 400ml)	400	pots	0.57	Rs/pot	3,486	6100	pots
Seedling production	Cocopeat	1	block	150	Rs/block	2,288	15	block
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	3,050	15	pack
Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	12,800	32	unit
Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0	unit
					(b)	46,323		
By Farmers								
Bed preparation	FYM	1	truck	1500	Rs/truck	22,875	15	truck
Bamboo staking	Bamboo post	126	post	10	Rs/pot	19,215	1922	post
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	6,100	76	bundle
Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	3,200	8	set
Bamboo staking	Nail	1.0	kg		Rs/kg	0	8	kg
Seedling production	Vermin compost	40	liter			0	0	liter
					(c)	51,390		
					(a)+(b)+(c)	211,798		

Bilaspur

By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty	
Watering	Drip irrigation system	1	set	various	Rs/set		14	set
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		0	unit
Bed preparation	Mulching sheet	342	m	8	Rs/m	67,716	8465	m
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	5,850	234	kg
Bamboo staking	Steel wire	6	kg	100	Rs/kg	8,550	86	kg
Bamboo staking	Plastic mesh net	342	m	10	Rs/m	80,920	8092	m
Seedling production	Low poly-tunnel (pipe frame + poly sheet), 1.5 x 4m	1	set/farmer	5000	Rs/set	BPMU stock	2	set
Pest control	Fungicide	1	package	250	Rs/pack	6,500	26	package
Pest control	Insecticide	1	package	250	Rs/pack	6,500	26	package
					(a)	176,036		
By TCP								
Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	2,800	14	unit
Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	8,500	5	unit
Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	3,500	14	unit
Seedling production	Shade net for low poly-tunnel, W2 m x L5m	5	m/farmer	70	Rs/m	4,900	70	m
Seedling production	Clip to fix shade net on poly-tunnel	10	pc/farmer	15	Rs/pc	2,400	160	pc
Seedling production	Plastic pot (about 400ml)	400	pots	0.57	Rs/pot	5,943	10400	pots
Seedling production	Cocopeat	1	block	150	Rs/block	4,200	28	block
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	5,600	28	pack
Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	20,800	52	unit
Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0	unit
					(b)	58,643		
By Farmers								
Bed preparation	FYM	1	truck	1500	Rs/truck	39,000	26	truck
Bamboo staking	Bamboo post	126	post	10	Rs/pot	32,760	3276	post
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	10,400	130	bundle
Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	8,800	22	set
Bamboo staking	Nail	1.0	kg		Rs/kg	0	26	kg
Seedling production	Vermin compost	40	liter			0	0	liter
					(c)	90,960		
					(a)+(b)+(c)	325,639		

Sarkaghat

By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty	
Watering	Drip irrigation system (new installation)	1	set	various	Rs/set		1	set
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		0	unit
Bed preparation	Mulching sheet	342	m	8	Rs/m	24,966	3121	m
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	2,053	82	kg
Bamboo staking	Steel wire	6	kg	100	Rs/kg	2,100	21	kg
Bamboo staking	Plastic mesh net	342	m	10	Rs/m	24,208	2421	m
Pest control	Fungicide	1	package	250	Rs/pack	2,281	9	package
Pest control	Insecticide	1	package	250	Rs/pack	2,281	9	package
					(a)	57,889		
By TCP								
Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	800	4	unit
Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	6,800	4	unit
Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	1,250	5	unit
Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 4m)	1	unit/farmer	5000	Rs/unit	35,000	7	unit
Seedling production	Shade net for low poly-tunnel, W2 m x L5m	5	m/farmer	70	Rs/m	2,800	40	m
Seedling production	Clip to fix shade net on poly-tunnel	10	pc/farmer	15	Rs/pc	1,050	70	pc
Seedling production	Plastic pot (about 400ml)	400	pots	0.57	Rs/pot	2,086	3650	pots
Seedling production	Cocopeat	1	block	150	Rs/block	1,369	9	block
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	1,825	9	pack
Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	8,000	20	unit
Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0	unit
					(b)	60,979		
By Farmers								
Bed preparation	FYM	1	truck	1500	Rs/truck	13,688	9	truck
Bamboo staking	Bamboo post	126	post	10	Rs/pot	11,498	1150	post
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	3,650	46	bundle
Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	3,200	8	set
Bamboo staking	Nail	1.0	kg		Rs/kg	0	9	kg
Seedling production	Vermin compost	40	liter			0	0	liter
					(c)	32,035		
					(a)+(b)+(c)	150,904		

Una

By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty	
Watering	Drip irrigation system	1	set	various	Rs/set		5	set
Watering	Motor pump, ?? Hp	1	unit		Rs/unit		0	unit
Bed preparation	Mulching sheet	342	m	8	Rs/m	10,260	1283	m
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	844	34	kg
Bamboo staking	Steel wire	6	kg	100	Rs/kg	2,250	23	kg
Harvesting, Selling	Platform digital scale, 50kg	1	unit/sub-project	6,000	Rs/unit	12,000	2	unit
Pest control	Fungicide	1	package	250	Rs/pack	938	4	package
Pest control	Insecticide	1	package	250	Rs/pack	938	4	package
					(a)	27,229		
By TCP								
Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	1,000	5	unit
Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	1,700	1	unit
Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	1,250	5	unit
Bamboo staking	Plastic mesh net	342	m	10	Rs/m	12,825	1283	m
Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 4m)	1	unit/farmer	5000	Rs/unit	0	0	unit
Seedling production	Shade net for low poly-tunnel, W2 m x L5m	5	m/farmer	70	Rs/m	350	5	m
Seedling production	Clip to fix shade net on poly-tunnel	10	pc/farmer	15	Rs/pc	150	10	pc
Seedling production	Plastic pot (about 400ml vol)	400	pots	0.57	Rs/pot	857	1500	pots
Seedling production	Cocopeat	1	block	150	Rs/block	563	4	block
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	750	4	pack
Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	8,000	20	unit
					(b)	27,445		
By Farmers								
Bed preparation	FYM	1	truck	1500	Rs/truck	5,625	4	truck
Bamboo staking	Bamboo post	126	post	10	Rs/pot	4,725	473	post
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	1,500	19	bundle
Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	2,000	5	set
Bamboo staking	Nail	1.0	kg		Rs/kg	0	4	kg
Seedling production	Vermin compost	40	liter			0	0	liter
					(c)	13,850		
					(a)+(b)+(c)	68,523		

Dehra

By BPMU	Items	Q'ty per 400m2 or per farmer		Unit price		Total cost	Total Q'ty	
Watering	Drip irrigation system	1	set	various	Rs/set		1	set
Watering	Motor pump, ?? Hp	0	unit		Rs/unit		0	unit
Bed preparation	Mulching sheet	342	m	8	Rs/m	5,472	684	m
Bed preparation	Fertilizer (NPK=12:32:16)	9	kg	25	Rs/kg	0	0	kg
Bamboo staking	Steel wire	6	kg	100	Rs/kg	0	0	kg
Bamboo staking	Plastic mesh net, 15 x 15 cm mesh	342	m	10	Rs/m	6,840	684	m
Pest control	Fungicide	1	package	250	Rs/pack	0	0	package
Pest control	Insecticide	1	package	250	Rs/pack	0	0	package
					(a)	12,312		
By TCP								
Bed preparation	Tool - Rake	1	unit/farmer	200	Rs/unit	200	1	unit
Bed preparation	Tool - Ridger for small tiller	1	unit/sub-project	1700	Rs/unit	1,700	1	unit
Bamboo staking	Tool - Hand auger	1	unit/farmer	250	Rs/unit	0	0	unit
Seedling production	Low poly-tunnel (pipe frame + poly sheet, 1.5m x 4m)	1	unit/farmer	5000	Rs/unit	0	0	unit
Seedling production	Shade-net for low poly-tunnel, W2.0 m x L5m	5	m/farmer	70	Rs/m	0	0	m
Seedling production	Clip to fix shade-net on poly-tunnel	10	pc/farmer	15	Rs/pc	0	0	pc
Seedling production	Plastic pot for cucumber (about 400ml)	400	pots	0.57	Rs/pot	457	800	pots
Seedling production	Cocopeat	1	block	150	Rs/block	300	2	block
Seedling production	Seed of cucumber	1	pack	200	Rs/pack	400	2	pack
Harvesting, Selling	Plastic crate	4	unit/farmer	400	Rs/unit	1,600	4	unit
Harvesting, Selling	Platform digital scale	1	unit/sub-project	6,000	Rs/unit	0	0	unit
					(b)	4,657		
By Farmers								
Bed preparation	FYM	1	truck	1500	Rs/truck	3,000	2	truck
Bamboo staking	Steel pipe post	126	post	10	Rs/pot	2,520	252	post
Bamboo staking	Plastic rope	5	bundle	80	Rs/bundle	800	10	bundle
Bamboo staking	Tool - Hammer, Plier	1	set/farmer	400	Rs/set	400	1	set
Bamboo staking	Nail	1.0	kg		Rs/kg	0	2	kg
Seedling production	Vermin compost	40	liter			0	0	liter
					(c)	6,720		
					(a)+(b)+(c)	23,689		

Annex-2: Reports of Field Visit in 2020 and 2021

Title:	**Report on field visit for farmers- Khanot- Sarkaghat**
Date:	October 17, 2020, 11:00 AM-02:30 PM
Venue:	Khanot- Sarkaghat
Participants	BPMU – 1 Ms Sunita (AE) Farmers from Sub-projects : Khanot: 4 Ladheri Barin: 2 Jaddanallah: 2 Karadi Kandiol: 1 Ukhlala: 1 Trihami: 1 TCP: 1
Objectives:	By showing the results of harvest of cucumber in rainy season and early harvest of cauliflower, to let farmers have motivation for time shifted cultivation to get better profit from crops. • Getting information about the timings of sowing and transplanting crops to get early harvest. • Getting information about the advantage of ridger to prepare beds in short time. • Getting information about the material used for the cultivation.
Question/ interest/ comments of farmers	• Farmer in Kahnot, Mr Lekh Ram, informed that he is doing vegetable cultivation from long time, but not getting profit as Mr. Sunil Kumar got from cucumber and cauliflower. Mr. Lekh Ram is doing cultivation in 2000 m2 area near to his house. He wants to follow the schedule as cucumber in rainy season and early harvest of cauliflower in October. • Farmer in Jaddanallah, Mr Thakur Dass, informed that he makes ridges for potato or some other crops manually and it takes much time. He request TCP to get one ridger even he can pay for it. • Farmer in Trihami, Mr. Roop Lal, informed that he is doing vegetable cultivation like root crops (potato, colocasia, ginger and turmeric) to avoid the attack of animals, but next year he will do cultivation with same method near to his house. • Farmers in Ukhala, Mr. Sunil, Khanot and Mr. Ishwar, explained the results of early cauliflower, and they earned 3-4 times more money compare to main season.

Title:	**Report on field visit for farmers- Guriah- Hamirpur**
Date:	October 19, 2020, 11:00 AM-02:30 PM
Venue:	Guriah- Hamirpur
Participants	BPMU – 3 – Ms Nitika (AE), Ms Himani (AO), Mr Pritam (AEO) Farmers from Sub-projects : Guriah: 10 Beha: 2 Kirwin: 2 Rahjol: 1 Guhal: 1 TCP: 1
Objectives:	By showing the results of harvest of cucumber in rainy season and early harvest of cauliflower, to let farmers have motivation for time shifted cultivation to get better profit from crops. • Getting information about the timings of sowing and transplanting crops to get early harvest. • Getting information about the advantage of ridger to prepare beds in short time. • Getting information about the material used for the cultivation.
Question/ interest/ comments of farmers	• After watching the results of harvest at high price (Rs. 60-70/kg) farmers of Farmers in Guriah, Ms. Veena, Ms. Sushma and Ms Poonam want to install drip system in their fields to do the cucumber and early cauliflower cultivation from next year at same time. • AE in Hamirpur BPMU, Ms Nitika, informed that there is already surplus material of drip irrigation system (for 4-5 Kanal) in Guriah, so they can install in their fields. • Farmers in Kirwin, Mr. Desh Raj, Beha and Mr. Jai Singh, did the same activity this year in their fields, but after watching the status of crops in the field they couldn't get the results like Guriah. They informed that their nursery was not so good and many plants died after transplanting. • It is discussed at the time of field visit, that one or two farmers should have good skills to raise healthy seedlings. Nursery should not be raised by all farmers mainly in rainy season, so other farmers can buy seedlings from skilled farmer to get better results.

Title:	**Report on field visit for farmers- Domehar- Bilaspur**
Date:	October 22, 2020, 11:00 AM-02:30 PM
Venue:	Domehar- Bilaspur
Participants	BPMU – 3 Mr. Amit (AE), Mr. Vikram (AO), Mr. Anoop (AEO) Farmers from Sub-projects : Domehar: 7 Swara: 2 Lehri Sarial: 2 Domeda (DOA): 4 TCP: 1
Objectives:	To let farmers have motivation for time shifted cultivation to get better profit from crops by showing the results of harvest of cucumber in rainy season and early harvest of cauliflower,. • Getting information about the timings of sowing and transplanting crops to get early harvest. • Getting information about the advantage of ridger to prepare beds in short time. • Getting information about the material used for the cultivation.
Question/ interest/ comments of farmers	• Farmers in Domehar, Mr Dalip, Mr. Sunil and Mr. Ramesh, explained to other farmers that they tried early cauliflower first time in this year. In the beginning they were not sure that harvest will be there, but now they got very good crop and getting Rs. 50-55/kg. Mr. Sunil said that he will increase area next year. • Farmer in Lehri Sarial, Mr. Attar Singh, also doing vegetable cultivation in his fields in ordinary way. After watching the status of crop in the fields he was interested in cultivating cucumber and cauliflower by using the techniques/methods in time shifted cultivation. • Farmer in Swara, Mr. Roshan Lal, informed that he is also doing vegetable cultivation in about 3-4 Kanal, but they are not sure what price they will get from the harvest in main season and by doing with mulching sheet, drip irrigation and early varieties it is sure that they will definitely earn good money from cauliflower. • Farmer in Domeda (DOA), Mr. Manohar Lal, inquired about the availability of facility of drip system and mulching sheet is available in DOA with subsidy or not. • Mr. Anoop AEO, BPMU Bilaspur informed that 85% subsidy for drip irrigation system is available in DOA and interested farmers can apply in concerned blocks.

Title:	**Report on Field visit on Time-Shifted Cultivation for EOs and Farmers**
Date:	October 28, 2021, 11:15 AM-03:00 PM
Venue:	Budhwin, Hamirpur
Participants	BPMU: Hamirpur- 2 DDA: Hamirpur- 6 from six blocks Farmers: 40 from six blocks of DDA Hamirpur TCP: 2
Objectives:	By showing the results of harvest of cucumber in rainy season and early harvest of cauliflower, to let farmers have motivation for time shifted cultivation to get better profit from crops. Extension Officers of DOA can motivate farmers for cultivation with this method in their areas. • Getting information about the timings of sowing and transplanting crops to get early harvest. • Getting information about the advantage of ridger to prepare beds in short time. • Getting information about the material used for the cultivation.
Question/ interest/ comments of Extension Officers and Farmers	• Mr Suresh Banyal (SMS Hamirpur) asked farmers weather they know about mulching sheet or not, most of the farmers replied that they know about mulching sheet and some farmers has no information about mulching sheet and its uses. • Mr. Suresh Dhiman (SMS Nadaun) inquired about the ridger its attachments and availability and cost. • Mr. Vishwnath SMS DPM Hamirpur inquired about the use of poly sheet under the plug trays for nursery raising. TCP informed that poly sheet is used under the trays to prevent the contact of roots with soil. If there is contact of roots with soil, plant will get lanky and not harder compare to the method used for nursery raising with plug tray. • Mr. Hemraj (SMS Bojhari) inquired about the availability of mulching sheet in Hamirpur. TCP informed that it is available at HAVI Emporium near DDA Office in Hamirpur. • Mr. Dinesh AEO Taal, Block Bhoranj impressed by the results seen in the field. He introduced farmers of his block and inquired about weather TCP can support farmers in his area those who are willing in next year. • Mr Shekhar (farmer) from Amned (Sub-project of BPMU Hamirpur), Bhoranj Block informed that he is cultivating vegetables in one poly house and open field as well. He wants to grow cucumber and cauliflower with same method he has seen in the field visit. He also wants to get knowledge about early or late cultivation of vegetables in poly house. • Mr. Virender (farmer) from Bhoranj Block inquired about fertigation schedule and quantity. Mr. Vishal (farmer) of Budhwin explained about the fertilizers he used in different stages. He informed that he also used water soluble fertilizers through drip system to save time. • Mr. Suresh Banyal SMS Hamirpur inquired about used pesticides in the crop. Farmer informed that after 20 days he found the attack of spodopatera and he apply prophenophos two times in the crop. (After 20 and 40 day of transplanting) other no insect or disease found in the crop. • Mr. Krishan (farmer) from Sub-Project Manjru, explained the results of two-year cultivation with same method and timing. He also explained about the importance of mulching sheet and drip irrigation system to get harvest at the of high price of cops in the market.

Title:	**Report on Field visit on Time-Shifted Cultivation for EOs and Farmers**
Date:	November 10, 2021, 11:15 AM-03:00 PM
Venue:	Auhar, Bilaspur
Participants	BPMU: Bilaspur: 5 DDA: Bilaspur: 7 Farmers: 11 TCP: 3
Objectives:	By showing the results of harvest of cucumber in rainy season and early harvest of cauliflower, to let farmers have motivation for time shifted cultivation to get better profit from crops. Extension Officers of DOA can motivate farmers for cultivation with this method in their areas. • Getting information about the timings of sowing and transplanting crops to get early harvest. • Getting information about the advantage of ridger to prepare beds in short time. • Getting information about the material used for the cultivation.
Question/ interest/ comments of Extension Officers and Farmers	• Mr. Balbir farmer from Radoh Berthin Block inquired about the use of ridger. He wants to know that can they make ridges for potato or not. Mr. Anoop AEO BPMU Bilaspur informed that it is possible to make ridges with the sue of tiller and bed maker. • Mr. Ashok farmer from Jandenr Ghumarwin Block informed that he is also doing vegetables cultivation in his fields but this is the first time to see vegetable cultivation like this to harvest corps at the time of high price. He informed that from next year he will try same method of cultivation with same time. ADO Mr Brijesh Chandel informed him to get DOA scheme for installation of drip system. • Mr Vikash Dharmani AEO Ghumarwin request TCP to support for Mr. Ashok while start activity even in other area of Sub-Project. • Mr. Balbir Singh farmer from Asked that they can make ridges for potato by the use of ridger • Mr. Madan (farmer) from Sub-Project Domehar, explained the results of two-year cultivation with same method and timing. He also explained about the importance of mulching sheet and drip irrigation system to get harvest at the of high price of cops in the market. He informed that next year he will install drip system in another field to increase area to get more profit from vegetables. • Ms Raj Kumari (farmer) from Auhar also share her experience of cucumber and cauliflower cultivation. They are growing vegetables from long time and it was first time for her to do cultivation with this method and get harvest of cauliflower very early compare to previously. They also get more yield of cucumber compare with traditional way (no proper staking training and pruning). • Ms Sunita Thakur ADO Ghumarwin Block, inquired about the varieties of cucumber and early cauliflower. She also inquired about the spacing used for cultivation of cucumber and early cauliflower.

Discussion Paper

(Draft) Plan of activity: Support on consignment production of off-season vegetables ship to New Delhi

As of 13 March, 2020

1. Background

Advanced farmer in Hamirpur (hereafter called the outsourcer) sought farmers/fields for consignment production of exotic leafy vegetables in sub-project(s) in cool area, and he explained and discussed his idea with farmers of sub-project Kandi Nalah in Dec. 2019 and Feb. 2020. As a result, three farmers decided to engage in the consignment production.

Target period of harvest is from May to October and heavy rain in rainy season must hinder the continued production/harvest. The outsourcer planned a rain protection method by using low tunnel to overcome the difficulty, and inquired about possibility to extend a material support from BPMU/TCP to sub-project Kandi Nalah.

Considering the following points, BPMU/TCP decided to provide material support but the costs shall be shared by farmers 10%, outsourcer 30%, BPMU 30% and TCP 30%.

- It is an opportunity for the farmers to extend their outlet (buyer) as well as to add new items in their vegetable farming.
- If using of low tunnel (pipe frames + poly-sheets) for rain protection work well, it can be a good demonstration of new method.
- End-consumers are Japanese people in New Delhi. If farmers' production and shipments go well, it is a success case of entering into niche market in big city.

2. Outline of planned production

1) Annual production plan and items

Items	Target time of harvest														
	Apr.			May			Jun.			Jul.			Aug.			Sep.			Oct.		
C. Cabbage	◄																	►		
J. Cabbage				◄														►		
Broccoli				◄														►		
Lettuce					◄										►					
Cauliflower				◄														►		
Shungiku				◄											►					

2) Target volume based on request from buyer& Required field area for the production

Items	Target volume/month (kg)	Months	Target volume/year (kg)	Required field area (m^2)
C. Cabbage	500	6	3000	600
J. Cabbage	600	5	3000	625 - 650
Broccoli	300	5	1500	650
Cauliflower	300	5	1500	300
Lettuce	350	3.5	1225	400
Shungiku	70	4	280	
Total	2120		10505	2600

3. Target farmers and field area

Total 400 m2 *Photos shown in Annex

- Mr. Duni Chand : 200 m2
- Mr. Ram Dayal : 120 m2
- Mr. Tek Chand : 80 m2

4. New technique to introduce

Low tunnels with poly-sheet and shade-net roof:

At present, Kandi Nalah and adjoining areas growing vegetables (cole crops) from Feb. to June, harvest time is May and June.

To prolong the duration of harvest from May to October, protection from high sunshine in summer (May and June) and protection from rain in rainy days (July and Aug.) and is necessary. And low tunnel with simple & durable frames + shade-net or poly-sheet is considered a feasible solution technically and economically.

5. Necessary items & cost, cost sharing

1. Layout of field
   - Bed width: 120 cm, Distance between beds: 60 cm
   - Land shape: 20m x 20m, 1m width pathway at two sides (both ends) => Bed length 18m
   - Nos. of bed (row) - 20 / (120 + 0.6) = 11.1 beds or 11 beds

2. Material for covering 1 kanal (400 m2)

Items	Qty
Frames	For 1 bed: 18 m/1.5 m interval in 2 frames = 12 frames => For 1 kanal: 12 beds×11 frames= 132 frames
Poly sheet	18×2 m× 11 beds= 386 m2
Shade net	18×2 m× 11 beds= 386 m2
PVC pipe	18 m long×11 beds× 2 side=470 m => 470/3 m long pipe= 132 pcs.
Clips	132 frames× 2= 264 pcs.

3. Cost for covering 1 kanal (400m2)

Items	Qty per 400 m2	Unit price	Amount
GI pipe/frames	132 frames	Rs. 500	Rs 66000
PVC pipe	132 pcs	Rs 30/pc	Rs 3960
Poly sheet	386 m2	Rs. 55/m2	Rs 21230
Shade net	386 m2	Rs 35/m2	Rs 13510
Clips for jointing	264	Rs 20	Rs 5280
		Total	Rs 109,980

4. Cost sharing for 1 kanal

	%	Price	Items to be beard
Outsourcer	30	Rs 32994	Half of GI pipe
BPMU Mandi	30	Rs 32994	Half of GI pipe
TCP	30	Rs 32994	Poly sheet and Shade net
Farmers	10	Rs 10998	PVC pipe and Clips
Total	100	Rs 109,980	

Note: Commitment of farmers can be confirmed by cost sharing for this activity.

6. On-site activity

1) Technical guidance for farmers

By the outsourcer

- Sowing in plug trays, bed preparation, transplanting — 27 Feb. 2020
- Quality requirement check (grading, packaging in boxes) — Early May
- Setting of GI pipes and cover roof with poly sheet/shade net — Early or Mid May

2) On-site monitoring

Periodical monitoring by EO of BPMU Mandi

On-site visit to check the utilization/effect of low tunnels by TCP & BPMU Mandi

3) Advisory to the outsourcer

By TCP as per request

7. Terms and conditions to be agreed among the outsourcer and farmers

1) Shipping method
   - Place of delivery: On the bus to Mandi at National highway (Kullu-Mandi)
   - Transportation charges from Kandi Nalah to Mandi: by the farmers
   - Transportation charges from Mandi to Delhi: by the outsourcer
   - Frequency:

2) Pricing method
   - Determination of final weight:
   - Quality inspection: i) requirement, ii) inspection place :
   - Price discount due to quality level at Mandi:

3) Packing method
   - Materials for packing:
   - Cost sharing of packing materials:

4) Coordination of production (items, area, time) among three farmers

5) Coordination of shipment (items, q'ty, time) among three farmers

//end

ANNEX
Photos of Farmers' fields for the activity

Mr. Duni Chand: 200 m2

Backward

Forward

Mr. Ram Dayal: 120 m2

Mr. Tek Chand: 80 m2

This field is not uniformly flat.

