

# Methodology and Verification Protocol for DLI #4: Adoption of practices for efficient water use

## Background

DLI# 4 is the second of the two indicators to incentivize the implementation of groundwater management measures included in the WSPs. The DLI will incentivize demand side measures that reduce water consumption, including the introduction of efficient micro-irrigation systems and a shift in cropping patterns away from water-intensive crops including promotion of rain-fed horticulture and feeder separation. The disbursement will be based on the increase in area (in hectares) at Gram Panchayat (GP) Level or the increase in number of blocks (in case of feeder separation) benefiting from these measures.

## Framework for verification protocol

The verification protocol of DLI#4 comprises of 3 steps;

- I. Baseline data fixation
- II. Finalization of Template for Claiming of Incentive & list of associated documents
- III. Verification methodology

## I. Baseline Data Fixation

The broad framework for fixation of DLI#4 baseline data and indicators & sub indicators for claiming incentives for year on year increase under DLI#4 has been developed based on the Atal Bhujal Yojana Program Guidelines, Ver- 1.1 of the DoWR, Ministry of Jal Shakti and Project Appraisal Document (PAD) of the World Bank.

The baseline for DLI#4 shall be fixed for the first year i.e., 2020-21, the format for data submission by the states for base line data fixation is given in **Annexure I**. The baseline data will remain constant & will incorporate GP wise information on following sub indicators:

- a) Net surface area (in hectares) under efficient irrigation system
- b) Surface area (in hectares) under high & low water consuming crops and the difference between both
- c) Surface area (in hectares) under other water saving methods
- d) Adoption of electricity feeder separation in the block

## Data Validation / Checklist for baseline data of DLI#4

It is pertinent to mention that, the fixation of base line data is critical step under DLI#4, it is essential to take appropriate care for data consistency and hence a data validation / checklist have been prepared which should be strictly complied before submitting the data for fixation of base line. The checklist is as below:

- The surface area under different crops should be equal to the gross cropped area of the GP
- The gross irrigated area should be less than or equal to the gross cropped area of the GP
- The area under micro irrigation should always be less than the gross irrigated area
- To standardize the crop nomenclature across the states, a glossary of Hindi and English names of crops have been prepared and attached as **Annexure II**, this must be used.
- Information on the source of data is mandatory for baseline data
- All the information/data shared with NPMU should be certified by Project Director , SPMU
- Submission of baseline data as well as data for claim should be strictly as per the formats shared by NPMU

- Data under all sub-indicators is required to be submitted at GP level for claiming the incentive under DLI#4 except for electricity feeder separation where data is required at block level
- If GP-level supporting documents are not available, Project Director, SPMU may certify the copies and share with NPMU

## II. Finalization of Template for Claiming of Incentive & list of associated documents

The data for claiming the incentive incorporates GP wise information on annual incremental area taken under efficient water utilization practices. The achievement of the DLI will be based on the sum of the following sub-indicators:

- Year-on-year increase in surface area (in hectares) with efficient irrigation systems:* GP wise data on increase in area covered under the following water-efficient irrigation techniques in the Participating States will be used to determine incentive under this sub-indicator :
  - Micro Irrigation (Sprinkler)
  - Micro Irrigation (Drip)
  - Irrigation through pipelines
- Year-on-year increase in surface area (in hectares) with a shift in cropping patterns:* GP wise acreage of various crops will be used to determine the annual increase in surface area under low water consuming crops. The year-on-year increase in the surface area (in hectares) with a shift in cropping pattern shall be taken into account based on:
  - Surface area (in hectares) under high water-consuming crops
  - Surface area (in hectares) under Low water-consuming crops
  - Difference in the area under high and low water-consuming crops
- Year-on-year increase in surface area (in hectares) under other water-saving methods:* GP wise data on annual increase in surface area covered under other water-saving agriculture methods as given below shall be taken into account for determination of incentive under this sub-indicator:
  - Surface area under Direct seeding of rice(DSR)
  - Surface area covered with Laser Land levelling
  - Agriculture area utilizing mulching technique
  - Area cultivated through poly house technique
  - Agriculture area where hydrogel is used
  - Other water-saving agriculture practices

