



**EMPOWERING RURAL AND TRIBAL MAHILA KISAN OF DISTRICT DAHOD
THROUGH SUSTAINABLE AGRICULTURE LIVELIHOOD INTERVENTIONS
UNDER MAHILA KISAN SASHAKTIKARAN PARIYOJANA (MKSP)**

TECHNICAL PROTOCOL OF AGRICULTURAL PRACTICES FOR KHARIF & RABI CROPS

UNDER MKSP PROJECT



N M SADGURU WATER AND DEVELOPMENT FOUNDATION

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TECHNICAL PROTOCOL UNDER MKSP
 Name of the PIA: N M SADGURU WATER AND
 DEVELOPMENT FOUNDATION, DAHOD
 Districts: DAHOD



Mention Agro-climate, soil condition, Cropping pattern, major crops of the Intervened area			
Agro Climatic Zones	Sub tropically rainfall 800-1200mm		
Major Crops	Kharif - Maize,Paddy ,, Tuar (pegon pea), Soybean, , Rabi- Wheat, Gram,Summer -Green gram,urd		
Major Agricultural Season	Kharif,rabi and Zaid		
Pattern of Agriculture	Maize,Paddy ,, Tuar (pegon pea), Soybean,- Wheat, Gram- green gram ,urd		
Major Agricultural Activities	Practices	Training module developed (write yes/ No)	
	(Please mention the name of specific practice/method/substance/equipment used)		
1	Pre Cultivation		
	Crop selection	selection of crop will be done on the basis of interest of farmers and avilebility of inputes	Yes
	Variety (resistant variety / Improved variety etc)	Improved varieties considring yeild , qualality ,Duration ,Toleranace /resistance against insect ,pest and desieses	Yes
	Source of Seed (own /purchased etc)	Certified seed will be purchased	Yes
	Seed selection	Certified seed will be procured	Yes
	Seed rate	As per scientific recommendation	Yes
	Seed Treatment	As per scientific recommendation	Yes
2	Cultivation		
	Spacing	As per approved package and practices	Yes
	sowing/ Transplanting	As per approved package and practices	Yes
	Intercultural operations (weeding, thinning, etc)	As per approved package and practices	Yes
3	Water conservation and water management		
	Methods of water conservation	Through water harvesting structures, moisture conservation initiatives (thru mulching), promoting low water intensive crops like millets, pulses and oilseeds that can provide food security and better returns to the farmer	Yes
	Methods of irrigation	Irrigation will be applied according to recomandation along with obeservation of critical stages	Yes

	Plan of irrigation (irrigation at critical periods etc)	observation during monitoring	Yes
4	Soil fertility Mgmt. /Soil health enrichment and crop nutrient management		
	Biofertilizer /Organic Manure/ Green manure crops etc	Promotion of organic liquid manure like Amrit pani and fertilizers like composed khad which has shown very encouraging responses from farmers will be propagated extensively. This has substantially reduced production cost and enhanced productivity.	Yes
	Methods of application/Practices	Amrit pani will be use for spiring purpose while other will be as basel dose in soil during land prepration	Yes
	Duration/ Scheduling of application	Before swoing of each and every crop	Yes
	Micro nutrient management	will be sprayed as and when required	Yes
	Methods of enhancement of soil biomass	after evaluation critical benefits of Biomass irrespective of crops those will be allowed	Yes
5	Insect/Pest/ Management		
	Insect/ Pest control methods/ practices (E.G. If NPM, please specify particular method of control under NPM)	Practices of IPM and INM will be followed in each and every crop	Yes
	Insect/ Pest control substances(biopesticide/ others etc)	we will apply all the preventive measures but if occurance will be observed in any case inseticide will be applied as per recomandation	Yes
6	Disease Management		
	Disease control methods/ Practices	Practices of IPM and INM will be followed in each and every crop	Yes
	Disease control substance (bio funbgicide/others)	we will apply all the preventive measures but if occurance will be observed in any case fungicide will be applied as per recomandation	Yes
7	Harvesting will be done after observing maturity of vrop ,Evalutaing after maturity of Crop through maturity indices		
	Methods of harvesting	harvesting will be done through improved impliments	Yes
8	Practices for improving Agro ecological services (bringing tree component / Bio diversity etc) Motivation regarding transplantation of fruit and timber wood plantation		
9	If the PIA have any post harvest technology regarding storage of food grains, Seeds, value addition, please specify		