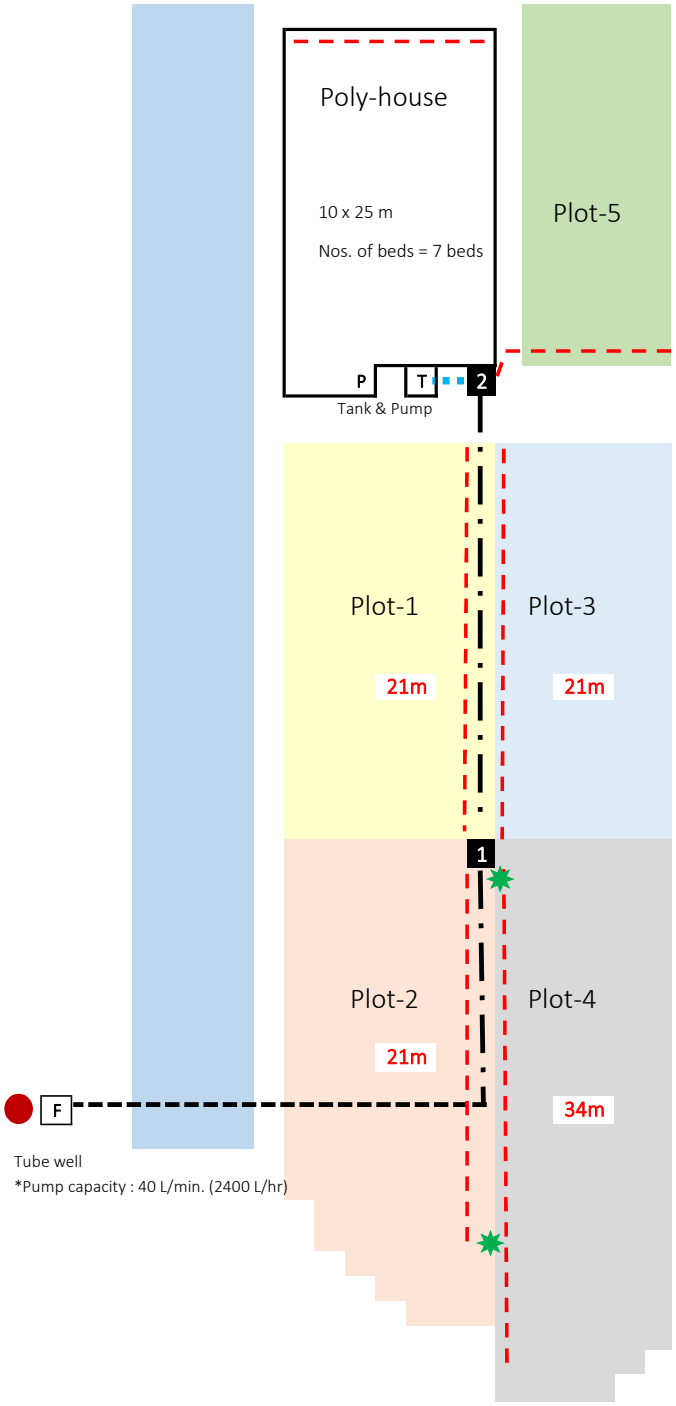
Two poly tunnels will be installed on relatively flat area

A: Promotion of market-oriented production planning by farmers

A-4: Assistance to make a production plan for whole farm (2022)

Result of the production planning for Maharal site - DOA Hamirpur (May 2022)
& Formats used for pre-planning by EOs and JICA TCP Experts

revised after the explanation to the farmer on 12-May.



	Area with drip irrigation (m2; estimation)
Poly-house	250m2 (10m x 25m)
Plot-1	190m2 (9m x 21m)
Plot-2	Similar to Plot 1; must be little less
Plot-3	170m2 (8m x 21m)
Plot-4	270m2 (8m x 34m)
Plot-5	200m2

Total of open fields: about 1020 m2

1 Hydrant 1 — Water to Plot-1, 2, 3, 4 with 4 gate-valves

2 Hydrant 2 — Water to Poly-house via water tank, Plot-5 with 2 gate-valves

T Water tank 1000 L
P Motor pump
F Filter unit

Drip main line (HDPE)
21m, 34m Length of Drip main line

Deliver pipe (HDPE); Underground at min. 30cm depth

Deliver pipe (HDPE); Underground at min. 50cm depth

HDPE Pipe with 90 elbow; from hydrant 2 to water tank ; removable

Tree

Recommended cropping systems (Land use)
13 May, 2022

Bijhali Block, Hamirpur Village : Maharal
Farmer : Amit

Rainfall

Plot	Name of Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Poly-house	Tomato					S	T		X	X X X	X X X			Sowing : plug tray
	Cucumber												S	Sowing : plastic pot
	Year 2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Cucumber	T		X X	X X X	X X X								
	Tomato					S	T		X	X X X	X X X			Sowing : plastic pot
	(Capcicum)					S	T		X	X X X	X X X			Sowing : plastic pot
1	Cucumber (short duration type)					S	T	X X X	X X X					Sowing : plug tray
	Potato (Kacha Aalu)									S		X X X		Sowing : direct
	Cole crop (Cabbage)										S		T	Sowing : plug tray
	Year 2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Cole crop			X X										
	Cucumber				S	T	X X	X X X	X X					Sowing : plastic pot
	Early cauliflower							S	T		X X X	X		Sowing : plug tray
2	Cucumber (short duration type)					S	T	X X X	X X X					Sowing : plug tray
	Early cauliflower							S	T		X X X	X		Sowing : plug tray
	Radish <inter cropping>									S		X X		Sowing : direct
	Cole crop										S		T	Sowing : plug tray
	Year 2023	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
	Cole crop			X X										
3	Early cauliflower							S	T		X X X	X		Sowing : plug tray
	Radish <inter cropping>									S		X X		Sowing : direct
	Cole crop										S		T	Sowing : plug tray
	Year 2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Cole crop			X X										
4														
	Same as Plot-3													
5														
	As the farmer likes													

FARM WORK SCHEDULE for Kick-off period

		May					June						Progress / Results (date of work done, etc.)
		1 - 10	10 - 15	15 - 20	20 - 25	25 - 30	1 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	
FYM & rotary plowing by tiller	Poly-house												
FYM & plowing / tilling by 4 wheel tractor	Plot-1, 2, 3, 4												
Bed making	Poly-house												
Bed making & Setting mulch sheets	Plot-1												
Bed making & Setting mulch sheets	Plot-2												
Bed making & Setting mulch sheets	Plot-3												
Bed making & Setting mulch sheets	Plot-4												
Bamboo stake/wire/net	Plot-1												
Bamboo stake/wire/net	Plot-2												
Prepare nursery place near tube well (Level/clean the place, set shade-net)				X									
Prepare vermin compost, clean soil (sieved)				X									
Sowing	Tomato			X									
Sowing	Cucumber			X									
Transplanting - Tomato	Poly-house												
Transplanting - Cucumber	Plot-1, 2												
Installation of drip system	Poly-house				Dead line => XX								
Installation of drip system	Plot-1, 2, 3, 4, 5				Dead line => XX								
Buy motor pump				X									
Buy tiller (Rent a tiller)				X									
Bring power line to the poly-house					XX								
Prepare bamboo posts; 160 pcs for Plot-1 & 2					XX	XX		X					
Hire labours					←	—	—	→					

On-site guidance by TCP and/or AEO

13-May 20-May 1-Jun 10-Jun 17-Jun

Provisional estimation of annual sales ; total field area = 250m2 + 1020m2

revised after the explanation to the farmer on 12-May.

		Poly-house		Plot-1			Plot-2				Plot-3	Plot-4	Plot-5
		Tomato	Cucumber	Cucumber	Potato	Cole crop (cabbage)	Cucumber	Early cauliflower	Radish [inter-cropping]	Cole crop (cabbage)	Same as Plot 1	Same as Plot 2	As he likes
Area	m2	250	250	190	190	190	190	190	190	190	170	270	200
Nos. of plant		525	525	228		600	228	1,026	1,026	600			
Harvest volume	kgs	4,725	4,200	1,140	200	600	1,140	570	205	600			
		(9kg/plant)	(8kg/plant)	(2019 data)		(1kg/pc)	(2019 data)	(2019 data)	(200g/pc)	(1kg/pc)			
Price	Rp/kg	25	25	20	35	15	20	40	25	15			
Sales	Rp	118,125	105,000	22,800	7,000	9,000	22,800	22,800	5,130	9,000			
Sub total		223,125		38,800			59,730				34,700	84,900	20,000

Grand total	**461,000**

Basic infromation sheet

revised after the explanation to the farmer on 12-May.

Plot 1, 2	Area (assumed)	190m2, 9m x 21m
	Watering method	Drip irrigation
	Cropping system	Cucumber ==> Early caulifolwer
	Bed layouot	19 beds (80cm wide) x each 8m long (assumed)
	Total length of beds	19 x 8 = 152m
	Cucumber	
	Spacing	70cm interval x 1 line ** Spacing should be 90cm in case of normal cropping schedule*
	Nos. of plant	12 in bed with SW-224 ==> 9 in bed
	Nos. of plant	228 in Plot 1 171 in Plot 1
	Nos. of bamboo posts	76 for Plot 1 (4 posts /bed)
	Variety name	MAMTA (for this year; short duration tyep), SW-224 (recommended for Year 2023)
	Target time of sowing	Now (mid. May) Type of pot : plug tray 50 holes
	Target time of transplanting	Early June ** Plastic bag pots should be used in case of normal cropping schedule.*
	Target time of harvest	Mid. Aug. - Late Oct.
	Cauliflower	
	Spacing	30cm interval x 2 lines
	Nos. of plant	54 in bed
	Nos. of plant	1026 in Plot 1
	Variety name	Megha
	Target time of sowing	Mid. July Type of pot : plug tray 100 holes
	Target time of transplanting	Mid. Aug.
	Target time of harvest	Early October - End Oct / Early Nov.

Poly-house	Area	250m2, 10m x 25m
	Watering method	Drip irrigation
	Cropping system	Tomato ==> Cucumber
	Bed layouot	7 beds x each 23m long
	Total length of beds	7 x 23 = 161m
	Tomato cultivation	
	Spacing	60cm interval x 2 lines (single stem per plant)
	Nos. of plant	75 in bed
	Nos. of plant	525 in poly-house
	Variety name	Hinsoma or AVTar-7711
	Target time of sowing	Now (mid. May) Type of pot : plug tray 100 holes
	Target time of transplanting	Mid. June
	Target time of harvest	Mid. Aug. - End Oct.
	Cucumber cultivation	
	Spacing	60cm interval x 2 lines
	Nos. of plant	75 in bed
	Nos. of plant	525 in poly-house
	Variety name	RIZK ZAWAN or KIAN
	Target time of sowing	Mid. Dec. Type of pot : Plastic bag pot, Double tunnel method
	Target time of transplanting	End. Jan.
	Target time of harvest	Mid. March - End. May

Target crops and harvest time; discussion & determination

1) Good price

	Harvest time
Cucumber	in Rain season
Early cauliflower	early October
Coriander	in Rain season
Spinach	in Rain season / Summer
Potato (Kacha Aalu)	Nov
Radish	mid. Sep - mid. Oct
Fresh ginger	Aug - Sep

2) Easy to grow (Farmer skill level is low/beginner)

3) Farmer cultivated before

	Harvest time	
Bottle guard		
Radish		
Early maize (green cob)	June	(@15Rp/kg)

<Main / core crops> ***** Determine 2 to 3 crops***

For Poly-house

For Open field

<Possible combination >

DOA's support / intervention

Items of DOA subusidy	Yes	No
<Durable items>		
Drip system (pipes from hydrant, drip tubes, filter unit)	✓	
Hydrants & main pipe	✓	
Water tank		✓
Electric motor		✓
2-wheel hand tractor with rotary (BCS 730/740)	Max. 25000 Rp	
Engine-driven tiller		
Knapsack sprayer	✓	
<Consumables>		
Mulching sheet		✓
Fertilizer		✓
Chemicals	✓	
<Tools>		
Auger		✓
Rake		✓

Assumption of the planning

Max. field area that DOA/Block office can install the drip irrigation ??

- Area in the application : 2000m2

- Installation : in 15 days = by the end of May

Target crops and harvest time; Block-wise planning

	Area Method of watering Core crop Crops before / after core crop Technique to introduce	Skill level	Profit	Labour		
Poly-house						
Block 1						
Block 2						
Block 3						
Block 4						
Block 5						

D-1 (2) : PMU's trial - Use of cultivation control technology

Plan of activity:
Trial of Cucumber + Early cauliflower cultivation in Paddy area by use of mulching sheet, furrow irrigation & underground drain (2022)

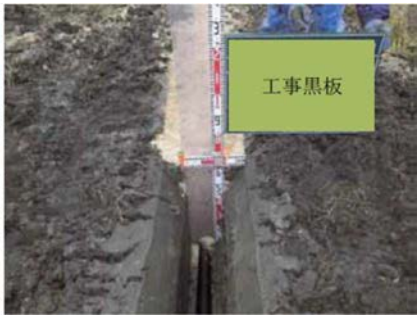
25 Feb. 2022; version 01

1. Background &purpose

Positive results were obtained from the trial of new cropping system; Cucumber + Early cauliflower by use of mulching sheet & drip irrigation in 2019, and new cropping system was promoted in 2020 and 2021 by BPMU Hamirpur, Bilaspur and Sarkaghat at total 20 sub-projects.

This time-shifted cultivation method targets to harvest cauliflower in October and transplanting of plug-tray seedlings should be done in early August; in the midst of rain season. As a matter of course, the method is difficult to apply in paddy field which is designed to impound in rainy season. Therefore, the promotion activity in 2020 and 2021 targeted the sub-projects in maize + wheat area.

In Japan, underground drain is widely used to improve drainage in paddy field to cultivate vegetables, etc. However it is not seen in paddy fields (mostly terraced paddy fields) in the project area.



In Nov. 2019, JICA TCP and BPMU Baijnath decided to test an improvement of drainage by underground drain and new cropping system in terraced paddy field, and FIS Ragloo was selected as the trial site. However, the trail was called off in 2020 and again in 2021 due to pandemic of COVID-19 and lock down situation in April.

In February 2022, JICA TCP determined the two (2) trial sites/farmers with support of BPMU Palampur and EOs of DOA Kangra; namely FIS Ragloo and FIS Makruhal Kuhl, and prepared this plan document after checking of trial fields.

2. Trial sites

	Sub-project	HPCDC Phase1	DOA Block	AEO circle	Field size	Field owner
1	FIS Ragloo	BPMU Baijnath	Panchrukhi	Sagoor	About 85m^2 x 1 plot (no comparison field)	Mr. Chanchel, Mrs. Sushma devi
2	FIS Makruhal Kuhl	BPMU Baijnath	Bhedu Mahadev	Panapar	About 70-75m^2 x 2 plots	Mr. Shammu Kumar

Photos of the trial fields are shown in ANNEX 1.

3. Technique to be applied in the trial

(1) Technique to test

1) Counter measures against an impoundment & excessive soil water condition in rainy season

a. To improve a drainage

- Surface drain by shallow ditch; in proper layout
- Underground drain; by using locally available materials

To confirm the efficacy of underground drain, conduct a comparative test (with-without test)

b. To mitigate excessive soil water condition in bed

- Heightening bed after cucumber cultivation by deepen furrow (ditch) between beds

2) Watering method

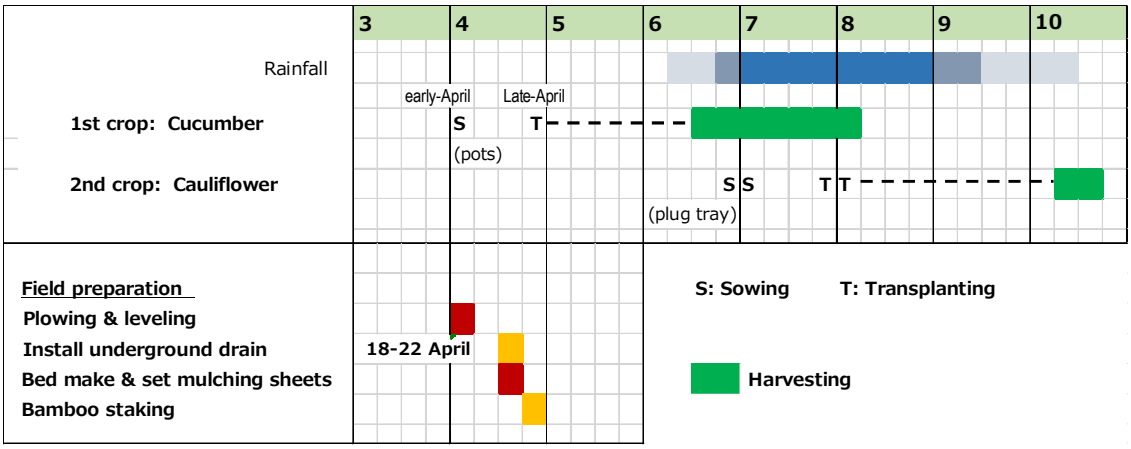
- Furrow irrigation for mulched beds

(2) Cultivation technique to introduce

- Cucumber seedling production by pots
- Prepare beds in April and cover beds with mulching sheet (2 crops cultivation in same bed)
- Vertical staking by bamboo posts, wire and plastic net

* Both farmers have ploy-house equipped with drip irrigation by gravity, and have experience in cauliflower cultivation.

4. Cropping schedule and Work schedule



Target time / scheduled date of key works are as follows:

Pre-arrangement for installing underground drain

Work	Date
Itemize materials to request farmers to prepare	Before end of Feb.
Ask farmers for preparation of materials & hired labour	Middle of March
Check the farmer's preparation	Early April on the day for sowing
Delivery of items by JICA TCP to the sites	Early April & 18 April

Field preparation

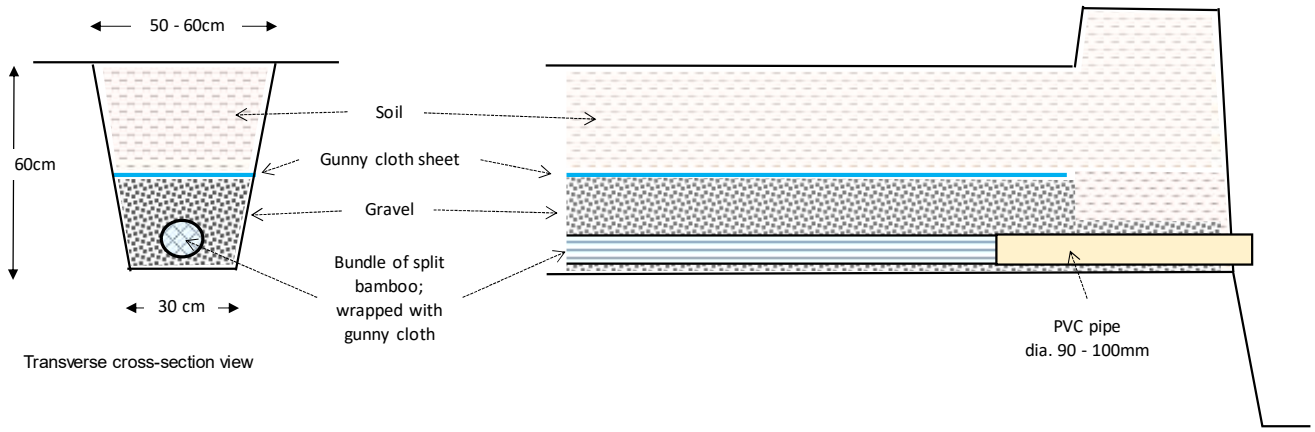
Work	Date
Plowing, leveling, weeding by Farmers	Early April
Install underground drain by JICA TCP & Farmers	18 - 22 April
Bed making & set mulch sheets by Farmers under JICA TCP guidance	18 - 22 April
Bamboo staking by Farmers	Last week of April

Sowing & Transplanting

	Sowing	Date	Transplanting	Date
Cucumber	Early April	to be determined	Late April	to be determined
Cauliflower	Late June - Early July	to be determined	Late July - Early Aug.	to be determined

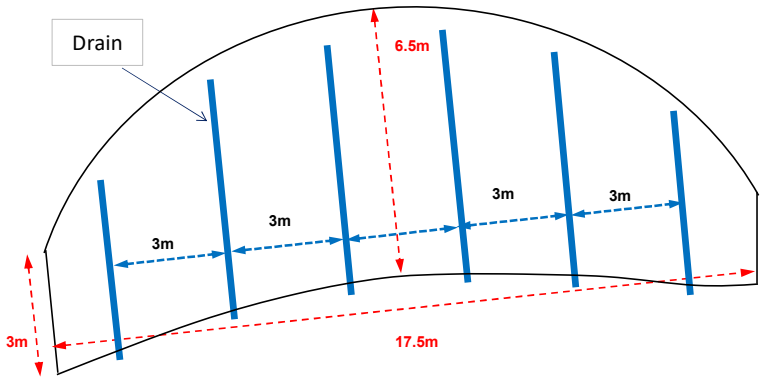
5. Design of test plots

(1) Design and Layout of Underground drain

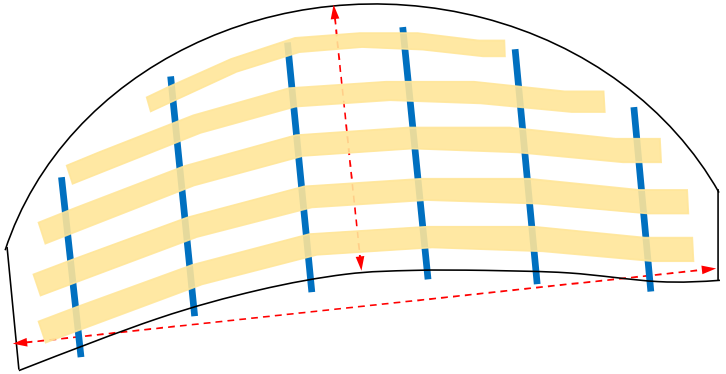


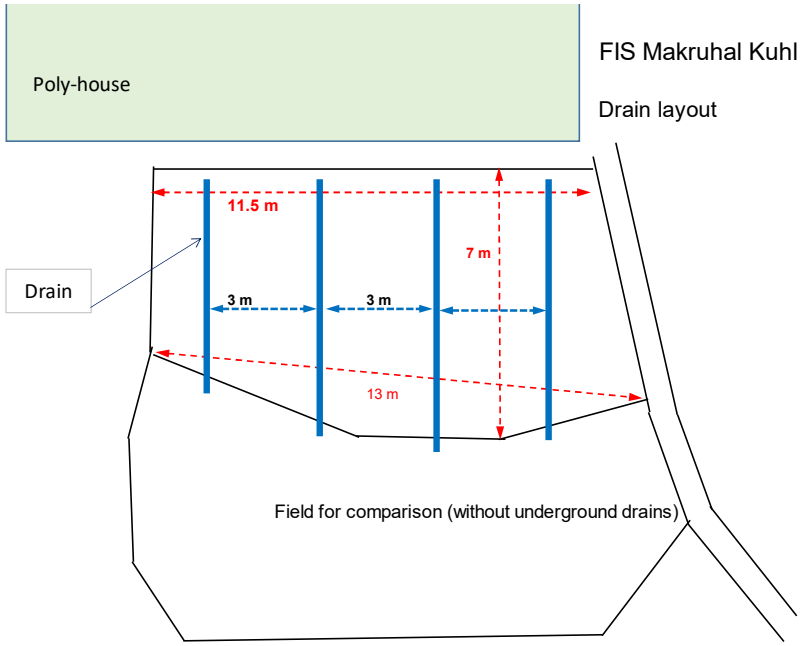
Layout of Underground drains and Beds

FIS Ragloo Drain layout

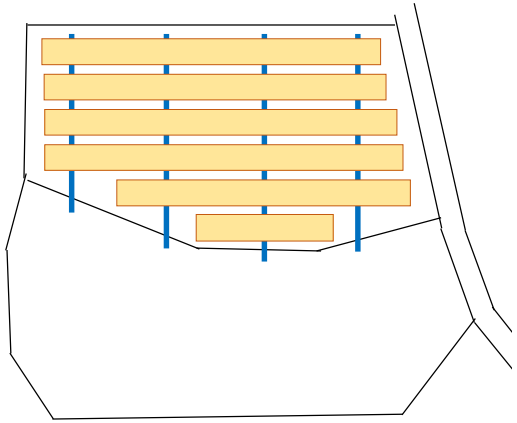


Bed layout Bed width 80cm + Gap (pass) 30cm





Bed layout (plan) Bed width 80cm + Gap (pass) 30cm



Design of comparative test at FIS Makruhal

Plot	Approx. area
Upper field: Surface drain by shallow ditch plus Underground drain	70-75m^2
Lower field: Surface drain by shallow ditch only	70-75m^2

Spacing: Cucumber 90cm, 1 line/bed Cauliflower 40cm, 2 lines/bed

6. Necessary items, specification & q'ty for Underground drain installation

Items	Specification	Q'ty		
		FIS Ragloo	FIS Makruhal	Total
Bamboo *	3m long	20 pcs	15 pcs	35 pcs.
Gravel	Size 2 – 4 cm	1 trailer	1 trailer	2 trailer
Coarse sand		0.5 trailer	0.5 trailer	1 trailer
Gunnysack (jute bag)		24 + 17 =41 bags	17 + 13 = 30 bags	71 bags
PVC pipe	Dia. 3 inch	6 m	4 m	10 m
End cap for 3 inch PVC pipe		8 pcs	6 pcs	14 pcs
Plastic string		4 rolls	3 rolls	7 rolls
Tools for earthwork		shovel x 3, mattock/hoe x 2, plastic basin x 4		
Hired labour for digging and bed making		3 persons x 2 days (21-22 April)	3 persons x 2 days (19-20 April)	

* Each bamboo (3m long) are to be split into 4 – 6 pcs.