A brief note on the above mentioned agricultural water efficient practices are given in **Annexure III**

- Year-on-year increase in the number of blocks where electricity feeder separation has been adopted:* Electricity line distribution data collected at the block level will be used to determine the annual incremental number of blocks adopting feeder separation for agriculture. The achievement will be evaluated based on
  - Annual incremental number of blocks adopting feeder Separation that have gone functional

After due consideration of the state wise feedback, a standard template has been devised for claiming incentives under DLI#4 based on year-by-year incremental data under various sub-indicators. The template for submission of data for the claim is provided in **Annexure IV**.

### **List of documents to be submitted with claim format**

- Document on area taken under micro irrigation/other innovative water saving methods through convergence should be certified by Project Director, SPMU and submitted to NPMU
- Claim for any incremental area under innovative water saving techniques covered by self/private financing (by private company / CSR/Trust/NGO) requires to be submitted along with supporting documents certified by the Project Director, SPMU
- The Project Director, SPMU should certify the claim for incremental area in the declaration form enclosed.
- The certification/signature of Project Director, SPMU shall be accepted with the assumption that all relevant documents towards incentive claim at Gram Panchayat level by different line departments/individuals/private companies/NGOs/Trusts have been duly checked and verified at SPMU level.
- SPMUs to ensure availability of all the supporting documents with the DPMUs towards incentive claim from line departments/other sources under their jurisdiction ,so that the same can be produced at the time of physical verification by QCI or other authorized person.
- Information about the source of data is mandatory in claim format

### III. Verification methodology

The verification methodology comprises two steps:

- a) Desktop assessment of claim at NPMU
- b) Physical verification of claim by QCI

#### a) Desktop assessment of claim at NPMU

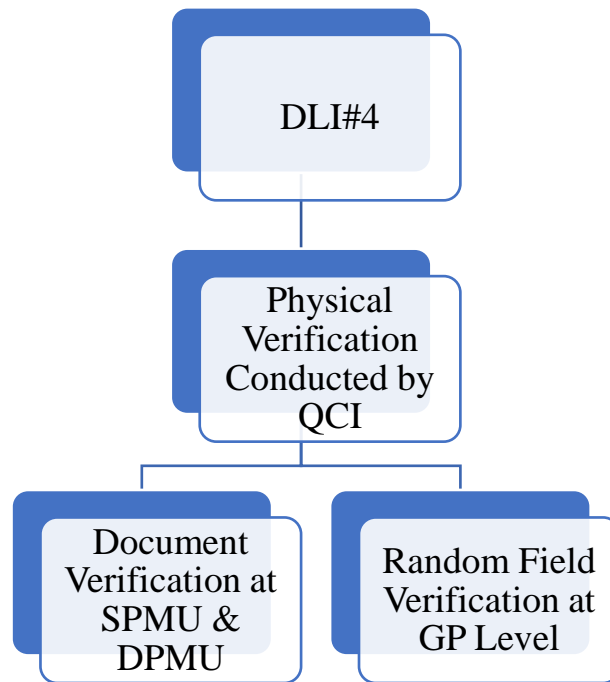
Desktop assessment of the submitted claim under DLI#4 will be done by NPMU based on the template for claim submitted by SPMU. The process to be followed is given below

- The claim of incremental area taken under micro irrigation & other water saving methods as submitted by the SPMUs in the claim format will be verified with the demand side interventions implemented through convergence and self /public financing as certified by Project Director, SPMU
- The claim for incremental area under crop shifting to low water consuming crops will be verified in comparison with baseline data.
- Claim for blocks taken under electricity feeder separation in the claim year which has gone functional will be verified with the documents from line department
- The total claim of incentive made for the State under DLI#4 in the declaration form submitted by the Project Director, SPMU, will be cross verified with the duly filled district wise claim format submitted by the State.