N. M. Sadguru water and Development Foundation, Gujarat

TECHNICAL PROTOCOL UNDER MKSP

Name of the PIA: NM Sadguru water and development foundation

Districts: Dahod

Mention Agro-climate, soil condition, Cropping pattern, major crops of the Intervened area		
Agro Climatic Zones	Sub tropical	
Major Crops	wheat	
Major Agricultural Season	Rabi	
Pattern of Agriculture		
Major Agricultural Activities	Practices (Please mention the name of specific practice/method/substance/equipment used)	Training module developed (write yes/ No)
1	Pre Cultivation	
	Crop selection	selection of crop will be done on the basis of interest of farmers and availability of inputs and resources
	Variety (resistant variety / Improved variety etc)	HI 1544 ,HI 1418,GW 496and Lok-1,GW 322,273
	Source of Seed (own /purchased etc)	Own seed and Certified seed will be used
	Seed selection	Improved varieties considering yield ,quality ,Duration ,Tolerance /resistance against insect ,pest and diseases
	Seed rate	40-50 Kg per acre
	Seed Treatment	<ul style="list-style-type: none"> • Seeds are usually treated with Bavistin or Vitavax to control seed borne fungal diseases including smut. <p><u>Procedure for Seed Treatment is as follows:</u></p> <ul style="list-style-type: none"> • Grade out bold seeds separately from lots of improved seed. • Take 10 liter of hot water (60 degree Celsius) in an earthen pot. • Dip 5 Kg of improved graded seeds in it.
		Yes

		<ul style="list-style-type: none"> Remove the seeds which float on the top of water. Mix 2 kg well decomposed compost, 3 liter cow urine and 2 kg of jaggery. After mixing it properly, keep the mixed material as such for 6-8 hour. After this, filter it so that solid materials along with seeds and liquids get separated. After that, mix 10 gm of fungicide properly and keep in shade for 10-12 hrs. Then wheat gets germinated. The germinated seed is used for sowing in the tilled field. 	
2	Cultivation		
	Spacing	Depth of Sowing Seed should be placed 5-6 cm deep below the soil where sufficient soil moisture is available to enable germination. Crop geometry 25-30cm Row to Row distance	YES
	sowing/ Transplanting	The best method of sowing is with a seed drill or dropping seed with a Chonga attached to a deshi plough. Dropping seeds in open furrows behind a deshi plough and broadcasting are found to be inferior to line sowing with seed drill.	
	Intercultural operations (weeding, thinning, etc)	<ul style="list-style-type: none"> After the first, second & third irrigations, hoeing and weeding should be done using conoweeder to loosen the soil and to make the wheat field free from weed. The loosening of soil results in better aeration for the root zone and increases the root length by letting them take more moisture & nutrient from the soil. 	
3 Water conservation and water management			
	Methods of water conservation	According to the slope appropriate channel will be prepared for irrigation	
	Methods of irrigation	Light irrigation	
	Plan of irrigation (irrigation at critical periods etc)	<u>Irrigation scheduling in Wheat:</u> <ul style="list-style-type: none"> First Irrigation 20-25 days after sowing (Crown root-initiation 	