Items for requesting arrangements by farmers (costs are covered by JICA TCP)

1. Bamboo 3m long; split each bamboo into 4 - 6 pcs
   FIS Ragloo 20 pcs
   FIS Makruhal 15 pcs
2. Gravel size 2 - 4cm 1 trailer per site
3. Coarse sand 0.5 trailer per site
4. Hired labour for digging and bed making 3 persons x 2 days per site

7. Necessary items & q'ty for Cucumber cultivation

- The farmers shall provide and bear the cost for the items marked with ＊.
- TCP shall bear the cost for other items.

Items		FIS Ragloo	FIS Makruhal
For Bed making			
FYM	＊	0.5 trailer	1 trailer
Fertilizer (NPK=12:32:16)		4 kg	6 kg
Tool - Rake 1 unit/farmer		1	1

Items		FIS Ragloo	FIS Makruhal
Mulching sheet, W 1.2m, 400m/roll		0.5 roll	0.5 roll
Tool - JICA Ridger for small tiller		To be determined	
For Bamboo staking			
Bamboo post	*	To be determined	
Tool - Hand auger		1	1
Plastic mesh net, W 1 m, 15 x 15 cm mesh, 100m/roll		1 roll	1 roll
Steel wire		3 kg	3 kg
Plastic string	*	Some rolls	Some rolls
For Cucumber seedling production			
Plastic pot		200	200
Cocopeat (use the remain for cauliflower seedlings)		0.5	0.5
Vermin compost	*	10 – 15 liter	15 – 20 liter
Cucumber seeds		1 pack	1 pack
Shade-net, W2.0 m x L5 m/sheet		To be determined	
Clip to fix shade-net on poly-tunnel. 10 pcs/farme			
For Harvesting work			
Plastic crate		4 units	4 units

8. Persons concerned

DOA Kangra

DDA	Dr. Rahul Katoch
SMS, Panchrukhi block	Vijay Awashwati
AEO, Sagoor circle	Manu Nag
SMS, Bhedu Mahadev block	Bannu Sood
AEO, Panapar circle	Yash Pal

BMPU Palampur

BPM	Banita Sood (Ms)
ADO	Jitender Vardhan

JICA TCP

Japanese expert	Ban Yoshihiro
Japanese expert	Aoyama Kenta
Local expert	Amit Agnihotri

// end

ANNEX 1: Photos of the Trial fields

FIS Ragloo (17 Feb. 2022)

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01 Feb. 2020</td></tr>
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FIS Makruhal Kuhl (17 Feb. 2022)

	
	

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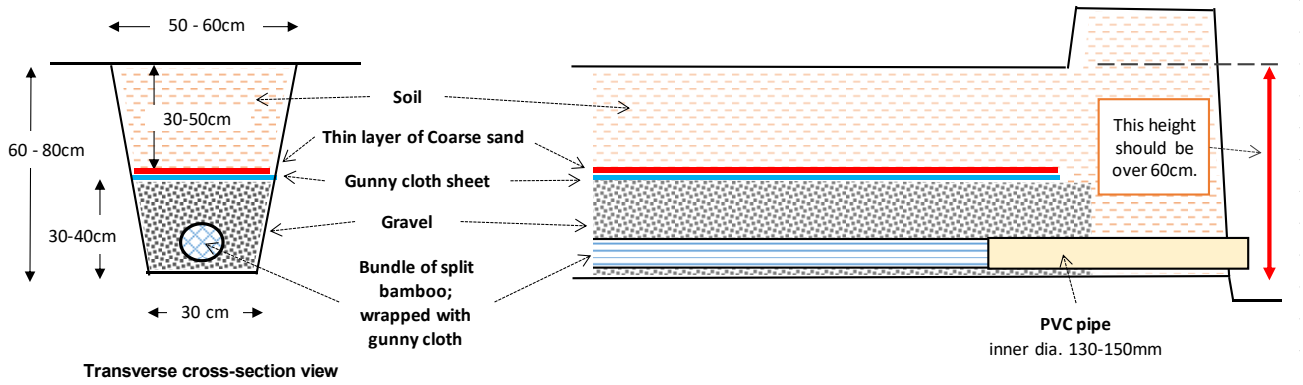
Manual on Installation of Underground Drain with locally available materials

1. What is the Underground drain?

It is simply to set pipe (air space) at a safe depth for cultivation (normally 60-100cm depth).
It is common/traditional technique to improve soil drainage of farm fields in Japan. Now several kinds of industrial pipes & specialized machinery are used for large-scale installation, but for small fields bamboo/tree branch and wood tips/rice husk/gravel, etc. are also utilized.

Structure of underground drain and materials used in the trials are as follows:



Structure & materials of Underground drain

As shown in the above figure, more than 60cm difference in level with lower field is required to install the underground drain. 50cm difference may work, but farmer have to work carefully when he plow/rotary with engine-driven tiller since soil depth becomes only 20-25cm.

2. Necessary materials

Necessary materials are as follows. All items are locally available. Quantities are estimated based on the results of trials.

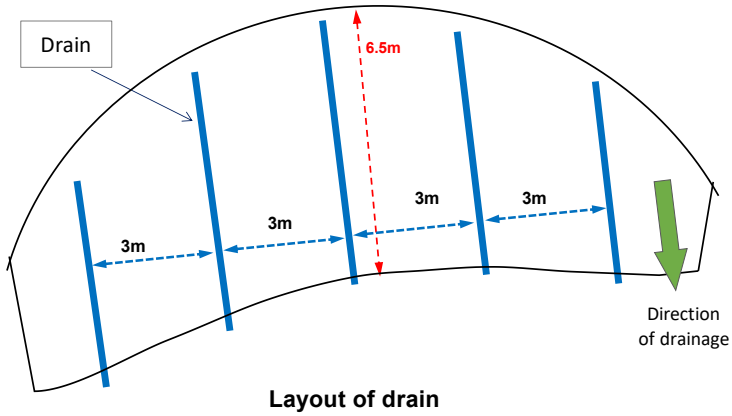
Items	Specification	Quantity to make 4 lines of 6-7m long drain
Bamboo *	3m long	about 20 pcs.
Gravel	Size 2 – 4 cm	about 0.5 trailer
Coarse sand		about 0.2 trailer
Gunnysack (jute bag)		35 - 40 bags
PVC (VU) pipe	VU125 (inner dia. 130mm) or VU150 (inner dia. 150mm)	4 m (1m long x 4 pcs.)
End cap for PVC pipe	VU125 or VU150	4 pcs.
Plastic string		2 - 3 rolls

* Each bamboo (3m long) are to be split into 4 – 6 pcs.

3. Layout of underground drain

Distance between drain and drain is basically about 3m. Interval can be altered according to situation of soil drainage in the field.

FIS Ragloo



Layout of drain

Layout of beds

4. Work process

(0) Field preparation -- Clean (weed) the field.

(1) Dig trenches as shown in the figure of structure

- Make the bottom of trench smooth and inclined to discharging direction, and trample (compact) by foots.

(2) Prepare bamboo-bundle pipes (drain pipes)

Make bamboo-bundle pipes as shown in following photos.

[1] Bundle split bamboos at about 15cm diameter, and tie with plastic string tightly; tie both ends & middle part. Bundle should be tight and firm.

- Do not use cotton string.

[2] Prepare gunny cloth sheet to wrap bamboo-bundle:

Cut both of long-sides of gunnysack to make a sheet of about 50cm x 120cm size.

- Do not cut the bottom of sack.
- Purpose of gunny cloth sheet is to prevent clogging by soil and to prolong life time of drain system.

[3] Wrap bamboo-bundle with gunny cloth sheets, and tie with plastic string tightly.

- Wrap a cloth sheet around bundle tightly, and then wind string in a spiral manner.
- When you wrap second sheet, make overlap of sheets; 15cm or more.
- Do not cut off leftover of sheet at end of bamboo-bundle. Leftover shall be used when connect two bundles.

(3) Setting of drain pipes

Set the made drain pipes as shown in the figure of structure.

[1] First, pave gravel at bottom of trench; at about 5cm thick. Then, set drain pipes.

[2] Connection of two (2) drain pipes:

Make both ends contacts and wrap the connected portion with leftover of gunny cloth sheet, and tie with plastic string. Wrap in tight. If leftover is not long enough to cover the connected portion, use another small piece of sheet to wrap.

[3] Connection of drain pipe and PVC pipe:

Do same as above [2]. But insert bamboo-bundle into PVC pipe; about 10cm or a little more.

Cut bamboo-bundle pipe to adjust the length, if necessary.

(4) Backfill

Do it as shown in the figure of structure.

- Drain pipes should be covered by gravel. After backfill with gravel, trample (compact) by foots.
- Do not forget to put gunny cloth sheets over the gravel layer. Set sheets in whole trench; except end part.
- Spread coarse sand over the gunny sheets to make thin layer; 2-3cm thick.
- Keep soil depth at least 30cm.

(5) Backfill of end part

As shown in figure of structure, backfill of end part (above PVC pipe) should done by soil. Then make dyke.

(6) Make marks to show the position of drains

Use cut pieces of bamboo, etc. to mark the position of drains; marks for “Careful when you plow”.

(7) Check whether it work or not

Irrigate the field to check whether it work or not, if possible.

8) Others

- Installation can be carried out any time in a year; just select good time to dig trenches.
- Keep end-caps on the PVC pipes during dry season.

// end

Manual on Anaerobic Soil Disinfestation inside poly house

1. What is Anaerobic (reductive) Soil Disinfestation?

Anaerobic (reductive) soil disinfestation is one of methods to control soil-borne pathogens and pests.
The method consists of application of easily decomposable organic matter, irrigation, and covering the soil surface with plastic film, thereby inducing anaerobic (reductive) soil conditions and suppressing many soil-borne pests including fungi, bacteria, nematodes and weeds.

In Japan, it was developed as an alternative to chemical fumigations based on the knowledge of irrigated paddy rice & upland crop rotation system that was rather tolerant of soil-borne disease development. It is reported that anaerobic soil disinfestation is effective against crops/diseases shown below. One advantage of the method, maintenance of soil suppressiveness to Fusarium wilt of tomato is suggested.

Crop	Disease name	Pathogen	
Cucurbita spp. Tomato	Fusarium wilt	Fusarium oxysporum	Filamentous fungi
Tomato	Brown root rot (Corky root)	Pyrenochaeta lycopersici	
Cucurbita spp.	Black root rot	Phomopsis sclerotioides Kesteren	
Eggplant	Verticillium wilt	Verticillium dahliae	
Tomato	Root knot nematode	Meloidogyne spp.	Nematode
Tomato	Root lesion nematode	Pratylenchus spp.	

Source: JA Zennou Ibaraki, Japan

Mechanism of disinfestation:

1. When the soil is mixed with bran (organic matter) and soil temperature rises to over 30°C, the number of microorganisms that feed on bran rapidly increases.
2. At this time, if the soil is in a flooded condition, it causes a shortage of oxygen in the soil due to the oxygen consumption by microorganisms.
3. Most of pathogens and pests require oxygen to live. Hence, pathogens and pests die or stop growing /increasing.
4. In addition, pathogens are killed by combined actions such as high temperature (solar heat & fermentation heat), organic acids generated in anaerobic condition, and metal ions released into soil water.

Period of treatment:

Treatment period is 3 weeks + 10 days for soil cooling/oxidization = Total 1 month

2. Important points to understand

(1) Necessary water volume & time of the treatment

Necessary quantity of water to make a field submerged condition is 10 - 15 tons [1]/100m^2 in Japan. In

[1] 1 ton of water = 1000 liters of water

Japan, this soil treatment is carried out in July-August (in summer time after the rainy season) to attain soil temperature at over 30°C. There is good amount of rainfall in these months, and soil outside of poly-house is wet/humid. On the other hand, soil is very dry in April-May in H.P., and over 20 tons/100m^2 of water must be necessary. [2]

Monthly average temperature (max./min./average; 1981-2010) in August (hottest month) in Tsukuba, Ibaraki pref. (where vegetable production in poly/grass-house is prevailing) is 30.2/21.8/25.5°C. By reference to it, it is assumed that the treatment is practicable during the period of minimum/average temperature are over 20°C /30°C; i.e. from late March/early April to early September in case of Hamirpur.

In conclusion, JICA TCP Experts suggest the times of treatment as follows: Since it was very difficult to make all area to submerged condition evenly in the trials in May 2022, implementation in August when soil around poly-house is well wet is recommended.

Availability of water	Time of the treatment	Remarks
If farmer can deliver over 20 ton/100m^2 in a day	April - May (hot & dry time; and soil around poly-house is very dry)	
If farmer can deliver 10 tons/100m^2 in a day	Start at early to middle of August (rainy season; and soil around poly-house is wet)	Check weekly weather forecast to find a good timing (sunny day continues for 2-3 days)

(2) Method of watering

Important but difficult work is "to deliver a lot of water evenly over the area to treat in 1-2 days".
Two methods are explained in this manual.

(A) Watering by old drip tubes & without making beds (use existing drip system)

(B) Watering by pipe (hose pipe or HDPE pipe) & after making beds (bring water directly from hydrant/tube well)

Depend on the available water volume/discharge rate and materials/equipment, farmer shall chose one of the method.

- Method (A); old drip tubes are required.
- If the pump for existing drip system is not strong (discharge rate is low), water cannot be delivered evenly over the area to treat. In this case. Method (B); to bring water directory from hydrant/tube well is recommended.
- Method (B); pipes to bring water directly from hydrant/tube well are required.
- Method (B); numbers of beds and way of bed making are not same as usual way. Refer to the below section.
- Method (B); existing drip system should be used together with pipes, if possible.

[2] In the TCP's trials carried out in May 2022, 10-15 tons/100m^2 was target quantity as shown in Japanese technical papers. Since there was no flow meter in poly-house, applied water volume was roughly estimated by numbers of 500L water tank and/or guess discharge rate per 10 minutes. It was hard to figure out the applied volume correctly because of power cut and voltage fluctuation, and watering was stopped when we guessed that "more or less15 tons/100m^2 were delivered". In addition, when watering was stopped, some parts were submerged (water appeared at soil surface) but other parts were not.

3. Materials to use

Items	Quantity	Remarks
Water	Enough volume to make the field submerged condition. Minimum 10 - 20 tons/100m^2	Water volume vary by season & location.
Wheat bran	@100kg/100m^2	
Chopped wheat straw	@100kg/100m^2	
Well matured FYM	A little less than usual application	
Clear plastic film(s)	Enough size to cover the area to treat	Clear films are preferable, but used films are OK.

In case of watering by old drip tubes & without making beds (Method A)

Old drip tubes	Set at 50cm interval: For 105m^2 poly-house: 13 tubes	Punch small holes to use for the treatment, i.e. no way to use for watering crops any more.
Tee for drip tube	For 105m^2 poly-house with 10 outlets: 3 tees	

In case of watering by pipes & after making beds (Method B)

Hose pipe or HDPE pipe		Connect to hydrant/tube well
Stone roofing plates	Width of poly-house x 2: For 105m^2 poly-house: 7m x 2 = 14m	

4. Work process

Preparation and work process are a little different by the selected watering method.

(1) Overall work process of treatment

Day 0: Preparations

Field preparation and preparation for watering

Day 1: Treatment

<table>
<tr><td>(Method A) Watering by old drip tubes & without making beds by old drip tubes</td><td>(Method B) Watering by pipes & after making beds</td></tr>
<tr><td colspan="2">[1] Spread the materials (wheat bran, straw and FYM)</td></tr>
<tr><td colspan="2">↓</td></tr>
<tr><td colspan="2">[2] Mix the spread materials with soil by rotary tiller</td></tr>
<tr><td colspan="2">↓</td></tr>
<tr><td colspan="2">[3] Level the entire area</td></tr>
<tr><td>↓</td><td>↓</td></tr>
<tr><td rowspan="3">[4] Set old drip tubes at 50cm interval</td><td>[4] Make beds</td></tr>
<tr><td>↓</td></tr>
<tr><td>[5] Prepare for watering</td></tr>
</table>

- Do all works in one day.

Day 2: Treatment (watering)

Water until soil become submerged condition

Day 3: Treatment

Additional watering, if necessary ⇒ Cover the area with clear plastic film ⇒ Seal the poly-house

(2) Preparation works (Day 0)

[1] Field preparation -- cultivate roughly the entire field of poly-house by rotary tiller.

[2] Preparation for watering

<Method A>

1. Calculate how many tubes are necessary, and prepare enough number of old drip tubes.
2. Punch small holes with sharp nail on old tubes; one hole in between the original outlets in case of 30 cm interval tubes. In case of 45cm interval tube, punch 2 holes at 15cm interval.
   - Use 1mm - 1.5mm diameter nail. Never use large nail to punch additional holes.
3. Set tee-connectors to increase number of tubes.

<Method B>

1. Prepare stone roofing plates or other materials to stop water at end of furrows.
2. Prepare pipes to bring water directly from hydrant/tube well into poly-house.

- Do other necessary preparation to deliver water to poly-house in advance.

(3) Treatment works in Day 1

[1] Spread the materials over the area to submerge (treat); as shown in following photos.

1. Spread wheat bran at the rate 1kg/m^2

2. Spread chopped wheat straw at the rate 1kg/m^2

3. Spread FYM

[2] Mix the spread materials with soil by rotary tiller


- Cultivation depth: about 20cm.

[3] Level the entire area

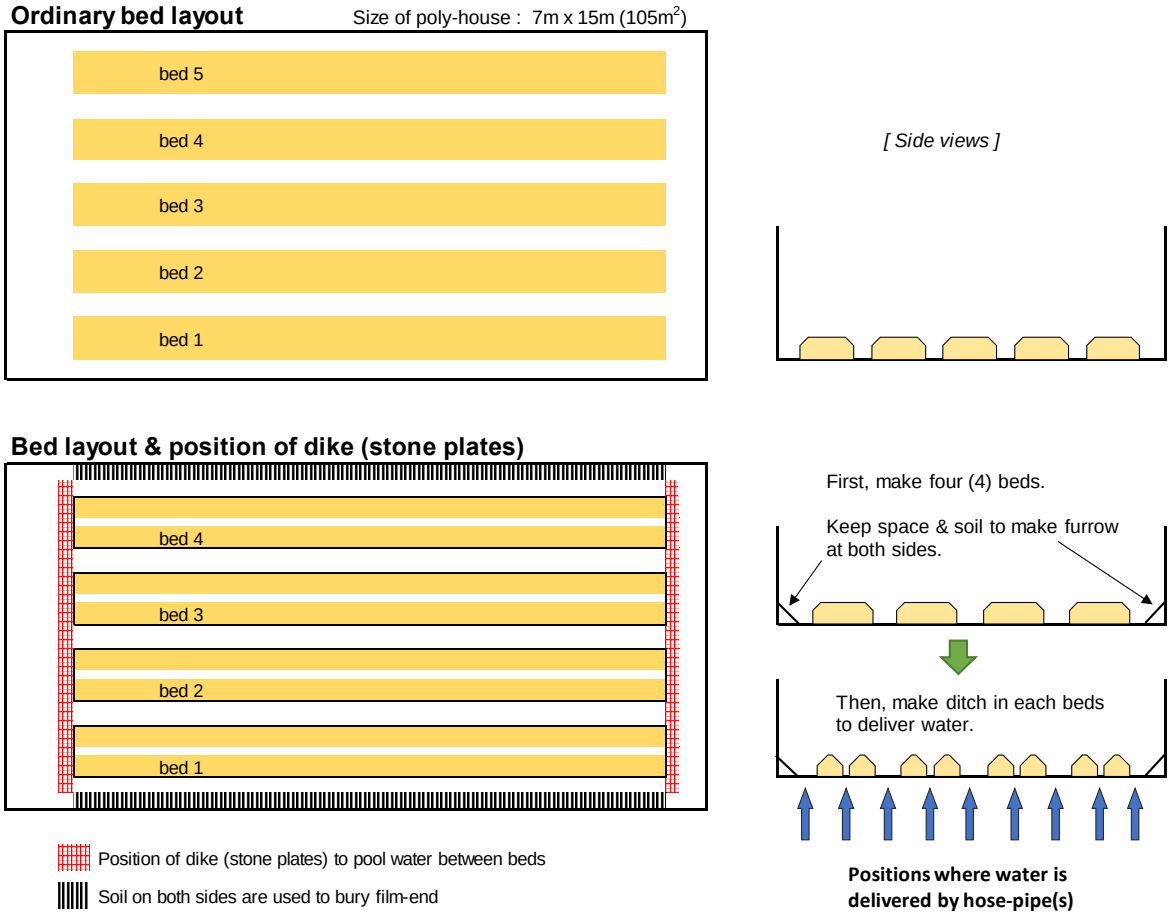
<Method A: Watering by old drip tubes & without making beds>

[4] Set old drip tubes at 50cm interval

<Method B: Watering by pipes & after making beds>

[4] Make beds

Prepare beds as shown in the flowing figure. Numbers of beds and way of bed making is not same as usual way.



- You may make ditch by walking (compress soil by foots) on 4 beds.
- Do not make beds high (i.e. do not make furrows deep).

[5] Prepare for watering

Place stone plates at both ends of furrows as shown in above figure. And set drip tubes on the beds, if you can use it together with pipe watering. Make bottom of furrows flat and compress by foots.

Just for reference

Note: This photo was taken in the trial.

There were not ditches in the beds; therefore, stone plates were placed separately.

(4) Treatment works in Day 2 : Watering

[1] Water until soil become submerged condition

<Method A: Watering by old drip tubes & without making beds>

- Check water is coming out evenly or not. If necessary, punch additional holes.
- Do watering continuously in 1 - 2 days until all area become a submerged condition (water appear at soil surface).

<Method B: Watering by pipes & after making beds>

- Water until furrow become pool; do it one by one. And repeat watering until water appear (stay) at soil surface. Someone has to manage watering all the time.
- Use existing drip system simultaneously, if possible.

Just for reference

Note: This photo was taken in the trial.

There were not ditches in each beds; and beds were a little too high.
Therefore, top of beds were not submerged.

Submerged condition
= Water appear at soil surface

Right furrow : submerged

Left furrow: not yet submerged

Top of beds: not yet submerged

- Water permeability in poly-house is not uniform. Farmer has to check/judge the state by his eye.

- Close the side ventilation at the end of day 1 works.

(5) Treatment works in Day 3

[1] Additional watering, if necessary

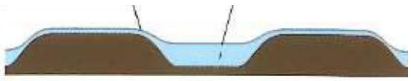
Check the wet condition in the morning. If no water appear at soil surface, do additional watering.

[2] Cover the area to treat with clear plastic film(s)

- Bury end parts in soil.
- Make enough overlap when you use some sheets.

<Method A>

<Method B>



[3] Seal the poly-house

Seal-up the poly-house for 3 weeks.

(6) After the treatment

1) 3 to 5 days after the treatment (after covering the area with plastic films)

Check smell in poly-house. If it smell like a ditch (dirty / poor water flow ditch), it shows the anaerobic (reductive) reaction has started in the soil.

2) Remove the plastic films and open the side ventilation to dry/cool the field

Remove the plastic films 3 weeks after the treatment. Open the side ventilations and leave the poly-house for about 5-7 days.

3) Check the degree of anaerobic treatment

Dig about 20cm and observe soil color. Check at several points in the treated area.

Soil color	Degree of treatment	Photo
Whole part of a hole show clear blue-gray color	Very good	A
Whole part of a hole show intermediate color between clear-gray & original soil color	Fairly good	B
Whole part of a hole show original soil color	Not treated	C

A : Clear blue-gray color

B : Intermediate color between clear-gray & original soil color

C : Original soil color

5. Important points when you prepare beds

You can start making beds 5-7 days after removing plastic films.

- Do not mix with un-treated soil.
- In case of Method A; Do not plow deep; limit to max. 25cm deep. Deeper part may not be well treated.
- Reduce the amount of fertilizer to 50-80% of usual amount.
- Keep 10 days period after removing plastic films until planting of seedlings.