After assessment, the template will be shared with QCI for physical verification

#### b) Physical verification of claim by QCI

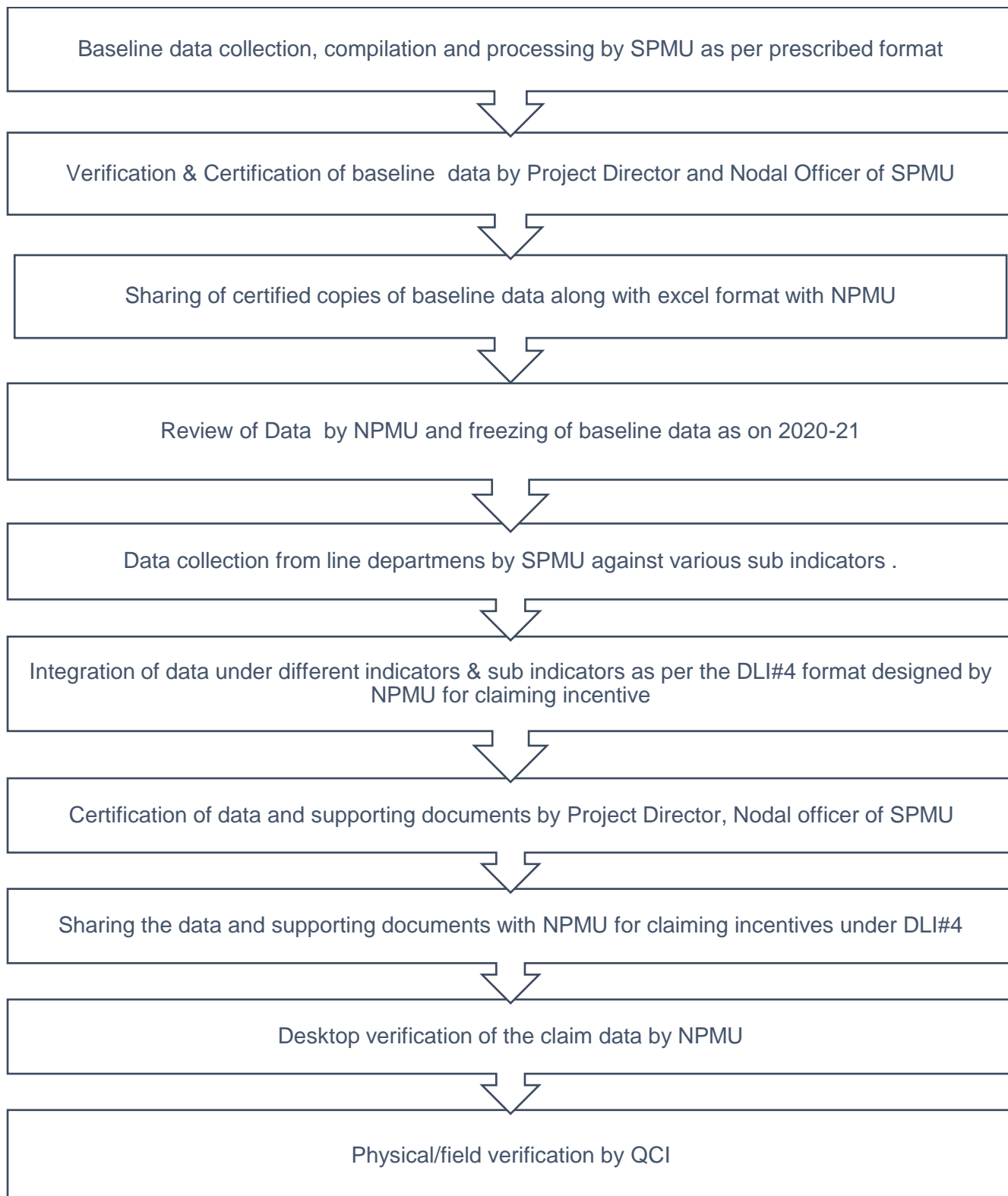
The physical verification by QCI as TPGVA shall be done in the following way -