		<p>stage).</p> <ul style="list-style-type: none"> • Second Irrigation 40-45 days after sowing (tillering stage) • Third Irrigation 70-75 days after sowing (late jointing stage) • Fourth Irrigation 90-95 days after sowing (flowering stage) • Fifth Irrigation after 110-115 days of sowing (dough stage) 	
4	Soil fertility Mgmt. /Soil health enrichment and crop nutrient management		
	Biofertilizer /Organic Manure/ Green manure crops etc		
	Methods of application/Practices	Irrigation will be applied according to recommendation along with observation of critical stages	
	Duration/ Scheduling of application	<ul style="list-style-type: none"> • Give 3 tons of farm yard manure + 4 kg Azotobacter + 4 kg P.S.B., per acre • Give 2 sacks of urea per acre, in 3 equal portions. First portion: At the time of sowing, 30 kg Second portion: 30 days after the sowing, 30 kg • Third portion: 65 days after the sowing, the rest • At the time of sowing, give 125 kg Single Super Phosphate + 35 kg Murate of Potash. • When the grains are tender, spray 0.5% zinc sulphate + 0.25% Borax, twice, with a gap of 15 days 	
	Micro nutrient management	Use Primary Macro Nutrients (N, P, K), Secondary Macro Nutrients (Ca, Mg & S) and all Micro Nutrients as required by the plants. Use Bio and Organic Fertilizers as major source of 'Carbon'	
	Methods of enhancement of soil biomass	after evaluation critical benefits of Biomass irrespective of crops those will be allowed	
5	Insect/Pest/ Management		
	Insect/ Pest control methods/ practices (E.G. If NPM, please specify particular method of	Insect/ Pest control methods/ practices	<ul style="list-style-type: none"> • Use of amrit pani in 1% (1:100 ratio (10 ml liquid in one lt of

	control under NPM)	<p>water)) and is finely and thoroughly be sprayed during cool hours of the day after 15 days of germination or transplanting as prevention of any insect and pest attack.</p> <ul style="list-style-type: none"> • Use of IPM Practices: Go for Cultural , Mechanical, Chemical (natural inputs only) and biological control measures • Cultural control: Grow marigold, ladies finger etc. as trap crops, on border of crop field • Mechanical control: Use pheromone trap, yellow plate, bird perches, etc. • Use natural inputs like cow urine, neem based bio-pesticides, etc. • Biological control: Use artificial shelters in the form of wooden caskets/boxes/flowerpots etc. to favor beneficial insects (to live and reproduce) who are the natural enemies for pest 	
	Insect/ Pest control substances(biopesticide/ others etc)	we will apply all the preventive measures but if occurrence will be observed in any case insecticide will be applied as per recommendation	
6	Disease Management		
	Disease control methods/ Practices	Practices of IPM and INM will be followed in each and every crop	
	Disease control substance (bio fungicide/others)	<p>Disease control methods/ practices</p> <ul style="list-style-type: none"> • Plant nutrient management: Give balanced nutrition to plants; promote foliar application for better nutrient absorption. • Environmental manipulation: Avoid water stress, maintain soil pH by need based use of lime/ammonium sulphate, timely remove unwanted shrubs, etc. • Seed treatment-Carry on seed treatment using bio fungicide 	
7	Harvesting		

	Methods of harvesting	Generally wheat crop is harvested in the month of march- April and extended up to may-June when the grains contain about 10 % moisture and become hard to crush between teeth and during crushing give a clear sound and it turns golden yellow and is completely dry and straw becomes dry and brittle	
8	Practices for improving Agro ecological services (bringing tree component / Bio diversity etc)		
	Motivation regarding transplantation of fruit and timber wood plantation		
9	If the PIA have any post harvest technology regarding storage of food grains, Seeds, value addition, please specify		
	<ul style="list-style-type: none"> • It is noticed that there is marked deterioration in weight, test, nutrients or nutritive value and germination of wheat grain when they are stored. Thus the grains should be thoroughly dried after harvesting and before storage and the storage pits; bins or godowns should be moisture free and should be fumigated to keep away the pests including rats 		

TECHNICAL PROTOCOL UNDER MKSP

Name of the PIA:NM Sadguru water and development foundation

Districts: Dahod

Mention Agro-climate, soil condition, Cropping pattern, major crops of the Intervened area		
Agro Climatic Zones	Sub tropical	
Major Crops	Gram	
Major Agricultural Season	Rabi	
Pattern of Agriculture		
Major Agricultural Activities	Practices (Please mention the name of specific practice/method/substance/equipment used)	Training module developed (write yes/ No)
1	Pre Cultivation	
	Crop selection	selection of crop will be done on the basis of interest of farmers and availability of inputs and resources
	Variety (resistant variety / Improved variety etc)	GG-1,GG-2,BG-1103,BG-1083,dahod yellow
	Source of Seed (own /purchased etc)	Own seed and Certified seed will be used
	Seed selection	Improved varieties considering yield ,quality ,Duration ,Tolerance /resistance against insect ,pest and diseases
	Seed rate	25 -40 Kg per acre
	Seed Treatment	<ul style="list-style-type: none"> The seed should be placed 8-10 centimetres deep because the shallow be treated with 0.25 per cent Thiram or Carbendazim (Bavistin) before sowing.
2	Cultivation	
	Spacing	Depth of Sowing The seed should be placed 8-10 centimeters deep.
	sowing/ Transplanting	The best method of sowing is with a seed drill or dropping seed with a Chonga attached to a deshi plough. Dropping seeds in open furrows behind a deshi plough and broadcasting are found to be inferior to line sowing with seed
		YES