****

2.5 Activities to Achieve Output-4: Sustainable Plans of DOA to Promote Crop Diversification in the Respective 5 districts are Formulated Based on Achievements of the Project

Form for Annual Agricultural Development Plan and Progress

Sub- project:		**DPMU:**		**BPMU:**		**Staff in charge:**	
Farm land in sub-project area:	ha	**No. of HHs**		**No.of farmers:**		**Date:**	

Existing Condition 0 year ( )					Proposed Condition after Constructio 1st Year ( )				2nd Year ( )				3rd Year ( )			
Crops	Area Rev. (ha)	Area PRA (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total vegetable area																
% area under vege.																
Total					Total				Total				Total			

Progress after Completion of Construction 1st Year ( )				2nd Year ( )				3rd Year ( )			
Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total vege area.											
% vege area											
Total				Total				Total			

Extension Training Plan for Farmers

Sub-project: **DPMU:** **BPMU:** **Staff in charge:**

Sub-project area: ha **No. of HHs** **No.of farmers:** **Date:**

Activities	Trainings Done before completion of irri. Scheme	-1 (Year:)											1 (Year:)											2 (Year:)											3 (Year:)										
		1	2	3	4	5	6	7	8	9	#	#	#	1	2	3	4	5	6	7	8	9	#	#	#	1	2	3	4	5	6	7	8	9	#	#	#	1	2	3	4	5	6	7	8	9	#	#	#
A. **Infrastructure Development and Improvement**																																														
1. **Minor Irrigation System**																																														
1.1 Construction of Minor Irrigation System																																														
1.2 Improvement of Minor Irrigation System																																														
1.3 Survey, Investigation & System																																														
2. **Access Farm Road**																																														
2.1 Construction of Access Farm Road																																														
2.2 Improvement of Access Farm Road																																														
2.3 Survey, Investigation & System																																														
3. Micro Irrigation System for Demonstration																																														
3.1 Construction of Micro Irrigation System																																														
i Micro Irrigation System																																														
4. Handholding support service (O&M by farmers group)																																														
B. **Infrastructure development support**																																														
1. **Induction workshop for community motivators**																																														
2. **Awareness camp involving community**																																														
3. **Formation and formalization of farmers group**																																														
3.1 Workshop of group to develop objectives and norms																																														
3.2 Training to MC members on role and responsibility																																														
3.3 Exposure visit of MC members to WUA in other states																																														
4. **Capacity development of farmers groups on participatory, management process and institutional development**																																														
4.1 Training of MC members																																														
4.2 Training of women members																																														
4.3 Workshop on resource mobilization and revenue collection																																														
4.4 Training on accounting principles and practices																																														
4.5 Training of SHG members																																														
4.6 Training of office bearers of SHG																																														
4.7 Workshop of SHG members																																														
4.8 Refresher training of MC members																																														
5. **Capacity development of MC members on O&M of irrigation and water management**																																														
5.1 Workshop to discuss principal and practices																																														
5.2 Training on micro planning tools and techniques																																														
5.3 Field training on basic engineering skills																																														
6. **Promotion of federation of farmers groups**																																														
6.1 Workshop for cluster federation development																																														
6.2 Training for efficiency development of members																																														
6.3 Workshop for development of federation																																														
6.4 Workshop for development of Apex Federation																																														
7. **Provision for support services**																																														
7.1 Support services																																														
C. **Farmers support program**																																														
1. **Vegetable promotion**																																														
1.1 Orientation and need assessment																																														
1.2 Farm management																																														
i Training of bookkeeping																																														
ii Training of budgeting and monitoring																																														
1.3 Preparation techniques																																														
i Water saving and soil conservation																																														
ii Organic fertilizer and application																																														
iii Assistance for promotion of vermi-compost																																														
iv Exhibition, Kisan Mela and vegetable show																																														
v Training in application of fertilizer and micro nutrients																																														
1.4 Cultivation practice																																														
i Strategic vegetables																																														
a Cauliflower ①Nursery management																																														
b Tomato ②Transplanting/sowing																																														
c Potato and Peas /Fertilizer																																														
d. Cucurbits & other seasonal ③Triming/Thinning																																														
ii Exotic vegetables ④Harvesting																																														
1.5 Cropping pattern arrangement																																														
1.6 Organic pest management and IPM																																														
i Training of farmers' group ⑤Plant protection																																														
ii Exposure visits																																														
1.7 Post-harvest techniques																																														
1.8 Farm mechanization																																														
1.9 Micro-irrigation and poly house ⑥Water management																																														
1.10 Program for next generation																																														
1.11 Construction of collection centre																																													
1.12 Recruitment of community motivators																																														
2. **Food Grain's Productivity**																																														
2.1 Improvement of food grain productivity ①～⑥																																														
3. **Promotion of post harvest processing**																																														
3.1 Small scale agro-processing																																														
i Orientation workshop for SHG																																														
ii Training of accounting for SHG																																														
iii Training of budgeting and monitoring																																														
iv Training of organic fertilizer																																														
v Training of seedling raising																																														
vi Training of food processing																																														
3.2 Public Private Partnership																																													
D. **Institutional Development Component**																																													
2. **Strengthening of Extension Service Function**																																														
3. **Capacity Development of Community Motivators**																																														
3.1 Training on institutional development processes																																														
3.2 Training on basis of irrigation management																																														
3.3 Training on enhancing agricultural production																																														
3.4 Training on promotion and strengthening of SHG																																														
3.5 Training on facilitation for business promotion of SHG																																														
3.6 Training on fostering market linkages																																														
3.7 Exposure visit on participatory irrigation management																																														
3.8 Peer learning workshop fro community motivators																																														

Conditions)

(1) Training programs should be adopted, considering needs, requiremnt, and constraints given from farmres

(2) Training program shall be arranged every month.

(3) Training program shall be arranged for farmers group. Skill as well as information to be provided through training programs shall be shared with other famrers.

(4) Community motivator has to collect request, needs, constraints, and other data given from farmers, hence transfer to BPMU.

Sample

Implementation Plan in Potential Area

Activities to be taken up during the season	Purpose of activity	No of farmers / area to be covered	Output to be expected	Actual output (at the end of season)
1.Supply of Farm Inputs				
1.1 Wheat Seed Qty: ---Kg/ quintal Qty: ---kg/farmer Area to be covered: ha Variety: Guide on farming practices: Handouts:	Introduction of improved HYV - High yielding: ---------- - Disease resistance: ---------	30 farmers	- Farmers understand advantages. - ---- farmers may use this seed for the next season. - Yield may increase up to ---/ - Disease resistance is shown.	
2.Training Camp				
2.1 SPNF techniques Subjects: Handouts:	To apprise farmers about SPNF Model of cultivation	30 farmers	- Knowledge of farmers about SPNF model is increased. ----number of farmers may be interested.	
3.Field demonstration				
3.1 Okra Farm inputs (Seed / fertilizer / others): Sowing / harvesting timing: Farming practices: Field days: Handouts:	Introduction of improved HYV and adequate farming practices	1.0 ha	- Farmers understand advantages. - Increase in yield –q/ha against production of ---- q/ ha in existing varieties -More farmers (--- no.) may adopt next year.	
4. Farm school				
4.1 On SPNF in Peas KSP-110 inter cropped with Wheat Var.Bansi Timing / season: Subjects: Handouts: ---	Promotion of SPNF method of farming	25 farmers 1 ha	130 Quintal per ha yield of Peas. 5 quintals per ha yield of wheat Bansi.	
5.Exposure Visit				
5.1 Organic farming in Peas GS-10 to JICA site Sehal Points to be checked	Aware farmers on use of Bokashi & Neem EM in Peas	15	Improvement in Soil nutrition & increase in Organic matter of soil	

Attachment-2.5.3

2.6 Activities for Food Diversification (Food and Nutrition / Livelihood Improvement / Gender / Social Inclusion)

Let's Grow and Eat!

Amaranths

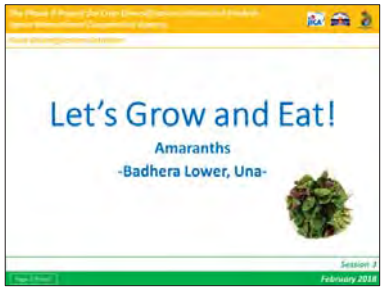
-Badhera Lower, Una-

Session 3

February 2018

Let's Grow and Eat!

Today we are going to learn about the amaranth



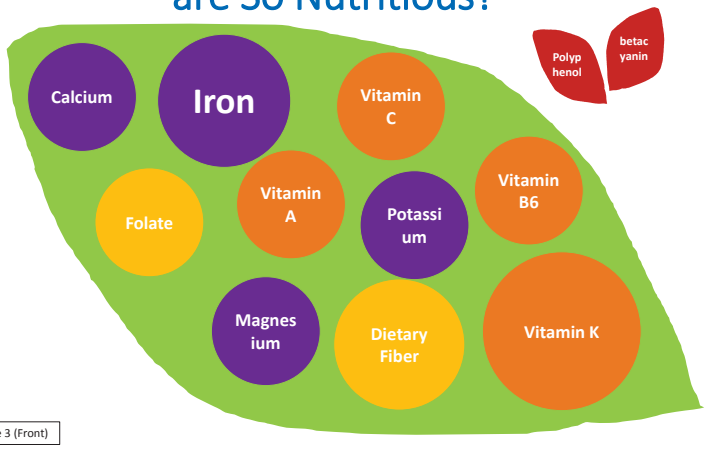
Is it a "weed" or a "vegetable"?

vs.

Is it a "weed" or a "vegetable"?

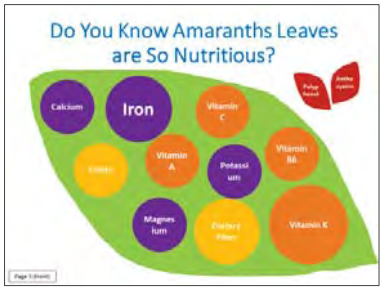
- Is it weed or a vegetable?? (ask the participants)
- Do you consume your self or feed it to the livestock?

Do You Know Amaranths Leaves are So Nutritious?

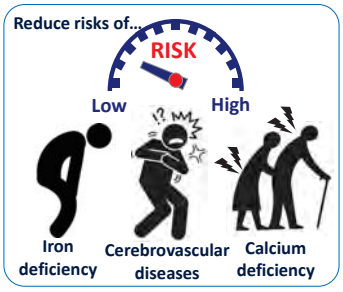


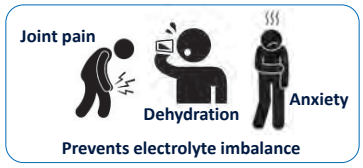
Do You Know Amaranths Leaves are So Nutritious?

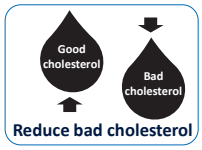
- Amaranth leaves are rich in many nutrients.
- They are rich in minerals like iron and calcium needed for blood formation and bone strength
- Rich in vitamins to fight against diseases
- Amaranth is also rich in dietary fiber to maintain good digestion
- Red amaranth is especially rich in betacyanin and polyphenol which help fight against cancer causing agents



Amaranths Leaves are Effective to....



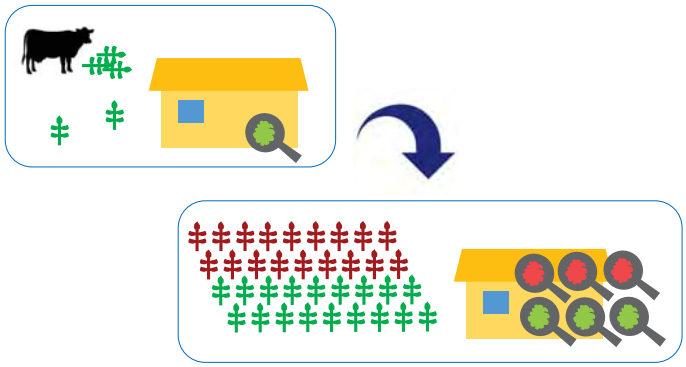




Amaranths Leaves are Effective to....

- Amaranth can be helpful in improving eyesight and fighting against cancer
- It reduces the risk of iron deficiency anemia, cerebrovascular disease and calcium deficiency
- It can be helpful in preventing joint pain, dehydration and anxiety
- It can be helpful in improving digestion and reducing bad cholesterol

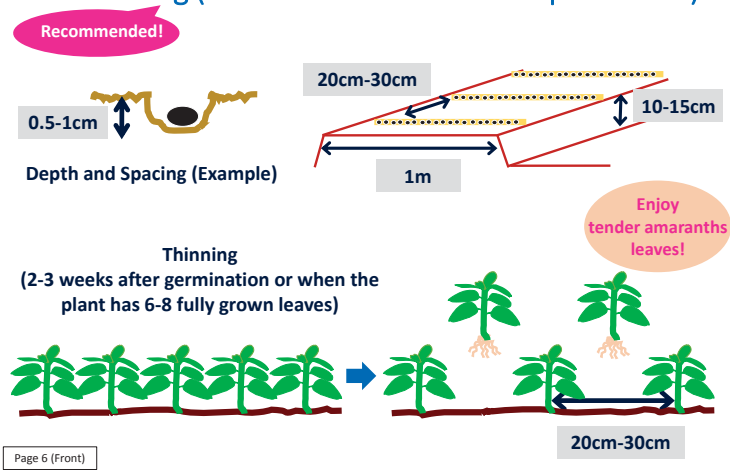
So... Let's Cultivate Amaranths for More Consumption!



So... Let's Cultivate Amaranths for More Consumption!

- As amaranth is very nutritious and healthy vegetable, let's grow it intensively in our home gardens and consume it more for better health.

Now...You Can Grow Amaranths for Greens! -Line Sowing (a little technical but more productive)-

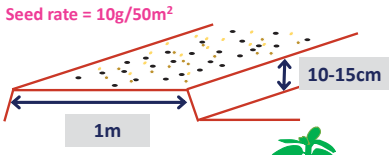


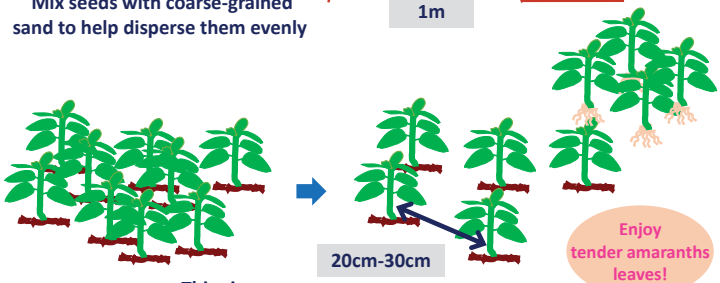
Now...You Can Grow Amaranths for Greens! -Line Sowing (a little technical but more productive)-

- Prepare the beds of width about 1metre and the height should be 10-15cm, with the spacing about 20-30 cm between the rows
- The depth and spacing for the seed should be around 0.5-1 cm into the soil
- You can start thinning plants after 2-3 weeks of germination or when the plant has 6-8 fully grown leaves. Keep the strongest one for later harvesting.
- Thinning is important to reserve space and soil nutrients for selected plants.
- After removal of plants, the distance between the plants left will be 20-30cm apart from each other
- You can enjoy the tender leaves of thinned younger leaves!

Now…You Can Grow Amaranths for Greens!
-Broadcasting (Easier but less productive)-

Mix seeds with coarse-grained sand to help disperse them evenly

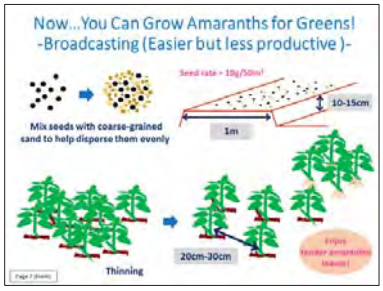




Thinning

Now…You Can Grow Amaranths for Greens!
-Broadcasting (Easier but less productive)-

- Mix the seeds with coarse sand to help them disperse evenly on the soil
- The width of the bed should be 1metre and the height should be around 10 -15 cm
- You can start thinning after 2-3 weeks of germination or when the plant has 6-8 fully grown leaves. Keep the strongest one for later harvesting.
- Thinning is important to reserve space and soil nutrients for the selected plants.
- After removal of plants, the distance between the plants should be 20-30 cm apart.
- You can enjoy the tender amaranths leaves!



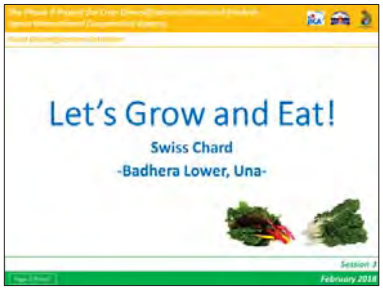
Let's Grow and Eat!

Swiss Chard

-Badhera Lower, Una-

Let's Grow and Eat!

- Today we are going to learn about the swiss chard



First..., In Which Season Do You Eat Spinach?

First..., In Which Season Do You Eat Spinach?

- In which season do you eat spinach?(ask the participants)
  - ➢ Rabi?
  - ➢ Kharif?
  - ➢ Summer?

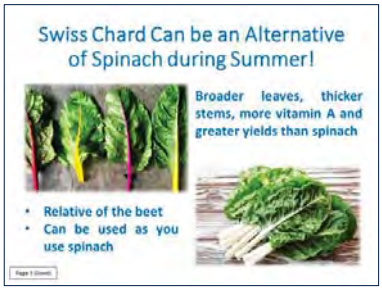
Swiss Chard Can be an Alternative of Spinach during Summer!

Broader leaves, thicker stems, more vitamin A and greater yields than spinach

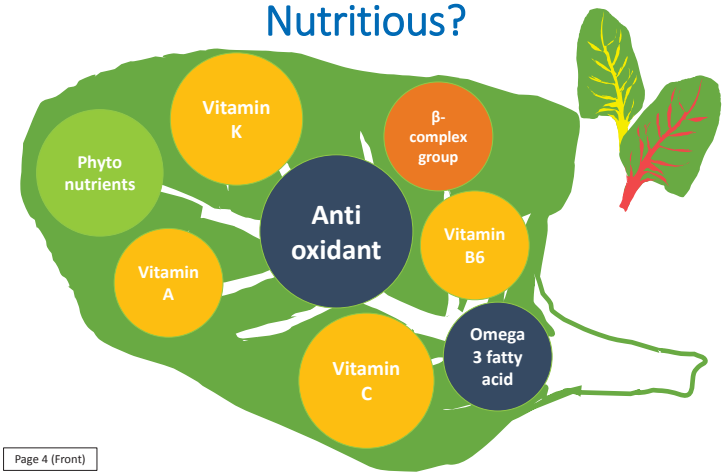
- **Relative of the beet**
- **Can be used as you use spinach**

Swiss Chard Can be an Alternative of Spinach during Summer/kharif!

- Swiss chard is a relative of beet with similar leaves
- It can be cooked as you use spinach
- It has broader leaves and is richer in vitamin A and also gives greater yield than spinach
- It can be a part of your meals in summer/Kharif in the place of spinach!



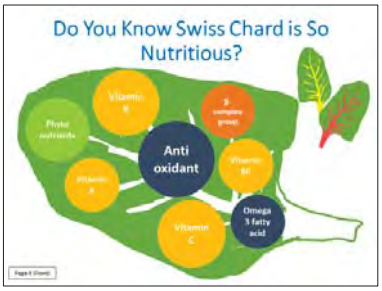
Do You Know Swiss Chard is So Nutritious?



Page 4 (Front)

Do You Know Swiss Chard is So Nutritious?

- Swiss chard is a very nutritious vegetable
- It is rich in nutrients like vitamin A, C and K, B complex vitamins
- It is rich in phyto nutrients and antioxidants
- It is rich in Omega 3 fatty acid
- Red and yellow stem Swiss chard can add colour to your table!



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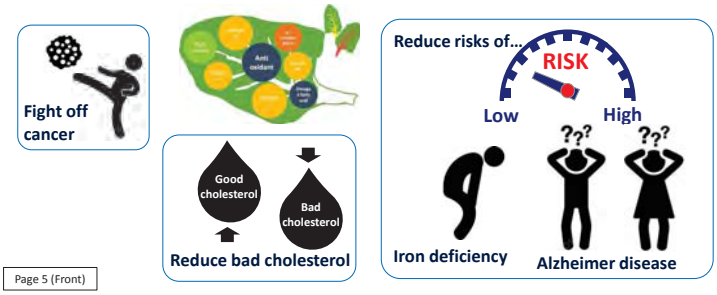
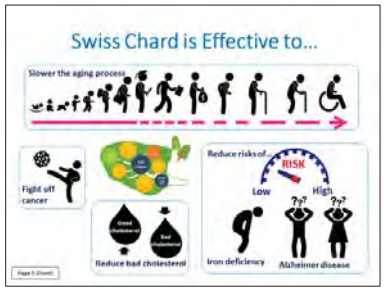
Swiss Chard is Effective to...



Page 5 (Front)

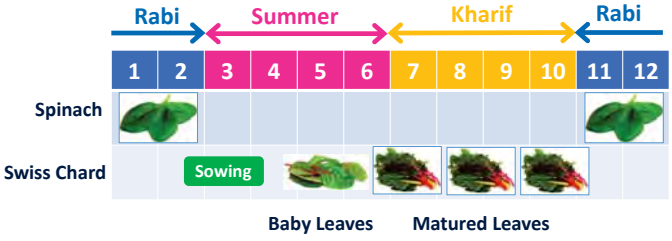
Swiss Chard is Effective to...

- It can be helpful in slowing the process of ageing
- It can help the body to fight against the cancer causing cells
- It can be helpful in reducing bad cholesterol
- It can help in reducing the risk of iron deficiency and Alzheimer disease



Page 5 (Back)

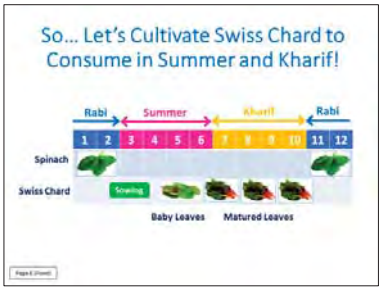
So... Let's Cultivate Swiss Chard to Consume in Summer and Kharif!



Page 6 (Front)

So... Let's Cultivate Swiss Chard to Consume in Summer and Kharif!

- We can start cultivating the Swiss chard in the beginning of the summer season at the time when spinach is rare. During first weeks, you can enjoy tender baby leaves and during following months, you can enjoy matured leaves.
- It can be a healthy *saag* in summer and Kharif



Page 6 (Back)

Now, Let's Sow Swiss Chard in Your Kitchen Garden!

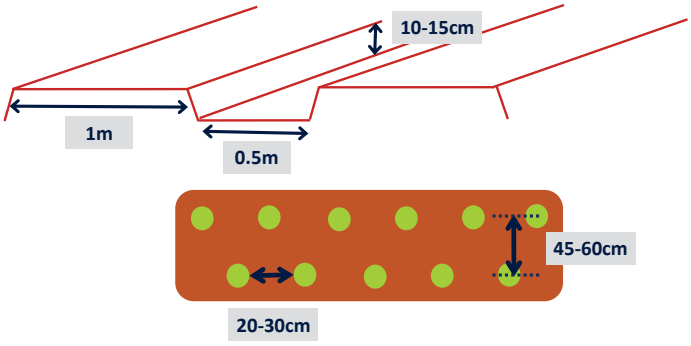
Seed Soaking for 4-6 hours before Sowing

Depth for Direct Sowing

Now, Let's Sow Swiss Chard in Your Kitchen Garden!

- Soak the seeds for 4-6 hours in water before actual sowing
- Sow the seeds 1.5 cm deep into the soil

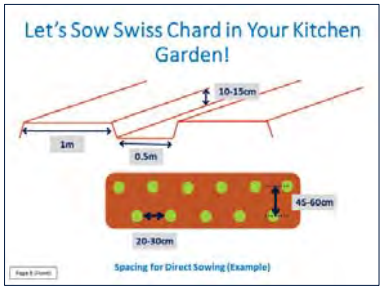
Let's Sow Swiss Chard in Your Kitchen Garden!



Spacing for Direct Sowing (Example)

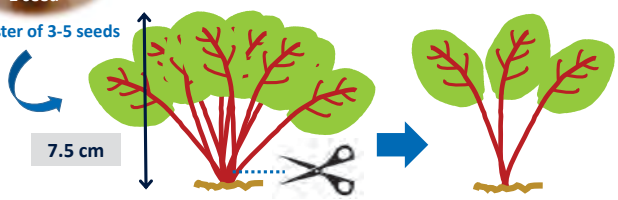
Let's Sow Swiss Chard in Your Kitchen Garden!

- The width of the beds can be kept 1m, while height should be 10-15 cm
- Keep the distance between the plant as 20-30 cm and between the rows as 45-60 cm



Let's Harvest Swiss Chard in Your Kitchen Garden!

A cluster of 3-5 seeds



Baby Leaf Thinning
(Use scissors not to damage the one to be remained)

Keep the Strongest One!

Let's Eat Thinned Baby Leaves!

Let's Harvest Swiss Chard in Your Kitchen Garden!

- As the seeds of Swiss chard are cluster seeds that contain several seeds, 3-5 plants can germinate from one seed cluster.
- You can remove the Swiss chard leaves when the plant reach a height of 7.5 cm
- Start by cutting the small, tender and young leaves of the plant with the help of scissor to avoid damage to the other leaves
- Keep the strongest one as such for the harvesting
- You can prepare healthy and tasty saag or sabji of the baby leaves or a fresh salad.

Let's Harvest Swiss Chard in Your Kitchen Garden!

Harvesting Outer Leaves
(Use scissors not to damage stalks to be remained)

Page 10 (Front)

Let's Harvest Swiss Chard in Your Kitchen Garden!

- Use scissor while harvesting the outer leaves to prevent damage to the other leaves
- Avoid uprooting as leaves will eventually regenerate and wait for following harvesting

Page 10 (Back)

The Phase II Project for Crop Diversification in Himachal Pradesh
Japan International Cooperation Agency

Food Diversification Activities

Let's Grow and Eat!

-Kale-

LEAFY VEGETABLES

Page 1 (Front)

DRAFT, Oct. 2019

1

Let's Grow and Eat!

- Today we will learn about the kale.
- Do you know about the kale?
- Have you every consumed the vegetable?
- How do you cook it?

Page 1 (Back)

2

Kale or Spinach? Which is Better for Your Health?