- For Physical Verification, it will be ensured that the 20% of the sampled GPs considered for verification by QCI are randomly selected and spatially distributed across the states under Atal Bhujal Yojana
- QCI shall visit the SPMU/DPMU for the collection of the source/supporting documents pertaining to the claim made by SPMU for increased area with efficient water utilization practices adopted in the claim duration
- During the field verification, QCI shall randomly visit the sampled site to verify the following sub-parameters of DLI#4 –
  - Year-on-year increase in surface area (in hectares) with efficient irrigation systems
  - Year-on-year increase in the number of blocks where electricity feeder separation has been adopted
  - Year-on-year increase in surface area (in hectares) under other water-saving methods
- A focused group discussion (FGD) shall be conducted by the QCI team with the random selected community members near the verified sampled field in the sampled GPs
- The field verification shall be carried out with the help of Sarpanch, GP officials and DIPs

#### Process Flow

The protocol for DLI#4 verification ideally involves several steps and interlinked processes, an attempt has been made to consolidate the entire process flow in the form of a flow diagram for better understanding. The flow diagram is given below:



Annexure I

Baseline data of DLI-4																															
State:-						SUB-INDICATORS OF DLI-4																			Gross Irrigated Area (Ha)	Gross Cropped Area (Ha)					
Sr. No.	Name of District	Name of Block	Name of GPs	Total area with MI proposed under WSP	Total area proposed for shifting to low water intensive crops under WSP ( Ha)	Net Surface Area (in Ha) with Efficient Irrigation System during the crop calendar Year 2020-21				Area under different crops (in Ha) as per crop calendar year 2020-21							Surface area under other significant water saving method ( Ha) used for agriculture in 2020-21							Does the Block have Electricity Feeder Separation (Yes/ No) (2020-2021)							
						Surface Area under Sprinkler (Potable, Mini, Micro, Permanent, Rain-Guns etc) Irrigation (Ha)	Area under Drip Irrigation (Ha)	Irrigation through Pipelines (Ha)	Total	Surface Area (Ha) Under High Water Crops				Surface Area (Ha) Under Low Water Crops			Difference in area under High and low water crops (+/-)	DSR Paddy	Laser Land Levelling	Poly houses	Mulching	Hydrogel in crops	Other (specify)				Total				
										Crop 1	Crop 2	Crop 3	Total	Crop 1	Crop 2	Crop 3									Crop 4	Total					
						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Block Wise Total						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Block Wise Total						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Source of data															Certified by																
															(Project Director, SPMU)																

## Annexure II

S.N.	Crop/ Group of Crops	English Name	Botanical Name	Hindi Name
1	<b>Cereals</b>			
		Pearl millet	Pennisetum Typhoides	Bajra
		Barley	Hordeum vulgare	Jau
		Barnyard millet	Echinochloa frumentacea	Sawan
		Sorghum	Sorghum bicolor	Jowar
		Common Millet	Panicum milliaceum	Cheena
		Little Millet	Penicum milliare	Kutki
		Foxtail Millet	Setarisiaitalica	Kangani
		Kodo Millet	Paspalum scrobiculatum	Kodo
		Maize or Indian corn	Zea mays	Makka
		Oat	Avena sativa	Jaie
		Finger millet	Eleusine coracana	Mundua, Ragi
		Paddy (Rice)	Oryza sativa	Dhan (Chawal)
		Wheat	Triticum acstivum	Gehun
2	<b>Pulses and Beans</b>			
		Black gram	Vigna mungo	Urad
		Chickpea (Bengal gram)	Cicer arietinum	Chana
		Chicking vetch	Lathyrus sativus	Khesari
		Cluster Bean	Cyamopiss tetragonoloba	Guar
		Cowpea	Vigna unguiculate	Lobia, Chawla
		Green Gram	Vigna radiata	Mung
		Horsegram	Dilichos biflorus	Kulthi
		Kidney bean	Phaseolus vulgaris	Rajma
		Moth bean	Vigna aconitifolia	Moth
		Lentil	Lens culimaris	Masur
		Peas	Pisum sativum vararvense	Matar
		Red gram (Pigion pea)	Cajanus cajan	Tur,Arhar