		drill.	
	Intercultural operations (weeding, thinning, etc)	<ul style="list-style-type: none"> • One hand weeding or intercultural with hand hoe or wheel hoe after 25-30 days and second if needed after 60 days of sowing may take care of weeds. • Fluchloralin (Basalin) 1 kg per hectare in 800-1000 liters of water as pre-planting spray may be used as an effective herbicide. <p>In case Basalin is not available use Metribuzin or Prometrynen at the rate of 1.0-1.5 kg active ingredient in 800-1000 liters of water per hectare as pre-emergence spray</p>	
3	Water conservation and water management		
	Methods of water conservation	According to the slope appropriate channel will be prepared for irrigation	
	Methods of irrigation	Light irrigation	
	Plan of irrigation (irrigation at critical periods etc)	Chick pea is mostly sown as a rainfed crop. However, where irrigation facilities are available, give a pre-sowing irrigation. It will ensure proper germination and smooth crop growth. If winter rains fail, give one irrigation at pre-flowering stage and one at pod development stage. In no case first irrigation should be given at flowering time of gram crop. A light irrigation should be given because heavy irrigation is always harmful to gram crop. Excess of irrigation enhances vegetative growth and depresses chick pea yield.	
4	Soil fertility Mgmt. /Soil health enrichment and crop nutrient management		
	Biofertilizer /Organic Manure/ Green manure crops etc	<ul style="list-style-type: none"> • Soils with low organic matter and poor nitrogen supply may require 20-25 kg per hectare of nitrogen as starter does which can meet plant requirement before the formation of nodules. • Besides nitrogen, pulses respond very favourably to phosphorous application if the soils are deficient in phosphorous supply. • If both nitrogen and phosphorous are required to be supplied then diammonium phosphate (18-46-0) at the rate of 100 to 150 kg per hectare should be applied 	

		<p>uniformly before the last discing ploughing.</p> <ul style="list-style-type: none"> It is better if all the fertilizers are drilled in furrows at a depth of 7-10 centimeters 	
	Methods of application/Practices	Fertilizer will be applied according to recommendation along with observation of critical stages	
	Duration/ Scheduling of application	As per Pop recommendation Before sowing of each and every crop	
	Micro nutrient management	will be sprayed as and when required	
	Methods of enhancement of soil biomass	after evaluation critical benefits of Biomass irrespective of crops those will be allowed	
5	Insect/Pest/ Management		
	Insect/ Pest control methods/ practices (E.G. If NPM, please specify particular method of control under NPM)	<p>Insect/ Pest control methods/ practices Some of the important insect pests of chick pea with their control measures are given below:</p> <p>Cutworm Gram cutworm is a serious pest in low lying areas where fields are cloddy. The larvae of this insect remain hidden under these clods during the day time and cause damage during the night. The caterpillars cut the plants at ground level. The pest is sporadic in nature and can be controlled by the application of Lindane 6% granules at the rate of 20-25 kg per hectare mixed in the soil.</p> <p>Gram Pod Borer This is the most serious pest of chick pea and causes damage up to 75 per cent reduction in yield. The caterpillar not only defoliates the tender leaves but also makes holes in the pods and feed upon the developing grains. While feeding on the developing seeds the anterior body portion of the caterpillar remains inside the pod and rest half or so hanging outside. When seeds of one pod are finished, it moves to the next. Unless the pest is controlled in the initial stages of infestation it takes the heavy toll of the crop. As a matter of fact this pest is the most limiting factor in gram production.</p>	