Page 2 (Front)

3

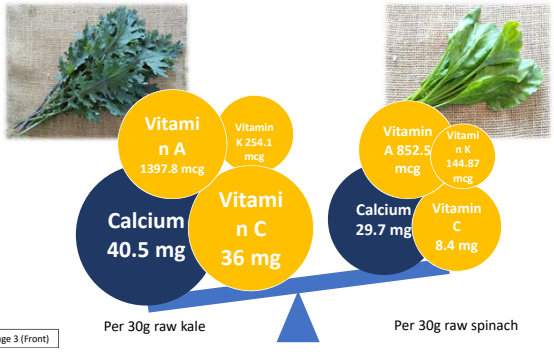
Kale or Spinach? Which is Better for Your Health?

- Kale or spinach? Which is better for your health?
- Both kale and spinach have nutritional advantages.

Page 2 (Back)

4

Let's Compare Kale and Spinach!



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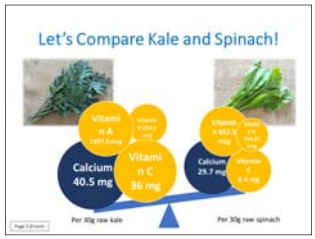
5

Let's Compare Kale and Spinach!

- Kale wins for slightly more bone-strengthening calcium and much more immune-boosting vitamin A (86% of your RDI: Reference Daily Intake). It also offers more vitamin C (half of your RDI), which is important for a healthy immune system.

Vitamin K supplied by kale is a tremendous amount (almost 300% of your RDI), which is needed for blood clotting and bone health.

Infor source:
https://skipthepie.org/vegetables-and-vegetable-products/kale-raw/compared-to/spinach-raw/?weight=30



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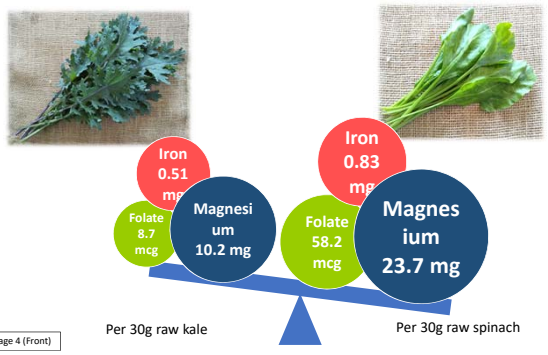
6

Let's Compare Kale and Spinach!



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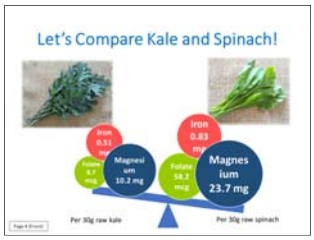
7

Let's Compare Kale and Spinach!

- Spinach offers more folate, which is necessary for pregnant or nursing moms. Spinach is also higher in iron, which your body needs to carry oxygen from your lungs to the rest of your body. It offers more magnesium — a mineral that if you're deficient in can lead to headaches, muscle cramps, and chronic fatigue.
- These two leafy greens definitely pack a nutritious punch for different reasons, so choose the one that'll fill your vitamin and mineral needs. If you're pregnant or have high blood pressure, spinach might be the one to reach for, and if you feel like you're coming down with a cold, grab some kale.

Infor source: https://skipthepie.org/vegetables-and-vegetable-products/kale-raw/compared-to/spinach-raw/?weight=30



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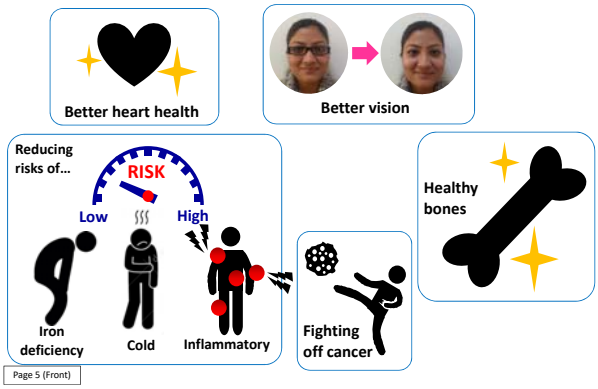
8

Kale May be Effective for…



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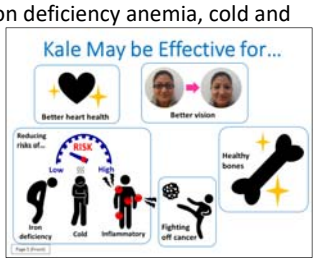
9

Kale May be Effective for…

- Kale can be helpful in improving eyesight, strengthening heart and bones.
- It reduces the risk of iron deficiency anemia, cold and inflammatory.
- It is also helpful in fighting against cancer.



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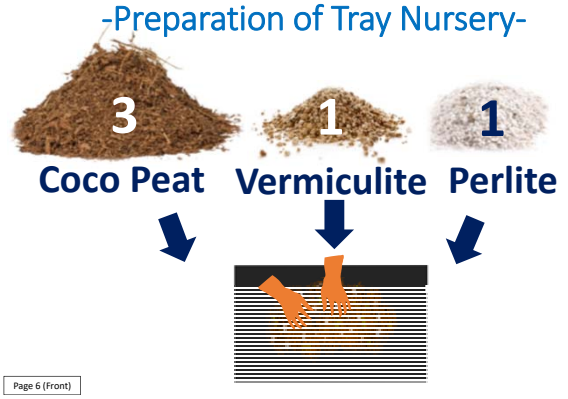
10

Let's Grow Kale! -Preparation of Tray Nursery-



Page 6 (Front)

11

Let's Grow Kale! -Preparation of Tray Nursery-

- Kale seedlings can be grown on tray nursery.
- Material used are coco peat, vermiculite and perlite at a ration of 3:1:1.
- Mix all the materials thoroughly in the given ratio on a poly sheet.

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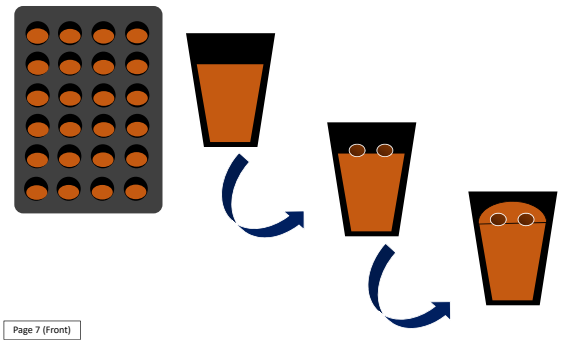
12

Let's Grow Kale!
-Preparation of Tray Nursery-



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13

Let's Grow Kale!
-Preparation of Tray Nursery-

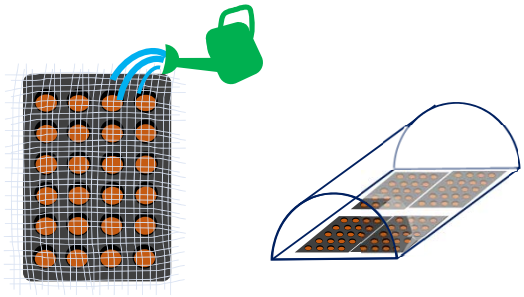
- Fill the empty cones in the tray to 2/3rd with the mixed medium.
- Place 2 seeds on the soil in every cone and cover them with the mixed medium.

Tips: Place the seeds in the centre of the cone so that roots can spread evenly and properly.

Page 7 (Back)

14

Let's Grow Kale!
-Maintenance of the Tray Nursery-



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15

Let's Grow Kale!
-Maintenance of the Tray Nursery-

- Watering should be done gently by putting net or any cotton cloth on the tray; direct watering can mess the soil & seeds in the cones.
- Do watering daily, if required.
- Keep the trays inside the poly house or poly tunnel to protect them from the severe coldness outside. The seedlings can grow faster in the poly tunnel.

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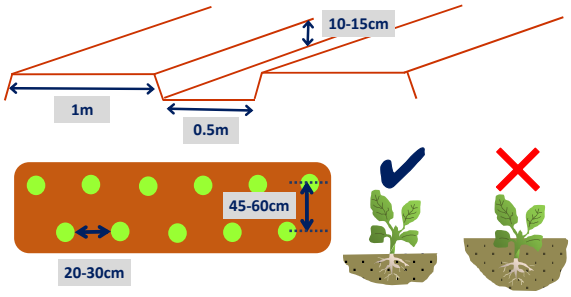
16

Let's Transplant Kale Seedlings on Beds!



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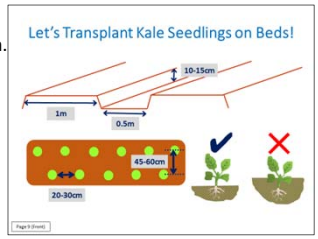
17

Let's Transplant Kale Seedlings on Beds!

- Seedlings can be transplanted when there have 3-4 true leaves and about 10-15 cm tall (about 20-25 days after the sowing date).
- The width of the beds can be kept 1m, while height should be 10-15 cm.
- Keep the distance between the plant as 20-30 cm and between the rows as 45-60 cm.
- Place the seedling on the hole and gently compact the soil surface by hand.



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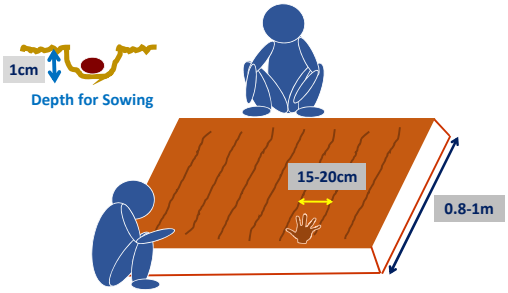
Optional

Let's Sow Kale Seeds on the Bed!



Prepare a raised bed in a poly house
(0.8-1m width to work effectively from both sides)

Page 10 (Front)

19

Optional

Let's Sow Kale Seeds on the Bed!

- Prepare a nursery bed with 0.8-1m width. If the width is longer than it, you will not be able to reach the middle part of the bed and will not be able to work effectively.
- Make lines for sowing.
- Spacing should be 15-20 cm. Spread the palm of your hand to measure.
- Sowing depth should be around 1cm.

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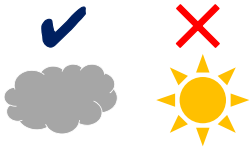
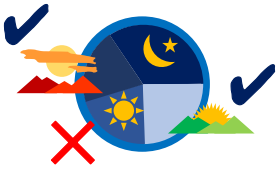
When Should You Transplant?



Do it on cloudy days!
Avoid sunny days



Do it in the morning or in the evening! Avoid daytime!

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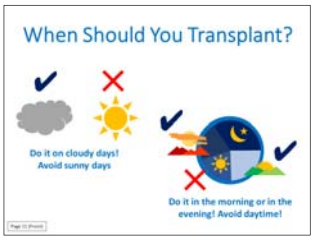
21

When Should You Transplant?

- The best time to transplant greens is in the morning or in the evening on a cloudy day.
- This protects the plants from direct sun while they make the quick transition from the trays to the soil.



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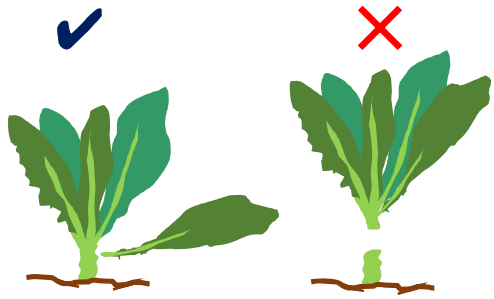
Let's Harvest Kale!



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23

Let's Harvest Kale!

- Harvest mature leaves by removing the outer leaves for continuous growth of the plant. The center of the kale plant containing the bud will continue to produce fresh leaves even after the removal of the outer ones and you can expect a higher yield to suit your needs
- Choose leaves that are bright green and fresh.
- Wash well to remove dirt off and to keep the leaves fresh as long as possible, before eating or bringing to market.

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24

Let's Grow and Eat!

-Soybean-

1

Let's Grow and Eat!

- Today we will learn about the soybean, which is a very healthy and nutritious crop.

2

Currently, How Do You Eat and Use Soybean?

3

Currently, How Do You Eat and Use Soybean?

- How do you eat the soybeans? (ask the participants)
- Do you roast? or put it in your *khichri*?
- Do you feed it to the livestock?

4

Do You Know Soybean is…

An Excellent Source of Plant Protein

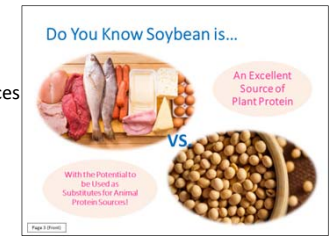
VS.

With the Potential to be Used as Substitutes for Animal Protein Sources!

5

Do You Know Soybean is…

- It is an excellent source of plant protein because it contains all essential amino acid that body can not make itself
- And because of this amino acid composition it has the potential to be used as a substitute for animal protein sources



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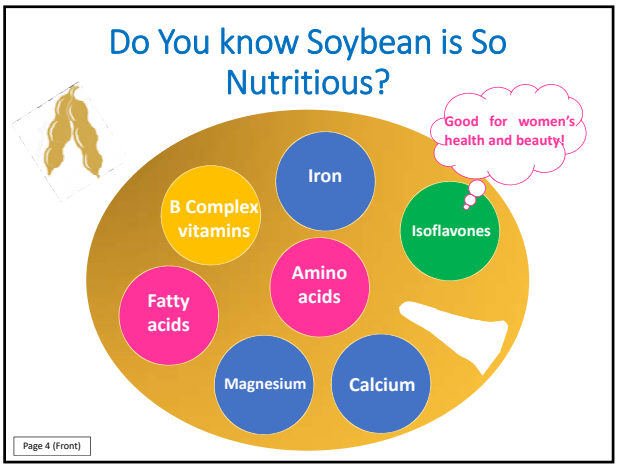
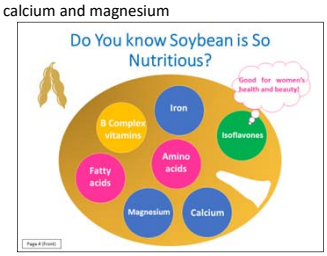


7

Do You know Soybean is So Nutritious?

- Soy bean is a very nutritious crop
- Soy bean is rich in B complex vitamins, amino acids, fatty acids
- It is rich in minerals like iron, calcium and magnesium
- It also contains isoflavones which is found to be good for the health of the women



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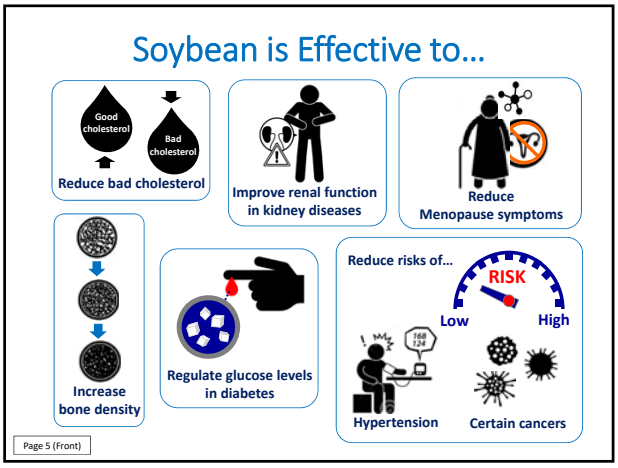
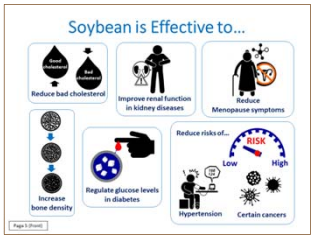


9

Soybean is Effective to...

- Soybean can be helpful in reducing bad cholesterol
- It can be helpful in improving renal function in kidney diseases
- It can be helpful in increasing bone density
- It can be helpful in regulating the glucose levels in diabetes
- It also reduces the risks of hypertension and certain cancers



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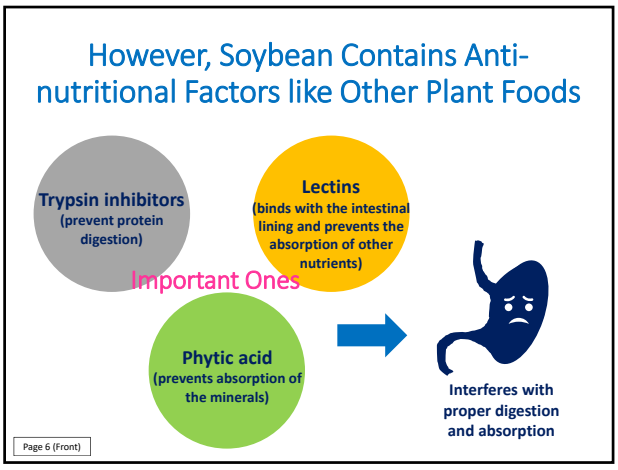
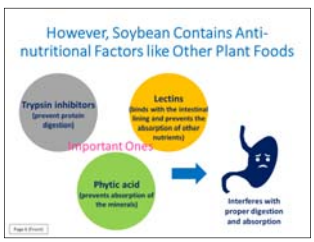


11

However, Soybean Contains Anti-nutritional Factors like Other Plant Foods

- Soybean also contains certain anti nutritional factors like trypsin inhibitor that can prevent the protein digestion
- It also contains lectins which binds with the intestinal lining and prevents the absorption of other nutrients
- Phytic acid present in the soybean can interfere with the absorption of the minerals
- All of these anti nutrients then interfere with the proper digestion and absorption of the food and its nutrients



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12

Through Processing of Soy, These Anti-nutritional Factors Can be Reduced

Page 7 (Front)

13

Through Processing of Soy, These Anti-nutritional Factors Can be Reduced

- There are some processes that can help you reduce these anti nutritional factors of soy bean
- For example-
- Roasting and cooking
- Soaking
- Germinating
- fermentation

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14

Let's Process Soy! -Soya Paneer (*Tofu*)-

Page 8 (Front)

15

Let's Process Soy! -Soya Paneer (*Tofu*)-

- We can process the soybean into soy paneer (*Tofu*)
- Soy paneer is a good source of protein, iron and calcium
- It has low fat, it can be used as a substitute for paneer in different paneer preparation

Page 8 (Back)

16

Let's Process Soy! -Soy Milk-

Page 9 (Front)

17

Let's Process Soy! -Soy Milk-

- We can process the soybean into soy milk
- Soy milk can be a substitute for the dairy milk as it contains no cholesterol, low fat and more iron content in comparison to dairy milk
- Tea and coffee can be prepared by using soy milk
- Curd can also be prepared using the soy milk

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18

The Phase II Project for Crop Diversification in Himachal Pradesh
Japan International Cooperation Agency

Food Diversification Activities

Let's Grow and Eat!

Green Soybean (*Edamame*)

Soybean

Page 1 (Front)

DRAFT, Oct. 2019

1

Let's Grow and Eat!

- Today we will learn about the green soybeans, which are harvested when beans are still young and soft. Green soybeans are called "*edamame*" in Japan, which means "branched bean".
- Soybeans and edamame have many similarities, but it is worth investigating their differences to help you decide which to use.

Page 1 (Back)

2

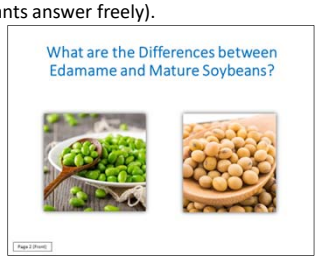
What are the Differences between Edamame and Mature Soybeans?

Page 2 (Front)

3

What are the Differences between Edamame and Mature Soybeans?

- Do you normally eat edamame?
- What are the differences between edamame and mature soybeans? (Let participants answer freely).
  - Appearance?,
  - Taste?,
  - Nutritional value?,
  - Health benefit?
- Which one do you prefer?!



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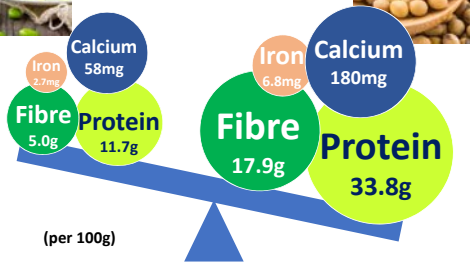
4

Let's Compare Edamame and Mature Soybeans!



(per 100g)

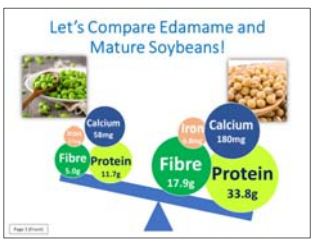
Page 3 (Front)

5

Let's Compare Edamame and Mature Soybeans!

- Since edamame is immature soybeans, its nutritional value is more or less similar to mature soybeans but mature soybeans have more nutritional value than edamame.
- Mature soybeans are richer in protein, dietary fiber, calcium and iron, etc.

Source:
https://www.soyafarm.com/blog/green-soybeans/



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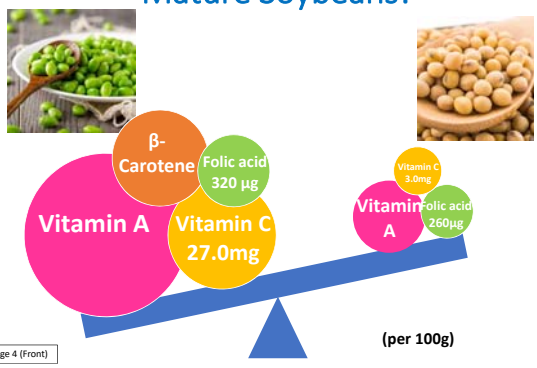
6

Let's Compare Edamame and Mature Soybeans!



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7

Let's Compare Edamame and Mature Soybeans!

- However, edamame's nutrition value is still higher if you look at vitamin A, vitamin C, β - Carotene and folic acid. Mature soybeans don't contain vitamin C, β - Carotene.
- Moreover, edamame is protected by pods and nutrient components can be hardly leached even after cooking edamame.

Source: https://www.soyafarm.com/blog/green-soybeans/

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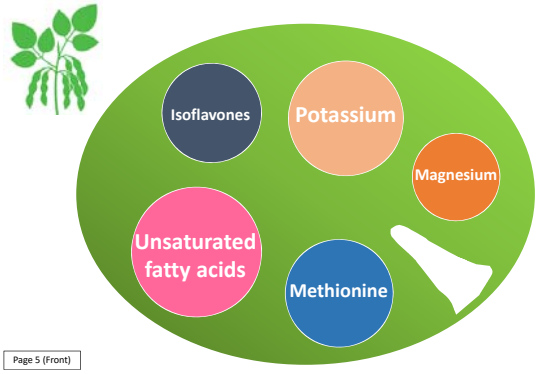
8

Moreover, Edamame is Rich in....



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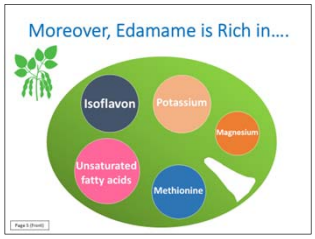
9

Moreover, Edamame is Rich in....

- Edamame is also rich in isoflavon, unsaturated fatty acids and methionine as well as some of the minerals such ax potassium and magnesium, etc.
- Edamame is a healthy vegetable having both good aspects of soybeans and deep green and yellow vegetables!



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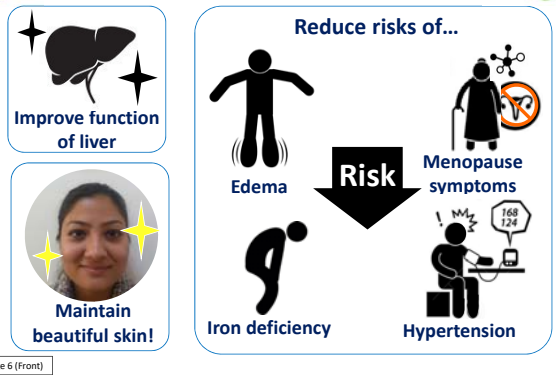
Edamame is Effective to...



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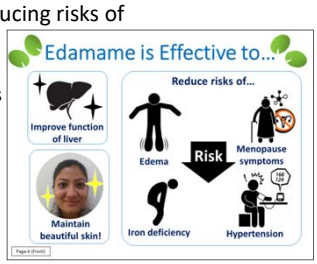
11

Edamame is Effective to...

- Edamame can be helpful in
  - ➢improving function of liver
  - ➢Maintain beautiful skin
- It can be helpful in reducing risks of
  - ➢Edema
  - ➢Iron deficiency
  - ➢Menopause symptoms
  - ➢Hypertension
- And...effective for fatigue recovery!



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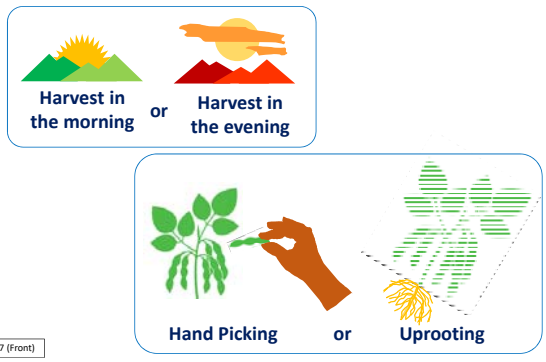
12

To Eat Edamame More Tasty and Healthy, Which Methods are Recommended?