S.N.	Crop/ Group of Crops	English Name	Botanical Name	Hindi Name
<b>3</b>	<b>Oilseed</b>			
		Rapeseed & mustard	Brassica species	Sarso
		Groundnut	Arachis hypogea	Mungphali
		Soybean	Glucine max	Soyabean
		Linseed	Linum usitatissimum	Alsi
		Sunflower	Helianthus annuus	Surajmukhi
		Safflower	Carthamum tinctorius	Kusum
		Sesame	Sesamum indicum	Til
		Niger	Guizotica abyssinica L.	Ramtil,Jagni
		Castor	Ricinus communis	Arndi
		Coconut	Cocos nucifera	Nariyal
		Oil palm	Elaeis guineensis	Oilpalm
<b>4</b>	<b>Fibre crop</b>			
		Cotton	Gossypium sp.	Kapas
		Sunhemp	Crotalaria juncea	San
		Jute	Corchorus olitorius	Jute
<b>5</b>	<b>Sugar</b>	Sugarcane	Saccharum Officinarum	Ganna
<b>6</b>	<b>Fruits</b>			
		Apple	Malus sylvespris	Seb
		Apricot	Prunus armeniaca	Khoobani
		Cashewnut	Anaardium occidentale	Kaju
		Fig	Ficus carica	Anjeer
		Grape	Vitis vinifera	Angur
		Guava	Psidium guajava	Amrood
		Jackfruit	Artocarpur heterophyllus	Katahal
		Lemon	Citrus Lemon	Nimbu
		Lime	Citrus Urantifolia	Bara Nimbu
		Litchi	Litchi chinensis	Litchi
		Mango	Magnifera indica	Aam



S.N.	Crop/ Group of Crops	English Name	Botanical Name	Hindi Name
		Orange Mandar	Citrus reticulata	Santara, Narangi
		Papaya	Carica papaya	Papeeta
		Pear	Pyrus communis	Naspati
		Pineapple	Ananas comosus	Ananas
		Banana	Musa paradisiaca	Kela
		Pomegranate	Punica granatum	Anaar
		Sweet Orange	Citrus sincensis	Malta, Mosambi
		Sapota	Manilkara zapota	Chiku
		Ber	Ziziphus mauritiana	Ber, Bor
		Datepalm	Phoenix dactylifera	Khajur
7	<b>Vegetables</b>			
		Ash gourd	Benincasa hispida	Petha
		Beet	Beta vulgaris	Chukandar
		Bitter gourd	Momordica charantia	Karela
		Bottle gourd	Lagenaria siceraria	Lauki
		Brinjal	Lolanum melongena	Baingan
		Cabbage	Brassica oleracca var,Capitata	Band gobi
		Carrot	Daucus carota	Gajar
		Cauliflower	Brassica oleracca var Botrytis	Phul gobi
		Cowpea	Vigna unguiculate	Lobia
		Capsicum	Capsicum annum	Shimla Mirch
		Cucumber	Cucumis sativus	Kheera
		French bean	Phaseolus vulgaris	Faras bean
		Indian flat bean or sem	Dolichos lablab	Sem
		Knol Khol	Brassica oleracea var,Gongylodes	Ganth gobi
		Spinach	Spinacia oleracea	Palak
		Amaranthus	Amaranthus sp.	Chaulai
		Lady's finger, Okra	Abelmoschus esculentus	Bhindi
		Little gourd	Cuccinia cordifolia	Kundur