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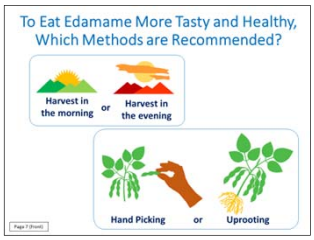
To Eat Edamame More Tasty and Healthy, Which Methods are Recommended? (1)

- Let participants think and answer;
  - ➢Harvest edamame in the evening or harvest it in the evening? Why?
  - ➢Hand picking or uprooting? Why?



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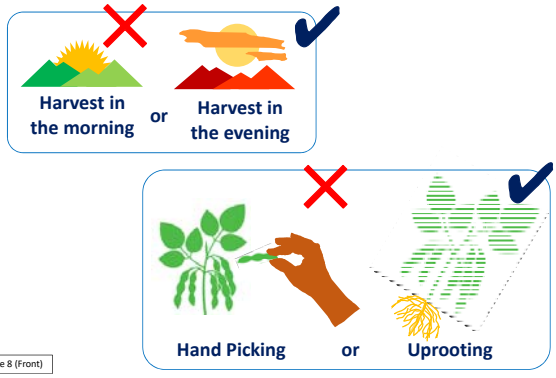
Let's Look at the Answers!



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15

Let's Look at the Answers!

- Harvest edamame in the evening for more sweetness and tastiness! A sugar content is increased and flavor components are increased compared to the morning harvested!
- Uproot edamame when you harvest it! Once pods are separated from the plant, their freshness will be decreased at once. Uproot the whole plant and remove the pods just before cooking.

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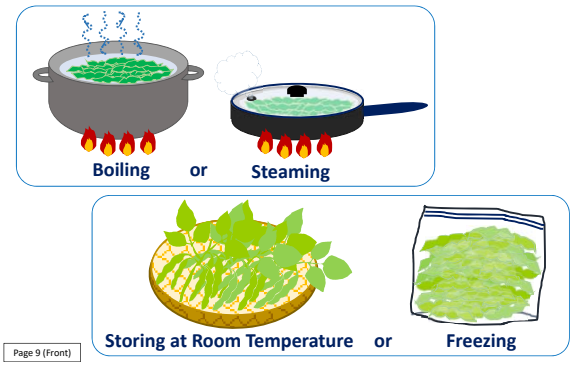
To Eat Edamame More Tasty and Healthy, Which Methods are Recommended? (2)



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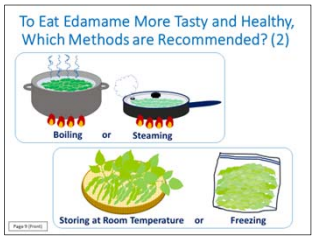
To Eat Edamame More Tasty and Healthy, Which Methods are Recommended? (2)

- Let participants think and answer;
  - ➢Boiling edamame or steaming edamame? Why?
  - ➢Storing edamame at room temperature without separating pods from the plant or freezing edamame pods after separating them from the plant? Why?



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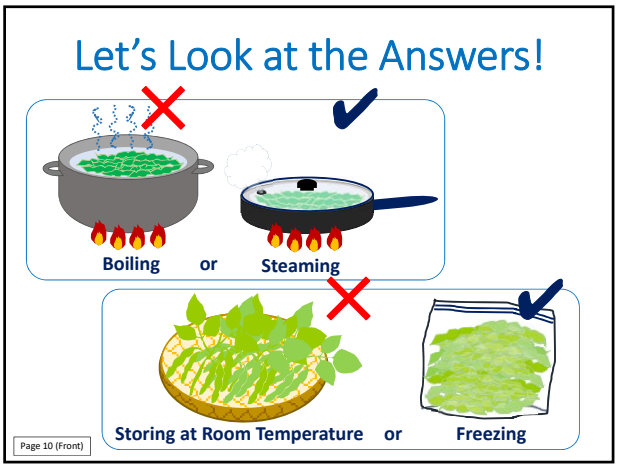

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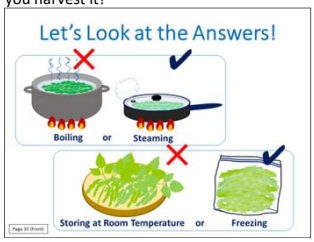
Let's Look at the Answers!

How to Cook

- You can take more nutrients from edamame by steaming with a little water than boiling and you can also feel it sweeter and tastier!
  - Wash edamame and put in boiled water without removing outer skin and inner skin (inner skin has a barrier functions to retain nutrition in the beans and the skin itself contains dietary fibre).
  - Put a cover and steam edamame for 5 minutes.
  - Nutrition value of edamame will not be changed before and after cooking but tastiness can be reduced as time passes. It is then recommended to cook it as soon as possible after you harvest it!

How to Store

- The best way to keep edamame fresh and tasty is to cook, cool it down and freeze it soon after harvesting, ideally in a container to keep for longer.
- At room temperature, tastiness can be soon decreased. If you still want to store it at room temperature, it is recommended to separate the pods from the plant, wrap them with wet newspaper.



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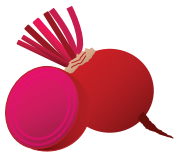
Let's Grow and Eat!

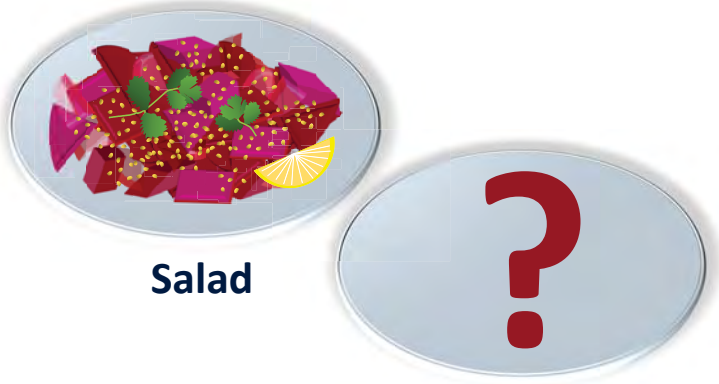
-Beetroots-



Let's Grow and Eat Beetroots!

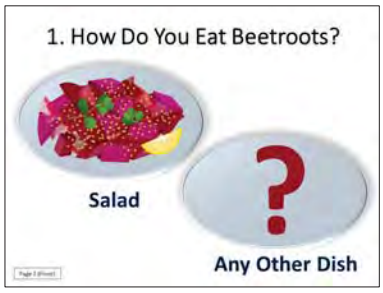
- Today, let's learn about beetroots!

1. How Do You Eat Beetroots?

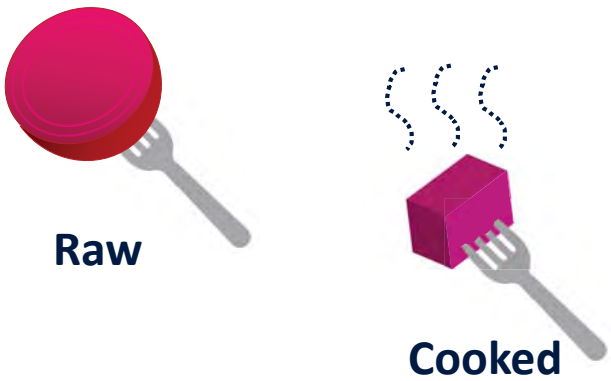


1. How Do You Eat Beetroot?

- Do you often eat beetroots at home?
- How do you eat the beetroots at home? Eat as salad only?
- Let's learn more ways of cooking the beetroots to take them more often and more easily!

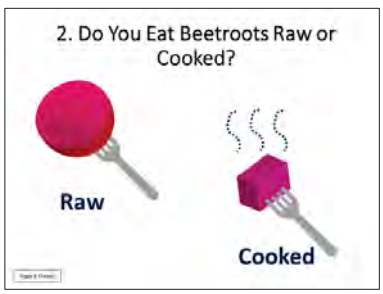


2. Do You Eat Beetroots Raw or Cooked?

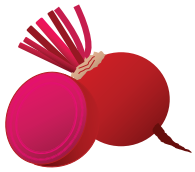


2. Do You Eat Beetroots Raw or Cooked?

- Do you eat the beetroots raw or cooked?
- Advantages or fresh consumption: Fresh and raw beetroot gives you more dietary nitrates.
- Advantages of cooking:
  Reduction of pungency



3. Do You Eat Beetroots With Greens or Without Greens?



Without Greens

With Greens

Page 4 (Front)

3. Do You Eat Beetroots With Greens or Without Greens?

- Do you eat beetroots with greens or without greens?
- Why not without greens?
- Greens are also nutritious and can be cooked like spinach.
- So, don't throw them out!

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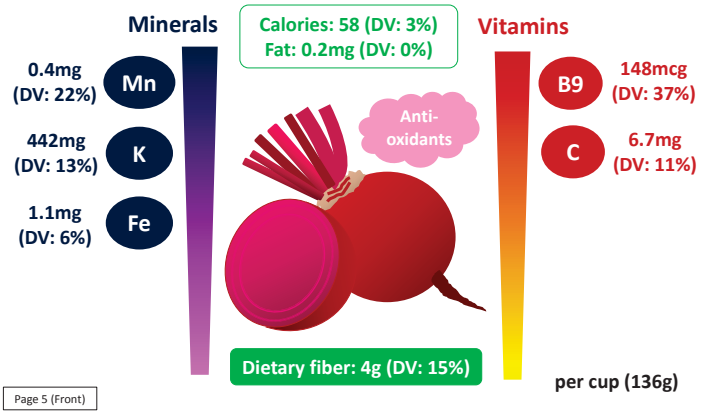
4. Do You Know Beetroots Have Many Nutrients in Few Calories and Fat?



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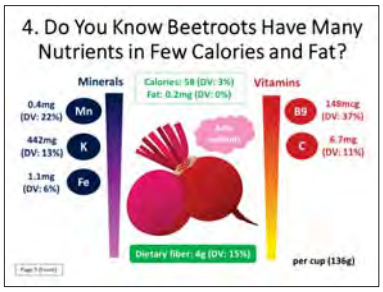
4. Do You Know Beetroots Have Many Nutrients in Few Calories and Fat?

- % Daily value is the percentage of the nutrient present per serving of the food to the recommended standard nutrients required per day by an individual.
- One cup i.e. 136g of the raw beetroot provides you with 3 % calories, 0 % fat, 15% dietary fibre of the daily value.
- It contains vitamins like DV 37% folic acid and DV 11% vitamin C.
- It also have minerals like DV 22% manganese, DV 13% potassium and DV 6% iron.



Nutrition info source
https://nutritiondata.self.com/facts/vegetables-and-vegetable-products/2348/2

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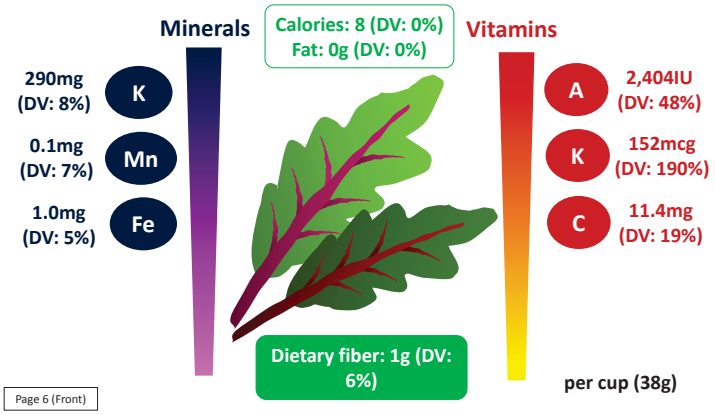
5. Do You Know Beetroot Greens are So Nutritious, too?



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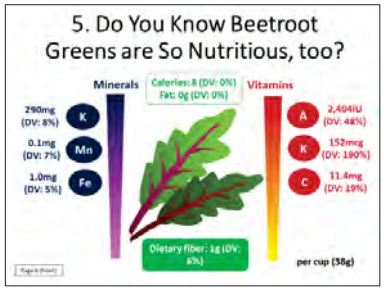
5. Do You Know Beetroot Greens are So Nutritious, too?

- Other than beet roots, beet leaves are also very nutritional, they are rich in vitamin A (48%), vitamin K (190%) and vitamin C (19%).
- They are also rich in minerals like potassium (8%), manganese (7%) and Iron (5%)
- DV of dietary fibre is (6%).



Nutrition info source
https://nutritiondata.self.com/facts/vegetables-and-vegetable-products/2352/2

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6. Beetroots May be Effective to…

Page 7 (Front)

6. Beetroots May be Effective to…

- Optimum amount of beetroots in the diet can help in maintaining healthy blood pressure.
- It can help in fighting inflammation.
- Due to good fibre content, it can help in weight loss.
- It can help in improving athletic performance, better digestive health,
- It can help in prevention against cancer and support brain health.

Info source
https://www.healthline.com/nutrition/benefits-of-beets#section9

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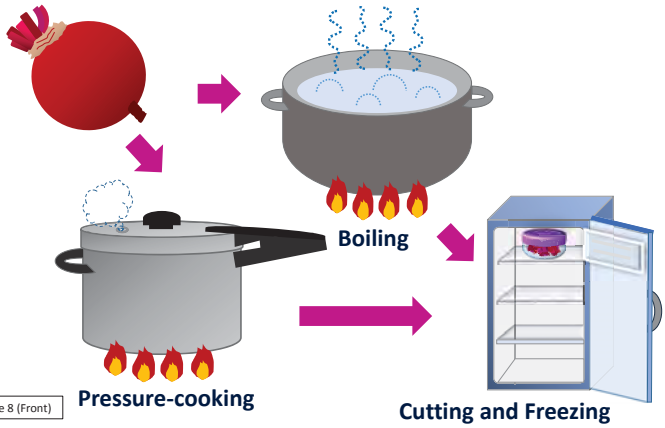
7. What are Tips for Cooking and Longer Storage?



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7. What are Tips for Cooking and Longer Storage?

1. Beetroots can be consumed raw without cooking when they are fresh. If you cook them, avoid over cooking as the beetroots have betalain pigments and vitamin-C both are heat sensitive. Steam cooking for 15-20 minutes can still prevent nutrient from leaching.
2. If you want to store them for a while without eating, pretreatment is recommended as follows for longer storage, wider range of cooking methods and higher degree of sweetness.

A. Boiling

a. Boil the beetroots leaving skin and a little stems/roots for 30 minutes at low heat in water mixed with a small quantity of vinegar to avoid leaching of pigments and nutrients.

b. Cool down the beetroots in boiling water and remove the skin. Avoid boiling the beetroots after cutting, as red pigments such as anthocyanins will be leached out.

B. Steam-cooking

3. After pretreatment, beets can be preserved for example in the form of pickles. They can be frozen in containers for longer storage for about 3 months and used directly as ingredients of salad and soup, etc. after melting slowly.

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8. Or You Can Simply Dry the Beetroots…

Page 9 (Front)

8. Or You Can Simply Dry the Beetroots…

- In addition, beetroots can be simply dried under the sun and grinded into powder using a blender.
- Beetroot powder is a concentrated form of beet nutrient which can be easily mixed with foods such as cake, bread and chapatti. Even children who do not like the beetroot can enjoy consuming it.
- Beetroot powder can be used as natural colour in foods.

Dried Beetroots Photo
https://www.olive-hitomawashi.com/column/2018/11/post-3218.html

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The Phase II Project for Crop Diversification in Himachal Pradesh
Japan International Cooperation Agency

Food Diversification Activities

Let's Grow and Eat!

-Pak-choi-

Leafy Vegetables

Page 1 (Front) DRAFT, Sep. 2019

1

Let's Grow and Eat Pak-choi!

- Today, let's learn about Pak-choi!

Page 1 (Back)

2

1. How Do You Eat Pak-choi?

Pak-choi *Sabji*

Any Other Dish?

Page 2 (Front)

3

1. How Do You Eat Pak-choi?

- Do you often eat pak-choi at home?
- How do you eat the pak-choi at home? Eat only as *sabji*?

Page 2 (Back)

4

2. Do You Want to Learn More Pak-choi Recipes?!

Pak-choi Daal

Pak-choi & Carrot Clear Soup

Pak-choi Pakora

Page 3 (Front)

5

2. Do You Want to Learn More Pak-choi Recipes?!

- Let's learn more ways of cooking the pak-choi to take them more often and more easily!
- We can introduce Healthy! Tasty! Recipes of pak-choi, which are 1) Pak-choi *Daal*, 2) Pak-choi & Carrot Clear Soup and 3) Pak-choi *Pakola*.

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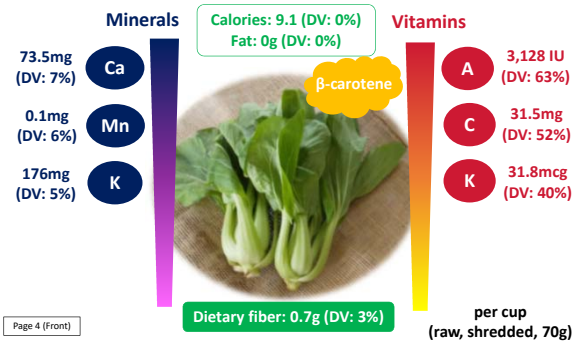
6

3. Do You Know Pak-choi is So Nutritious?



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7

3. Do You Know Pak-choi is So Nutritious?

- % Daily value is the percentage of the nutrient present per serving of the food to the recommended standard nutrients required per day by an individual.
- One cup i.e. 70g of the raw pak-choi provides you with only 0% calories and 0% fat, but 3% dietary fibre of the daily value.
- It is rich in vitamin A with DV 63%, vitamin C with DV 52% and vitamin K with DV 40%.
- It also has minerals like DV 7% calcium, DV 6% manganese and DV 5% potassium.
- Pak-choi is also rich in β-carotene!

Nutrition info source
https://nutritiondata.self.com/facts/vegetables-and-vegetable-products/2377/2

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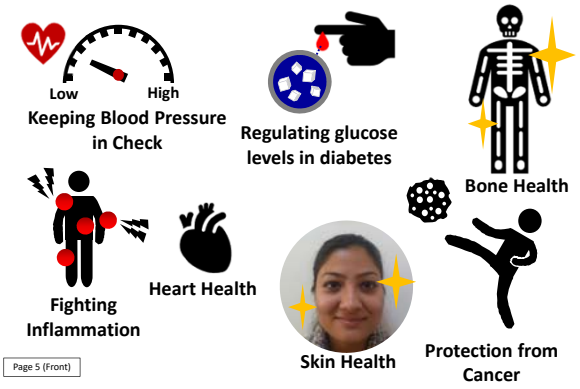
8

4. Pak-choi May be Effective for…



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9

4. Pak-choi May be Effective to…

- Let's see how pak-choi can be effective for our health.
- Pak-choi can be helpful in following ways:
  - ➢Keeping blood pressure in check
  - ➢Good heart health
  - ➢Fighting off inflammation
  - ➢Regulating glucose levels in diabetes
  - ➢Good bone health
  - ➢Healthy skin
  - ➢Protection against cancer

Info source https://www.medicalnewstoday.com/articles/280948.php

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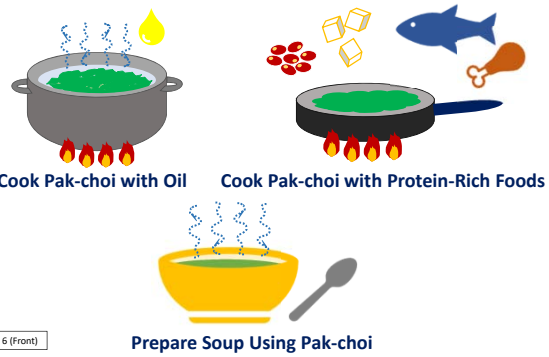
10

5. What are Tips for Cooking?



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11

5. What are Tips for Cooking?

1. Cook Pak-choi with Oil: As pak-choi is rich in β-carotene, let's cook it with oil for higher rate of β-carotene absorption. It is recommended to stir it with a strong fire or boil it with some drops of oil for better texture and more vivid colours, which can stimulate your appetite.
2. Cook Pak-choi with Protein-Rich Foods: Protein can help absorption of β-carotene or calcium. Moreover, protein can be helpful in preventing arteries from being hardened by taking with β-carotene or vitamin C. Let's then use recipes which combine pak-choi and protein-rich foods such as fish, eggs, cheese and legumes!
3. Prepare Soup Using Pak-choi: As pak-choi is rich in vitamin C, let's prepare soup using pak-choi for higher vitamin C intake! Vitamin C is water soluble, which is leached to water. Therefore, if you can make use of water once used for cooking directly in your pak-choi dish, this can prevent vitamin C from being lost from pak-choi.

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12

Let's Dry Vegetables!

Various Crops

1. Do You Face These Problems?

- I overproduced vegetables…
- Price of vegetables is too low…
- I want to consume more vegetables even during off-seasons…
- My children don't like vegetables…
- I want to enjoy various ways of consuming vegetables…

2. Then, Dried Vegetables are So Good for You!

- Easy to prepare!
- Easy to use!
- Tasty and healthy! (Nutrients and tastiness are concentrated)
- You can store them for longer period
- You can eat lots of vegetables

3. Which Veggies Do You Want to Dry?

4. How Do You Want to Dry Veggies?


Raw, thick


Raw, thin


Steamed, thin

After 1 week

After 1 day

After 2 days


Chewy


Crispy


Crispy, darker

5. How Do You Want to Use Dried Veggies?

<u>Cooking</u>

- Add directly in curry (sometimes, soaking in water is needed in advance depending on quality of dried veggies)
- Stir as sabuji after making them soft by soaking in water

<u>Healthy Sweets or Snacks</u>

- Instead of having sweets or snacks, enjoy the crispy or chewy texture and natural sweetness of dried veggies/fruits!

6. Let's Prepare Veggie Powder!

When they get crispy, you can grind them with a blender!

Too coarse

Dry again under non-woven cloth

OK!

7

7. How Can You Use the Veggie Powder?

8

The Phase II Project for Crop Diversification in Himachal Pradesh
Japan International Cooperation Agency

Food Diversification Activities

Let's Grow, Process and Sell!

-Beetroots-

Root Crops

Page 1 (Front)

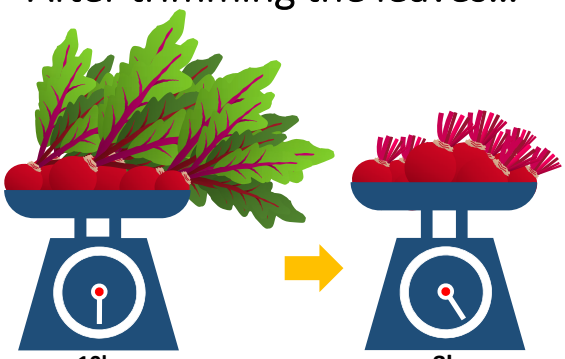
1

Let's grow beetroots, process it and sell it!!

- Today, let's learn how to calculate income through beetroot powder preparation!!

2

After trimming the leaves…

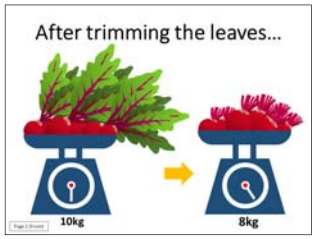


Page 2 (Front)

3

After trimming the leaves…

- Let's see how much of powder you can produce from 10kg of fresh beetroots including leaves!
- 10kg of fresh beets will be 8kg after trimming the leaves.



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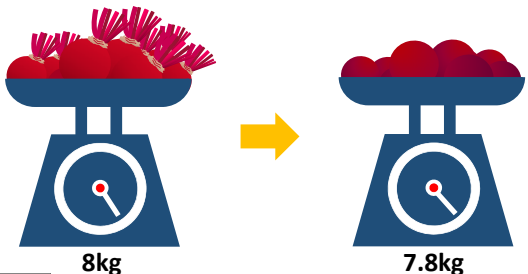
4

After Scrubbing the Skins…



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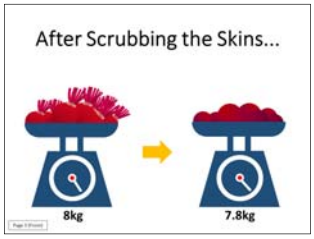
5

After Scrubbing the Skin…

- 8kg of fresh beetroots without leaves will be 7.8kg after scrubbing the skin.



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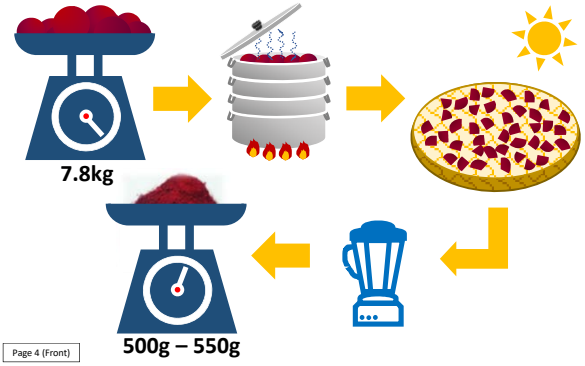
6

After Steaming and Drying...



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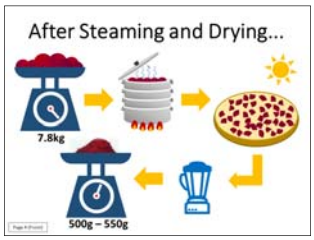
7

After Steaming and Drying...

- 7.8kg of scrubbed beetroots will be 500g-550g of powder after steaming, slicing, drying and grinding.



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8

100g of Powder Can be Sold at...

Page 5 (Front)

9

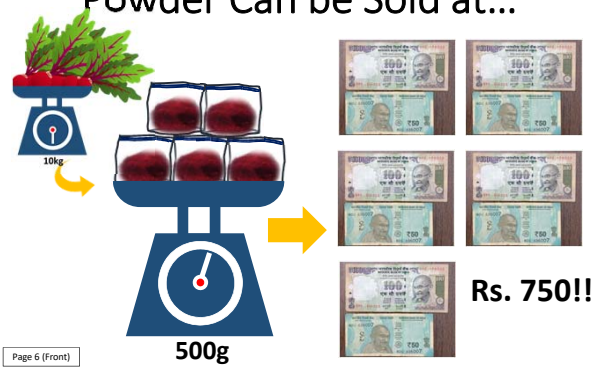
100g of Powder Can be Sold at...

- 100g of beetroot powder can be sold at Rs.150 at the sweets shop in the center of Bilaspur.

Page 5 (Back)

10

Then, 500g of Beetroot Powder Can be Sold at...



Page 6 (Front)

11

Then, 500g of Beetroot Powder Can be Sold at...

- That means, 500g of beetroot, which can be produced from 10kg of fresh beetroot including leaves, can be sold at Rs.750!!!
- Now let's think when in the beetroot season you should produce powder to maximize your income!

Page 6 (Back)

12

HEALTHY! TASTY! RECIPES

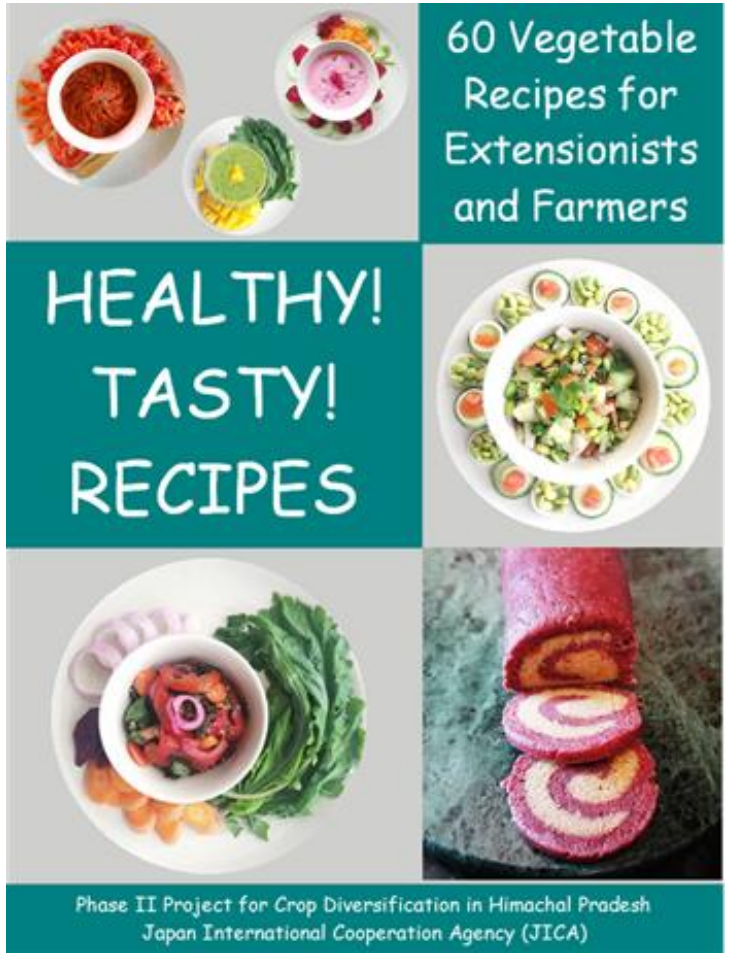
60 Vegetable Recipes for Extensionists and Farmers

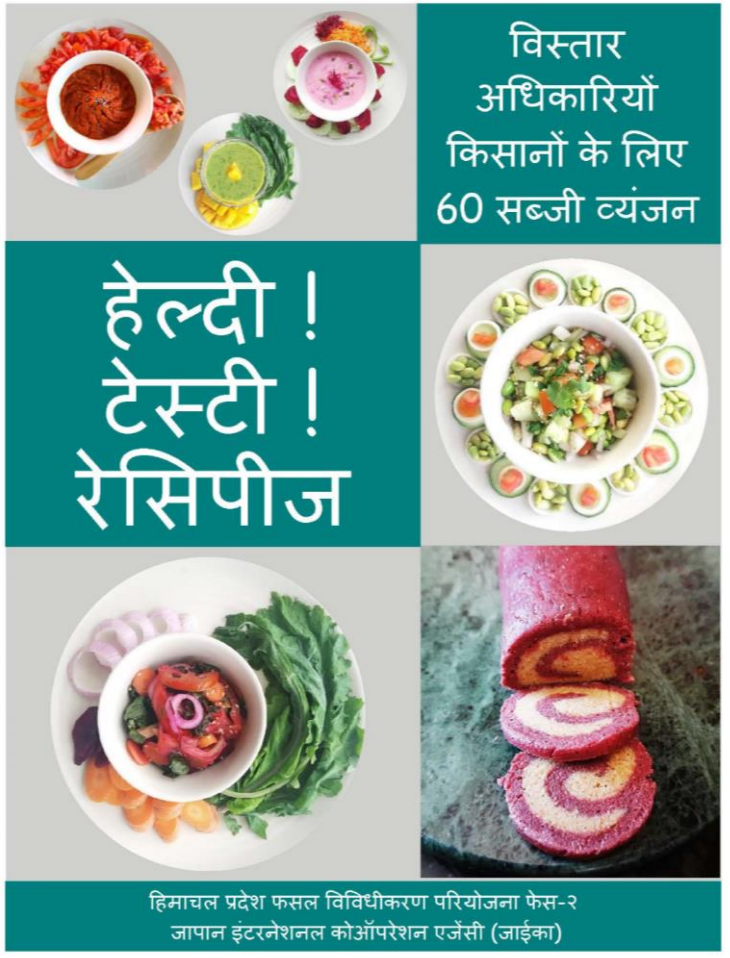
Food Diversification Activities (TCP)

Phase II Project for Crop Diversification in Himachal Pradesh

Japan International Cooperation Agency (JICA)

Contents of the Booklet



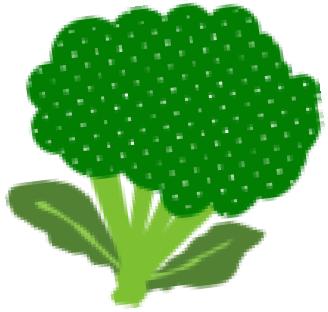


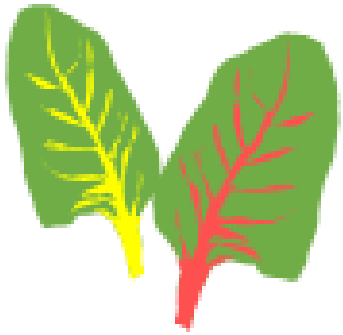
- Introduction
- Guide to Nutrition
- Recipes
- Attachment
  - Pictorial instructions
  - Table of the composition of the selected food items (please refer to the booklet)

To contribute to crop diversification:

We promote “food diversification”, namely farmers’ self-consumption of following crops by telling how to cook and eat:

- Crops newly introduced for marketing such as **broccoli** and ***pak choi***, also to contribute to smooth marketing
- New kitchen garden crops such as **Swiss chard** and **kale**
- Underutilized crops such as **soya bean**, **amaranthus leaves** and **beetroot green**

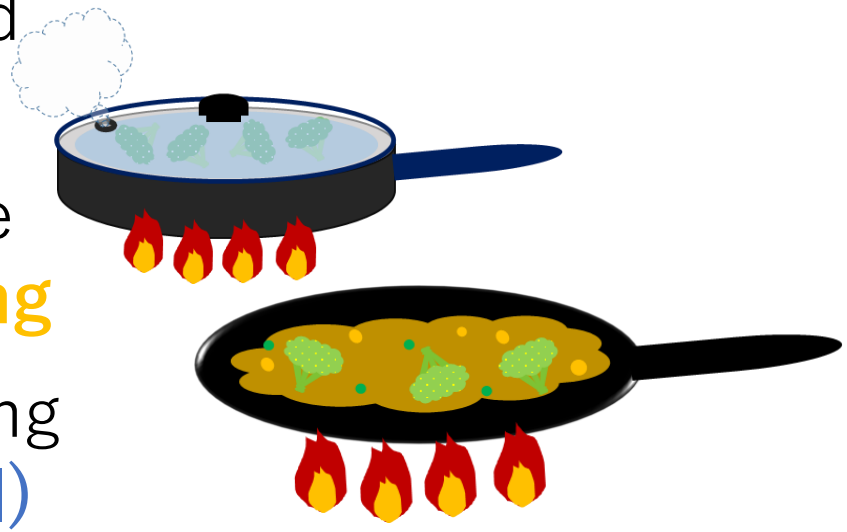




To contribute to nutrition improvement:

Considering the major health issues in Himachal Pradesh (**iron-deficiency anemia**, **hypertension**, **overweight**, **lack of animal protein**, etc.), we are aware of the following points:

- Use of crops rich in nutrients such as **iron** and **protein**
- Application of cooking methods to retain more nutrients such as **steaming** and **shallow frying**
- Use of low sugar, low salt and low fat, following the **WHO's Recommended Daily Intake (RDI)**



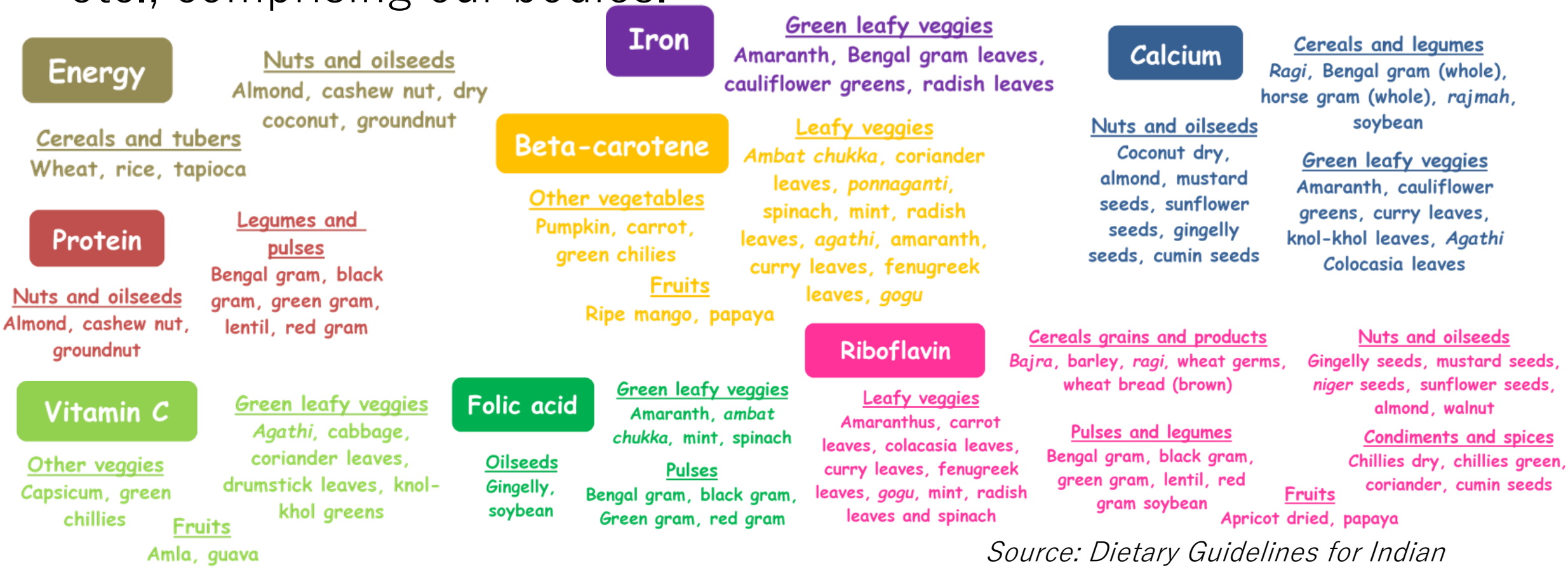
To provide tastiness and familiarity for wider acceptance:

We are aware of the following points:

- Maximization of value of **traditional recipes** and use of **ingredients locally available**, also welcoming **recipes suggested by extension officers and farmers**
- Suggestion of **"Immunity boosting recipes"** using vitamin-C rich vegetables with concern over the spread of COVID-19 infection in India.

Guide to Nutrition

- Crops are Rich in Nutrients! They can be obtained through daily diet and are all important components of muscles, fat and bones, etc., comprising our bodies.



Source: Dietary Guidelines for Indian

Guide to Nutrition

- Our recipes highlight following nutrient components in the target vegetables and other ingredients.
  - **Macronutrients: Fats, carbohydrates, dietary fiber and protein**
  - **Micronutrients:**
    1. **Vitamins: Vitamin A, C, D, E, K, riboflavin, niacin and folate**
    2. **Minerals: Calcium, iron and phosphorus**

  **For functions of the nutrients in detail, please refer to the booklet*

Guide to Nutrition (contd')

Health benefits of the nutrients focused in the booklet (Examples)

Nutrient component	Health benefits
Protein	Provides building block to the body and protection against disease, synthesize body cells.
Dietary fibre	Beneficial in weight loss, provides satiety value to the meal, prevents constipation.
Vitamin A	Maintains normal vision in dim light, required for normal bone and tooth development, fights against infections, maintains healthy epithelium
Iron	Essential in carrying oxygen to the lungs, helps in specific brain functions, an essential part of several oxidative enzymes. Deficiency leads to anemia.

Source: Food Science and Nutrition

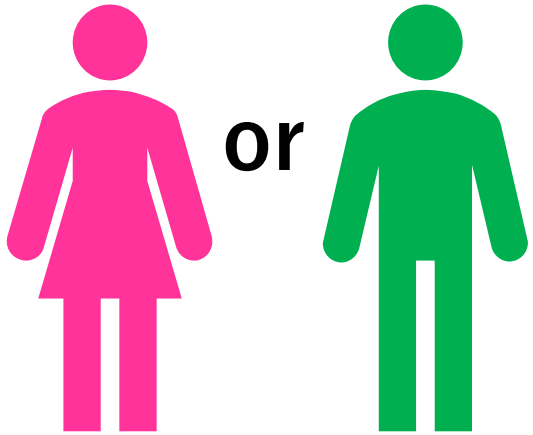
** For information on other nutrients, refer to the guide to nutrition in the booklet.*

Guide to Nutrition (contd')

Daily Value

Macronutrients

- Total fat: 78g
- Total carbohydrate: 275g
- Dietary fiber: 28g
- Protein: 50g



Micronutrients (Vitamins)

- Vitamin A: 900mcg
- Vitamin C: 90mg
- Vitamin D: 20mcg
- Vitamin E: 15mg
- Vitamin K: 120mcg
- Riboflavin (vit. B2): 1.3mg
- Niacin (vit. B3): 16mg
- Folate (vit. B9): 400mcg

Based on an intake of 2,000 kcal for an adult as a reference

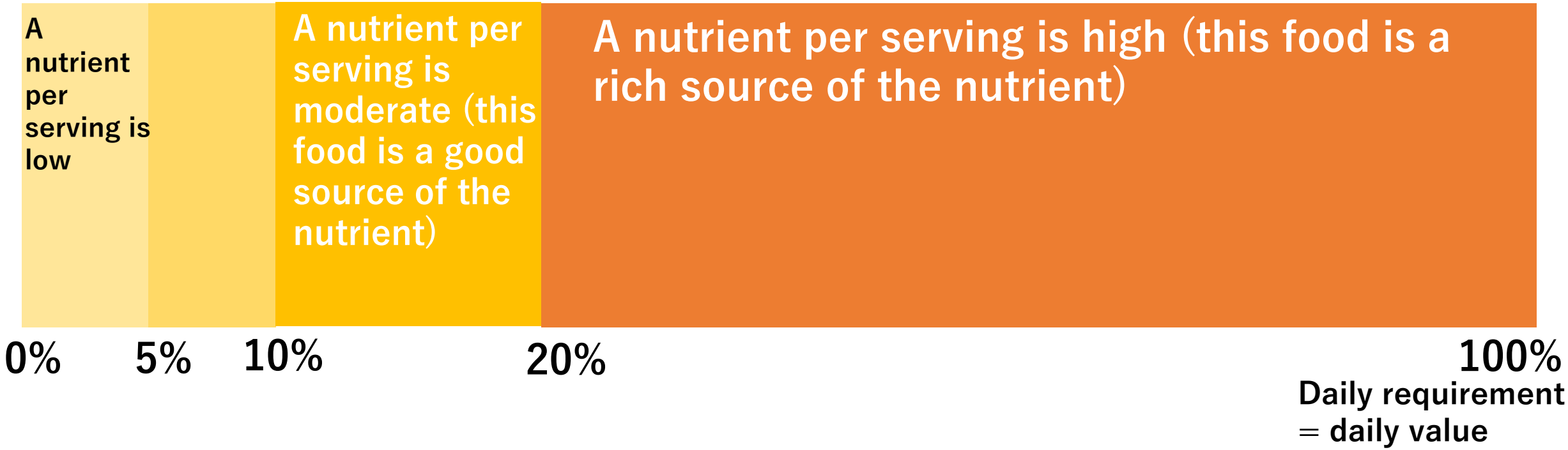
Micronutrients (Minerals)

- Calcium : 1,300mg
- Iron : 18mg
- Phosphorous: 1,250mg

Referring to DV presented in the labeling criteria of the US Food and Drug Administration

Guide to Nutrition (contd')

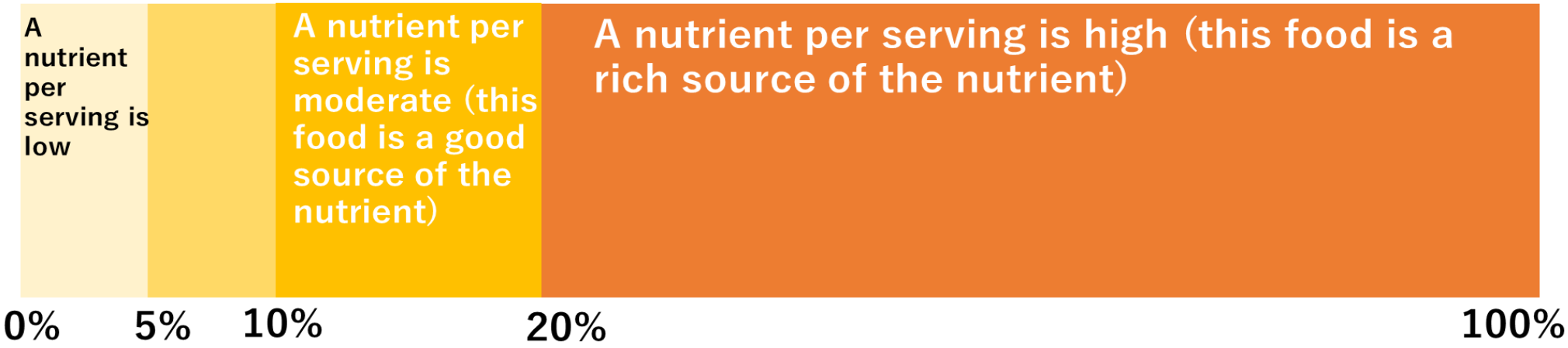
General Rule of Percent Daily Value



Remarks: Illustrated by the JICA TCP Expert team, sourcing from Code of Federal Regulations, Title 21, Chapter I, Subchapter B, Part 101, Subpart D, Section 101.54 (US Food and Drug Administration. April 1, 2017. Retrieved August 25, 2018)

Guide to Nutrition (contd')

General Rule of Percent Daily Value: In the case of iron



Soya bean 28.3% (5.1mg)

Spinach 20% (3.6mg)

Amaranth leaves 12.3% (2.3mg)

Swiss chard 12.3% (2.3mg)

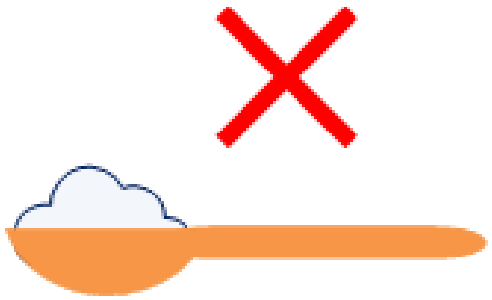
***Veggies are cooked, amounts are 100g, each**

Guide to Nutrition (contd')

Measurements rules of the booklet

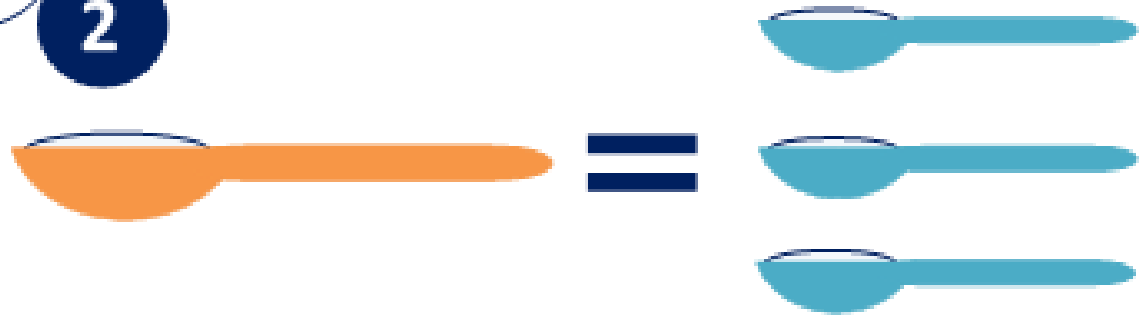
1

A level spoon



A heaping spoon

2



1 tablespoon = 3 teaspoon

Guide to Nutrition (contd')

Measurements rules of the booklet

3

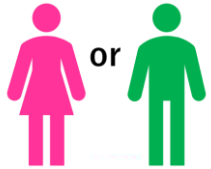
	 1 teaspoon (tsp)	 1 tablespoon (tbsp)	 1 cup
Salt	5~6g	15~18g	180~240g
Sugar	3~4g	9~12g	130~180g
Oil	4g	12g	180g
Corn starch	2g	6g	100g
Wheat flour	3g	9g	100~110g
Water	5g (5ml)	15g (15ml)	200g (200ml)
Vinegar	5g (5ml)	15g (15ml)	200g (200ml)
Milk/Soymilk	5g (5ml)	15g (15ml)	210g (200ml)
Butter	4g	12g	180g

General Rules of Measuring Using Spoons

Guide to Nutrition (contd')

Measurements rules of the booklet

To avoid overconsumption of salt, sugar and oil, we have set standards for measuring them not to exceed the WHO's Recommended Daily Intake (RDI).

	WHO's Recommended Daily Intake	Healthy! Tasty! Recipes' Recommendation
For	One adult/day (2,000kcal diet) 	Minimum 3 dishes 
Salt 	Less than 5g 	Maximum 1 teaspoon 
Sugar 	Less than 25g-50g 	Maximum 1 tablespoon 
Oil 	Less than 5-6 teaspoons 	Maximum 1 teaspoon 

WHO's Standards and Healthy! Tasty! Recipe's Standards

Recipes (60 in total)

Categories	Crops mainly used
Leafy and Stem Vegetables (x 17)	Swiss chard, amaranthus leaves (green/red), kale, broccoli, *pak choi*, Chinese cabbage, lettuce, beets green, spinach
Fruit Vegetables (x 9)	Tomato, brinjal, capsicum, bitter gourd, lady finger, French bean, green chilies, zucchini, bottle gourd
Root Vegetables (x 14)	Beetroot, turnip, radish, colocasia, yam
Soya bean (soya products) (x 5)	Soya beans (*paneer*, milk, flour, nuggets, soya bar)
Soya bean (soya dishes) (x 3)	Soya beans (*okara* cake, cake, veggie scramble)
Soya bean (green soya dishes) (x 3)	Green soya beans
Immunity boosting recipes (x 9)	Vitamin-c rich veggies/fruits:

Application of ideas from the field

Amaranthus rolls
Block Project Manager of Una

Lettuce wrap
Extension officer, BPMU Sarkaghat

Beet green *saag*
Farmer of BPMU Bilaspur

Beetroot nuggets
Farmer of BPMU Nurpur

Beetroot *kheer*
Agriculture development officer, BPMU Bilaspur

Soya chunk salad
Agriculture expert of PMU

Rhododendron *chutney*
Agriculture Development Officer of DoA, Hamirpur

Recipes

Introduction

Ingredients (incl. number of servings)

Methods of preparation (incl. preparation time)

LEAFY AND STEM VEGETABLES

PAK CHOI PAKORU

"*Pok choi pakoru* is a tasty shallow fried snack prepared with *pak choi* and gram flour. It provides the nutrition of *pak choi* and gram flour as vitamins and protein sources. It can be enjoyed as an evening-teatime-snack with sauce or chutney".