S.N.	Crop/ Group of Crops	English Name	Botanical Name	Hindi Name
		Musk melon	Cucumis melo	Kharbooza
		Onion	Allium cepa	Piyaz
		Pointed gourd	Trichosanthes dioica	Parwal, Potal
		Potato	Solanum tuberosum	Aaloo
		Sweet potato	Ipomoea batatas	Sakarkand
		Pumpkin	Curcubita moschata	Sitaphal, Lal Kaddu, Kumbhra
		Beetroot	Beta vulgaris	Chukandar
		Radish	Raphanus satius	Muli
		Round gourd of India	Citrullus vulgaris var, fistulosus	Tinda
		Snap melon	Cucumis melo var, momordica	Phoot
		Snake gourd	Trichosanthes anguina	Chachinda
		Tomato	Lycopersicon esculentum	Tamatar
		Turnip	Brassica rapa	Shalgam
		Water melon	Citrullus vulgaris	Tarbooz
		Drumstick	Foeniculum vulgare	Sahjan, Moringa
8	<b>Drugs and Narcotics</b>			
		Betal Leave	Piper betle	Paan
		Betalnut(arecanut)	Areca catechu	Supari
		Indian hemp	Cannabis sativa	Bhang
		Opium	Papaver somniferum	Afeem
		Tobacco	Nicotiana tabacum and Nicotiana rustica	Tambaku
9	<b>Condiments and Spices</b>			
		Black pepper	Piper nigrum	Kalimirch
		Cardamom, Cardamom	Elettaria cardamomum	Chhoti Ilaichi
		Chilies	Capsicum annum	Mirch
		Coriander	Coriandrum sativum	Dhania
		Cumin	Cuminum cyminum	Jeera

<b>S.N.</b>	<b>Crop/ Group of Crops</b>	<b>English Name</b>	<b>Botanical Name</b>	<b>Hindi Name</b>
		Ajwain	Trachyspermum ammi L.	Ajwain
		Fennel	Foeniculum vulgare	Sauf
		Ginger	Zingiber officinale	Adrak
		Turmeric	Curcuma longa	Haldi
		Fenugreek	Trigonella foenum-graecum	Methi
		Garlic	Allium sativum	Lahsun

## Annexure III

### Brief note on water-saving methods mentioned under DLI#4 baseline & claim format

**Direct Seeding Of Rice (DSR)-** DSR refers to the process of establishing a rice crop from seeds sown in the field rather than by transplanting seedlings from the nursery. Direct seeding can be done by sowing pre-germinated seed into puddled soil (wet seeding) or standing water (water seeding) or a prepared seedbed (dry seeding).

Under the conventional rice establishment system, the nursery is raised from seed; 4-5 week old seedlings are uprooted from the nursery and then transplanted in the main field. Under DSR, the seed is directly sown in the main field.



**Laser Land Levelling:** Laser levelling is a process of smoothing the land surface ( $\pm 2$  cm) from its average elevation using laser-equipped drag buckets. This practice uses large horsepower tractors and soil movers that are equipped with global positioning systems (GPS) and/or laser-guided instrumentation so that the soil can be moved either by cutting or filling to create the desired slope/level. This technique is well known for achieving higher levels of accuracy in land levelling and offers great potential for water savings and higher grain yields.

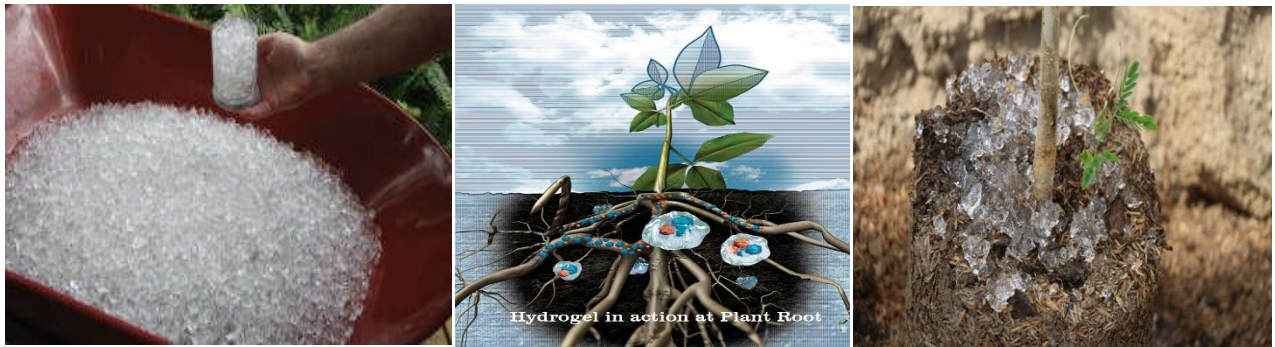


**Hydrogel:** A hydrogel is a three-dimensional (3D) network of hydrophilic polymers that can swell in water and hold a large amount of water while maintaining the structure due to chemical or physical cross-linking of individual polymer chains.