INGREDIENTS:

- *Pak choi* (chopped) : 1.5 cups
- Cabbage (chopped) : 1 cup
- Gram flour : 2 cups (200g-300g)
- Onion (chopped) : 1 tbsp
- Green chilies : 1 tsp
- Ginger (paste) : 1 tsp
- Mustard oil : 2 tsp
- Salt : 1/2 tsp
- Water : 1.2 cups (approx. 300ml)

(6 servings)

Nutritional Information per Serving:

	Amount	%DV
Calories	129.1kcal	6.5
Protein	7.3g	14.7
Fat	2.9g	3.8
Carbohydrates	19.1g	6.9
Dietary fibre	3.7g	13.3
Vitamin A	203.7mcg	22.6
Vitamin C	10.7mg	11.9
Vitamin K	21.0mcg	17.5
Folate	144.0mcg	36.0

Nutritional info

- **Nutrient content**
- **%Daily value per serving**

METHODS OF PREPARATION:

1. Mix the *pak choi*, cabbage, onion, green chilies, ginger and salt with the gram flour, then add water till the desired semi-liquid consistency of the paste is acquired.
2. Mix the paste thoroughly so that no gram flour clots remain in the paste.
3. On a griddle greased with oil, add the paste with the help of the ladle like small pan cakes and shallow fry from both the sides till light brown colour.
4. Serve warm with sauce or chutney.

(Preparation time: 30 min.)

Let's eat!

Recipes

Pak choi Pakoru

Nutritional Information per Serving:

	Amount	%DV
Calories	129.1kcal	6.5
Protein	7.3g	14.7
Fat	2.9g	3.8
Carbohydrates	19.1g	6.9
Dietary fibre	3.7g	13.3
Vitamin A	203.7mcg	22.6
Vitamin C	10.7mg	11.9
Vitamin K	21.0mcg	17.5
Folate	144.0mcg	36.0

Calories & macronutrients

Micronutrients with %DV higher than 10.0 (higher than moderate)

Attachments (Pictorial Instructions)

Preparation of the technical recipes:

- Beetroot powder
- Use of beets powder
- Beets swirl cookies
- Soya *paneer*
- Cream cheese

ATTACHMENT

Let's Learn Beetroot Swirl Cookies Preparation Visually!

1. Mix honey and melted butter in a bowl. Add milk, wheat flour, and ½ tsp of baking powder into the bowl and make a dough of it. In another bowl, prepare another dough by repeating the same process without adding beetroot powder. Refrigerate both the doughs for 1-2 hours.

2. Roll both the dough in a 1-2 cm thick and 9-12 inch rectangular sheet.

3. Flip the plain dough over the colored dough.

4. Make a roll of it and refrigerate for 1 hour.

5. Cut the roll into 6 mm thick cookies.

6. Take a kadai/ Skillet. Cover and preheat it for 10 minutes on low flame.

7. While preheating, take a steel plate and grease it properly with ghee. Dust the greased plate with flour and place cookies on the plate.

8. Now, carefully place the plate with cookies in the preheated *kadai* and bake for 10-15 minutes on a low flame.

9. Cool and serve. Store the cookies in an airtight container.

ATTACHMENT

Let's Learn Soya *Paneer* Preparation Visually!

8. Squeeze out liquid part (soya milk) from the solid fibrous part using tongs, etc.

9. Warm the soya milk on low flame till small bubbles appear.

10. Add a cup of vinegar and allow it for curdling and keep it warm on low flame till curdling occurs.

11. With the help of the muslin cloth, separate the liquid from the coagulated/curdled part.

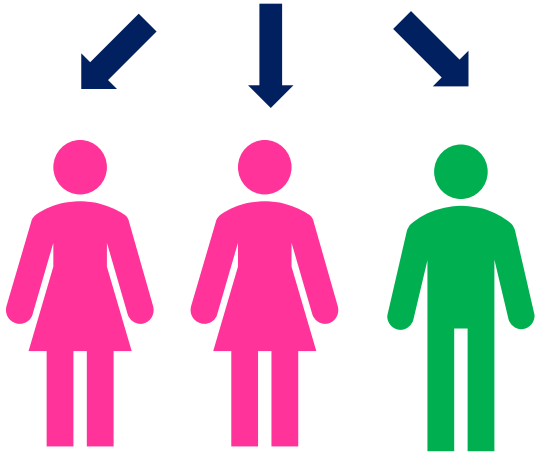
12. Tie all the edges of the muslin cloth from the top to prevent the curd from spilling.

13. Press it with a heavy object in a container with the holes for the escape of the excess water for 20 minutes.

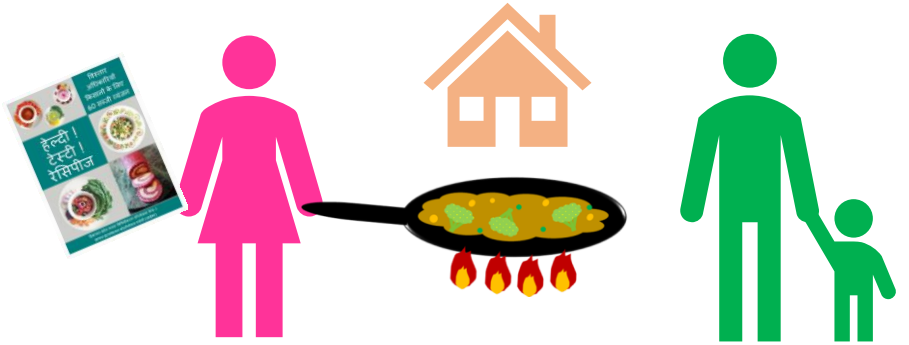
Here you are!

Eventually, the booklet is expected to help…

Extension officers



Farmers



Self-consumption of vegetables to contribute to **nutrition improvement**

Value addition to veggies through nutritional info

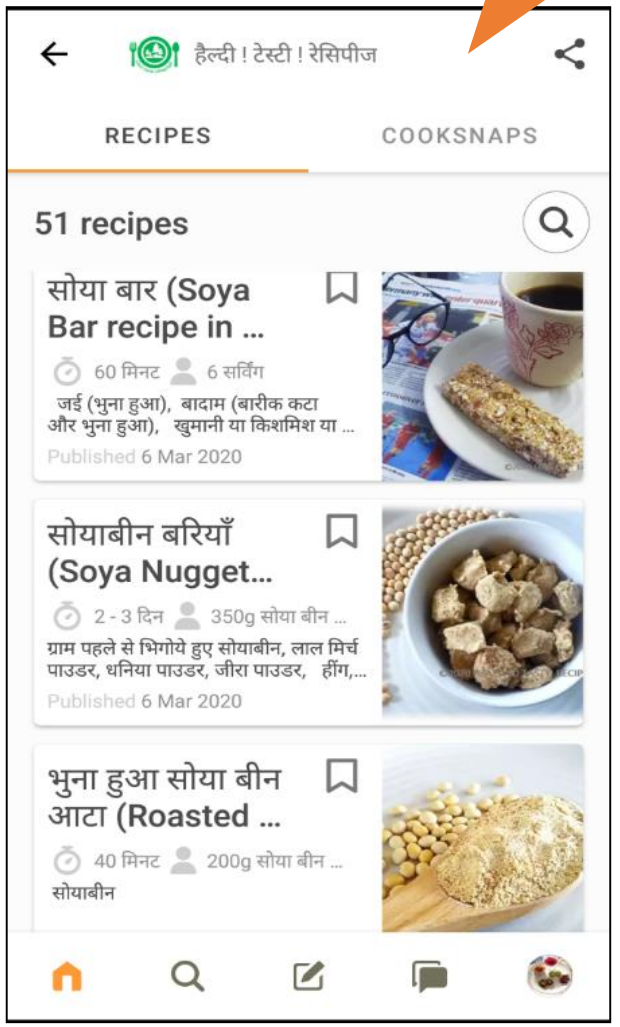
Introduction of or increases in target crops by farmers

Discussion of adding new crops to **CDPs**

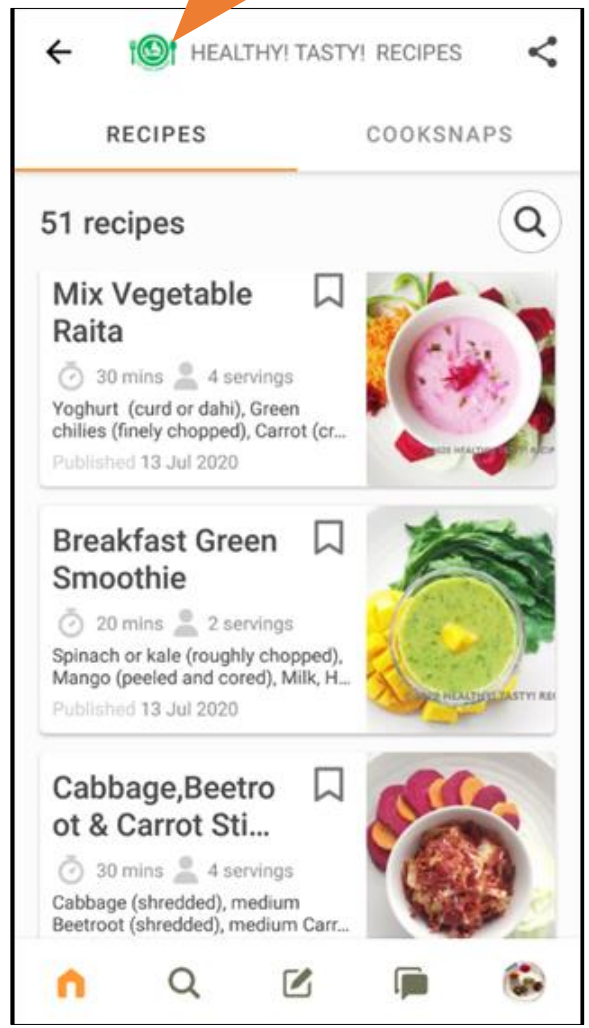
In addition to the booklet…

- We have created **official pages of “Healthy! Tasty! Recipes” on “Cookpad India” app**, a recipe sharing platform.
- Available in both **English** and **Hindi**, for the convenience of the farmers, extension officers and other users.

Hindi ver.



English ver.



To register for the cookpad…

Page links

English version:
https://cookpad.com/in/users/19505633

Hindi version:
https://cookpad.com/in/users/20736692

Cookpad ID

English version: @cook_19505633

Hindi version:@cook_20736692

Let's Taste Himachal!!

cookpad

अरबी की सब्जी (Arbi ki sabzi recipe in Hindi)

हैल्दी ! टेस्टी ! रेसिपीज

हिमाचल प्रदेश, भारत

इस रेसिपी में, अरबी को उबाला जाता है, और मसालेदार दही की ग्रेवी में पकाया जाता है। इसे चावल या चपाती के साथ परोसा जा सकता है। ...

more

Immunity Boosting Salad

HEALTHY! TASTY! RECIPES

Himachal Pradesh, India

Immunity Boosting Recipe: Immunity boosting vegetarian salad is loaded with veggies like beetroot, kale, carrot etc. which are found to be good source of immunity boosting nutrients like vitamin C, iron, folate, selenium, zinc etc. It is healthy, quick to make and can be enjoyed as healthy evening snack.

Amount of Nutrients and Percent Daily Value per Serving:

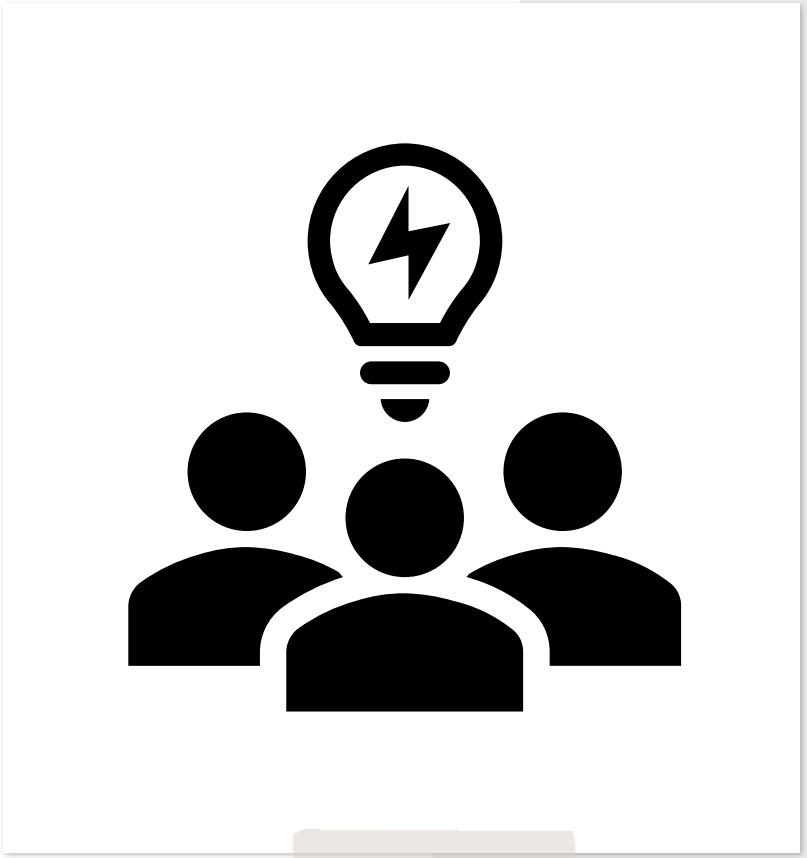
Thank you!

We strongly hope that the booklet will be used in the agriculture sector, by DOA and ATMA in the future, for its effective extension works in relation with the area of food and nutrition.

Your feedback is most welcome!

- Were the contents clear? (especially Guide to nutrition?)
- Do you think the booklet can help crop diversification?
- Do you think you can explain the contents to farmers?
- If not, which part are you not confident at?
- Do you have any comment to improve the contents?

Thank you!

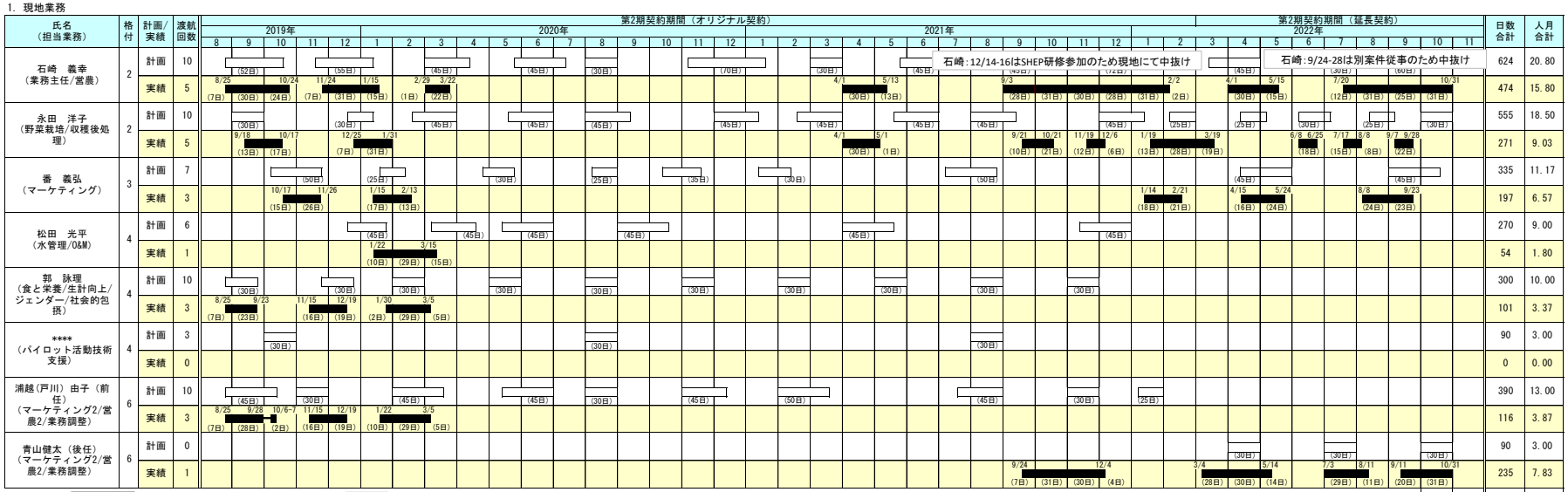


契約件名：インド国ヒマーチャル・プラデシュ州作物多様化推進プロジェクトフェーズ2（第2期）

監督職員確認印：　渡辺　淳　印

1. 現地業務

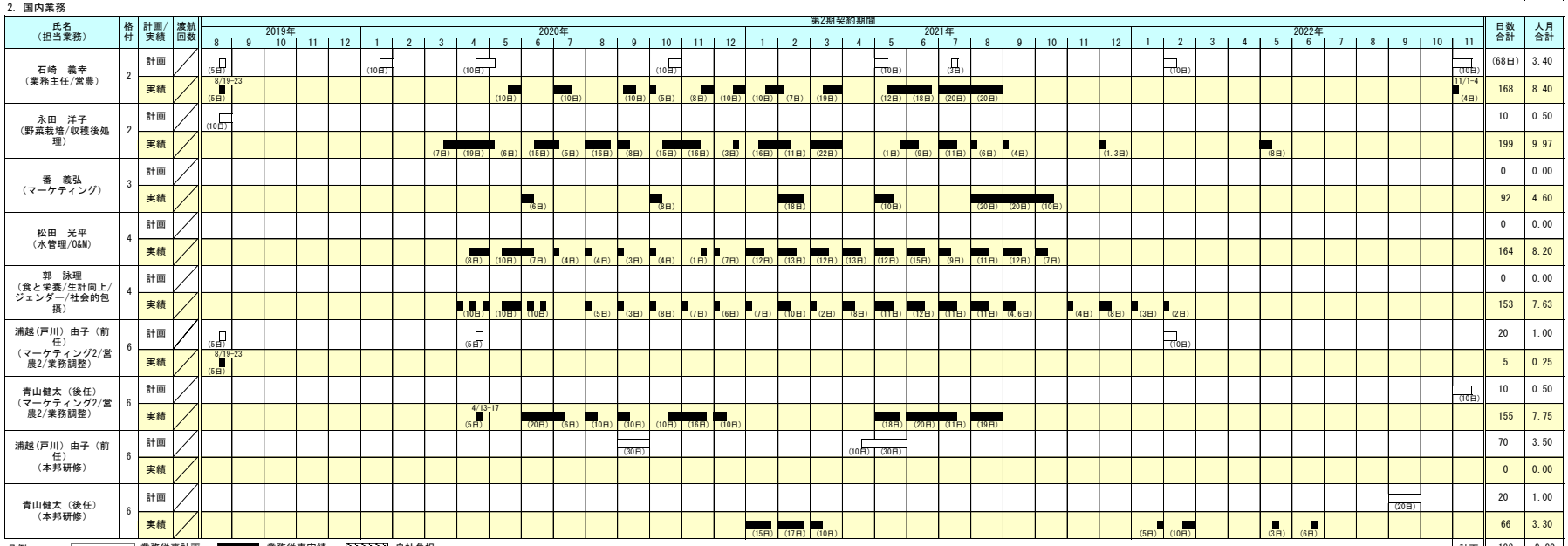
氏名（担当業務）	格付	計画/実績	渡航回数	日数合計	人月合計
石崎　義幸（業務主任/営農）	2	計画	10	624	20.80
		実績	5	474	15.80
永田　洋子（野菜栽培/収穫後処理）	2	計画	10	555	18.50
		実績	5	271	9.03
番　義弘（マーケティング）	3	計画	7	335	11.17
		実績	3	197	6.57
松田　光平（水管理/O&M）	4	計画	6	270	9.00
		実績	1	54	1.80
郭　詠理（食と栄養/生計向上/ジェンダー/社会的包摂）	4	計画	10	300	10.00
		実績	3	101	3.37
****（パイロット活動技術支援）	4	計画	3	90	3.00
		実績	0	0	0.00
浦越(戸川）由子（前任）（マーケティング2/営農2/業務調整）	6	計画	10	390	13.00
		実績	3	116	3.87
青山健太（後任）（マーケティング2/営農2/業務調整）	6	計画	0	90	3.00
		実績	1	235	7.83
			小計 計画	2654	88.47
			小計 実績	1448	48.27



凡例：　業務従事計画　業務従事実績　自社負担

2. 国内業務

氏名（担当業務）	格付	計画/実績	渡航回数	日数合計	人月合計
石崎　義幸（業務主任/営農）	2	計画		(68日)	3.40
		実績		168	8.40
永田　洋子（野菜栽培/収穫後処理）	2	計画		10	0.50
		実績		199	9.97
番　義弘（マーケティング）	3	計画		0	0.00
		実績		92	4.60
松田　光平（水管理/O&M）	4	計画		0	0.00
		実績		164	8.20
郭　詠理（食と栄養/生計向上/ジェンダー/社会的包摂）	4	計画		0	0.00
		実績		153	7.63
浦越(戸川）由子（前任）（マーケティング2/営農2/業務調整）	6	計画		20	1.00
		実績		5	0.25
青山健太（後任）（マーケティング2/営農2/業務調整）	6	計画		10	0.50
		実績		155	7.75
浦越(戸川）由子（前任）（本邦研修）	6	計画		70	3.50
		実績		0	0.00
青山健太（後任）（本邦研修）	6	計画		20	1.00
		実績		66	3.30
			小計 計画	198	9.90
			小計 実績	1002	50.10



凡例：　業務従事計画　業務従事実績　自社負担

合計	計画	2852	98.37
	実績	2450	98.37

報告書等	2019年 8	9	10	11	12	2020年 1	2	3	4	5	6	7	8	9	10	11	12	2021年 1	2	3	4	5	6	7	8	9	10	11	12	2022年 1	2	3	4	5	6	7	8	9	10	11
報告書	▲業務計画書			▲ワークプラン（第2期）							▲進捗報告書5号					▲進捗報告書6号					▲進捗報告書7号										▲進捗報告書8号								▲業務完了報告書
モニタリングシート						▲Ver. 6						▲Ver. 7						▲Ver. 8						▲Ver. 9						▲Ver10									

Chapter 4

Existing and Additional Duties and Responsibilities in Job Profile

Position	Existing	Additional
Agricultural Development Officers (ADOs)	1. Preparation of Agriculture Extension Officer circle-wise Agriculture Production Programme 2. Arranging and stocking all the inputs at all the sale points in the block timely and adequately. 3. To coordinate stocking od fertilizer/plant protection measures at various sale points in the block with HIMFED / Coop. Societies, HPMC, HP Agro-Industries Corporation. 4. To organize farmers training camps at village level. 5. To report shortage of seed, fertilizer etc. if any, immediately, to the SMS of DDA. 6. Intensive touring during the campaign period. 7. To ensure full utilization of irrigation potential. 8. Reporting the achievement every month to the DDA's / DAO's.	Marketing 1. To support farmers regarding preparation of production plans for market-oriented crop cultivation for maximization of their profits. 2. To share price trends of vegetables and cereals in wholesale markets of districts and other potential important markets outside the state suitable for export of farm produce from production areas. 3. To impart capacity building trainings to the farmers on group cultivation, marketing, pre & post-harvest handling, grading, packaging etc. of farm produce. Water Management and O&M 1. Awareness amongst users for troubleshooting their counter measures, technical support to users for Operation and Maintenance (O&M) after handing over irrigation schemes Food Diversification 1. To aware farmers about nutritious crops and nutritional requirement. 2. Nutrient rich recipes for healthy cooking and eating.
Agricultural Extension Officers (AEOs)	1. Arranging supply of Agricultural inputs from District Head Quarter. 2. Organize the training camps for farmers. 3. Contacting the farmers for supply of Agriculture inputs. 4. Organize field days. 5. Collection of soil samples representing Village, Panchayats and submission to District laboratory and ensure distribution of Soil Health Cards. 6. Coordination with Panchayats (PRI's)	
Sub-Divisional Soil Conservation Officers (SDSCO)	1. To be responsible for the planning / execution of soil conservation minor irrigation works in their respective jurisdiction under the over all control of Deputy Director of Agriculture 2. Undertake feasibility studies including preliminary investigations, data collection and site investigations for Irrigation and Micro Irrigation System (MIS) 3. To sensitize community for demand driven community irrigation schemes and inculcate sense of belongingness in the beneficiaries / community. 4. To form KVA/UGs for ensuring participation and smooth execution of proposed infra-structure. 5. To suggest ways and measures to prepare	1. Selection of MIS according to proposed cropping pattern and field size. 2. To conduct technical support for Operation and Maintenance (O&M) of created irrigation facilities for causes of failure and their counter measures to ensure sustainable use by the beneficiaries. 3. Capacity building training to the farmers/ users related to MIS (O&M) to ensure the sustainable use by the beneficiaries.

Position	Existing	Additional
	Barabandi schedule, calculation of water tariff, its collection, keeping of operation and maintenance record, preparing of maintenance budget for sustainability and to mitigate the damages caused due to natural calamities / ignorance. 6. Checking of quantity and quality of material installed by Service provider/ contractors. 7. Preparation of existing and proposed cropping pattern, estimating the crop water requirements, and determine the Cultivable Command Area (CCA), Crop budget, Benefit Cost Ratio (BC Ratio), that can be sustained by the created irrigation facility and MIS	
Junior Engineers (JEs)	1. Designing and execution of Soil Conservation schemes and recording of measurement of works execution of Soil Conservation estimate of const of works and preparation of original map of the land to be benefited the schemes.	