Natural hydrogels are those gels, whose polymers have natural origins such as gelatin and collagen. Synthetic hydrogels, on the other hand, are synthesized using synthetic polymers such as polyamides and polyethylene glycol.

Hydrogel works as water reservoirs around the root zones of the plant. In presence of water, it expands to around 200-800 times the original volume. When the polymers come in contact

with water, the water penetrates the hydrogel system by osmosis. When the surrounding around the root zone begins to dry up, the hydrogel gradually dispenses up to 95% of its stored water to plant absorption.



**Plastic Mulching:** Mulching is the process or practice of covering the soil/ground to make more favourable conditions for plant growth, development, and efficient crop production. Mulch is a technical term that means 'covering of soil'.

Plastic mulching is a thin film of polyethylene used to cover up the soil. Polyethylene is preferred because of its greater permeability to longwave radiation which can increase the temperature around plants during the night times. Mulch film comes in various colours, size, and thicknesses.



**Polyhouse:** Polyhouse or a greenhouse is a house or a structure made of translucent material like glass or polyethylene where the plants grow and develop under controlled climatic conditions. In India, Polyhouse farming is the most popular greenhouse technology for its low cost of construction. It creates a microclimate surrounding the crops that help in maximum growth regarding production and quality



**Annexure IV**

Data for claiming incentive under DLI-4 for the year 2021-22																												
SUB-INDICATORS OF DLI-4																												
State:-				Micro irrigation				Area under different crops (in Ha) as per crop calendar year 2021-22								Increase in Surface area under other water saving method ( Ha) used for agriculture in 2021-22						Blocks brought under feeder separation in 2021-22	Total claimed area ( Ha) for incentive during 2021-22					
Sr. No.	Name of District	Name of Block	Name of GPs	Increase in Surface Area (in Ha) with Efficient Irrigation System during the crop calendar Year 2021-22				Surface Area (Ha) Under High Water Crops during the crop calendar Year 2021-22			Surface Area (Ha) Under Low Water Crops during the crop calendar Year 2021-22				Difference in area under High and low water crops (+/-)*	Decrease in difference between high and low water crops w.r.t Baseline data*	Increase in Surface area under other water saving method ( Ha) used for agriculture in 2021-22											
				Surface Area under Sprinkler (Potable, Mini, Micro, Semi Permanent, Rain-Guns)	Area under Drip Irrigation (Ha)	Irrigation through Pipelines (Ha)	Total	Crop 1	Crop 2	Total	Crop 1	Crop 2	Crop 3	Total			DSR	Laser Land Levelling	Poly houses	Mulching	Hydrogel	Other(Specify)	Total					
				1.00	1.00	1.00	3.00																					
<b>Block Wise Total</b>				1.00	1.00	1.00	3.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00			
<b>Block Wise Total</b>				0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00			
Source of data(Name of the departments from which data has been Crop Calendar year : June, 21 to May, 22																												
*To be filled at NPMU																												
																					Certified by							
																					(Project Director, SPMU)							

### **Declaration for Incentive claim under DLI#4**

This is to certify that under DLI#4 : Adoption of practices for efficient water use, the template for claiming incentive based on incremental area (in hectares) taken under different innovative water efficient practices ( mentioned as Sub-Indicators) from October,2021 to March,2022, has been prepared after verification of the work/activity carried out by

- a) The line departments at Gram Panchayet Level through convergence of ongoing /new schemes and
- b) Through self/private financing(CSR/NGO/TRUST)

The total claim in the duration October,2021 to March,2022 for the State of ----- is for ----- ha, out of which increase in area under water efficient practices through convergence of schemes is ----- and increase in area through self/private financing is----- ha.

The claim template for DLI#4 has been prepared under my supervision and the data/information furnished in the template for increase in area under adoption of practices for efficient water use , is true to the best of my knowledge.

Project Director  
SPMU, Atal Bhujal Yojana