		<p>CONTROL MEASURES</p> <ul style="list-style-type: none"> • Spray Monocrotophos (Nuvacron) 36 EC at the time of pod formation at the rate of 1 millilitre mixed in 1 liter of water. The amount of solution may vary from 600-800 liters per hectare. The spray should be repeated, if needed after 15 days. • Alternatively, spray Endisulfan 35 EC at the rate of 1.25 liters mixed in 1000 liters of water per hectare 	
	Insect/ Pest control substances(biopesticide/ others etc)	we will apply all the preventive measures but if occurrence will be observed in any case insecticide will be applied as per recommendation	
6	Disease Management		
	Disease control methods/ Practices	Practices of IPM and INM will be followed in each and every crop	
	Disease control substance (bio fungicide/others)	<p>Diseases of Gram Crop</p> <p>The important diseases of chick pea are wilt, sclerotinia blight, grey mold, rust and Ascochyta blight. Symptoms of these diseases and their suitable control measures are given below:</p> <p>Wilt</p> <p>The main cause of this disease is a fungus, <i>Fusarium orthocerus</i> through other fungi are also associated with this disease. This disease causes considerable loss in most of the gram growing regions. The symptoms of the disease may be seen in the seedling stage as well as in an advanced stage of plant growth. The leaves start yellowing and afterwards drying. The plants too become yellowish and finally dry out. Roots turn black and ultimately decompose.</p> <p>CONTROL MEASURES</p>	

		<ol style="list-style-type: none"> 1. Treat the seed with Benlate T or a mixture of Benlate of Thiram (1:1) at the rate of 2.5 g per kg of seed. 2. Grow the resistant varieties like C-214, Avrodhi, Uday, BG-244; Pusa-362, JG-315, Phule G-5 etc. 3. In fields having heavy incidence of gram wilt, the cultivation of chick pea should be avoided for three to four years. 4. As far as possible sowing of chick pea should not be done before third week of October. 5. Deep planting of chick pea about 8-10 centimeters deep in the light soils reduces the gram wilt incidence. <p>Sclerotinia Blight</p> <p>It is caused by a fungus <i>Sclerotinia sclerotiorum</i>. This disease causes losses in Punjab, Haryana and Western Uttar Pradesh. The disease affects all the plants except the roots. The infection in the initial stage is visible on the stem near the ground. The affected plants first become yellow, then brown and ultimately dry out. On close observation, brown colored spots may be seen on affected stem which later girdle it. White cottony growth of the fungus with hard, black colored sclerotia may be seen on these spots on the stem.</p> <p>CONTROL MEASURES</p> <ol style="list-style-type: none"> 1. Use only healthy seeds free from sclerotia. 2. Grow disease resistant varieties like G-543, Gaurav, Pusa-261 etc. 3. After harvest, the diseased plants should not be allowed to stand in the field but should be destroyed by burning. 4. Treat the soil with a mixture of fungicides like Brassicol and Captan at the rate of 10 kg per hectare. 	
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Grey Mold

This disease is caused by a fungus *Botrytis cinerea* survives in the soil. This disease causes considerable damage in tarai area of Uttar Pradesh. Brown necrotic spots appear on twigs, petioles, leaves and flowers of the plant on attaining full vegetative growth. The branches and the stem also get affected parts. The affected stem finally breaks and the plant dies.

CONTROL MEASURES

1. Plant the crop late i.e. first fortnight of November.
2. Spray the crop with 0.2% carbendazim (Bavistin).

Rust

This disease is caused by a fungus *Uromyces ciceris arietini*. The disease is more severe in Punjab and Uttar Pradesh. The symptoms are visible in early February. Small, round to oval, light or dark brown pustules are formed on the under surface of the leaves. The pustules later turn black. Afterwards, these pustules appear on upper surface of leaves, petioles, twigs and pods. The affected leaves pre-maturely fall and therefore the yield is considerably reduced.

CONTROL MEASURES

1. With the appearance of first symptoms, spray the crop with 0.2% Mancozeb 75 WP followed by two more sprays at 10 days interval.
2. Plant only resistant varieties like Gaurav.

Ascochyta Blight

		<p>This disease is caused by <i>Ascochyta rabi</i>, a fungus which survives on plant trash left in the soil. This is an important disease prevalent in Punjab and parts of Himachal Pradesh. All the plant part except the root is affected. Small round, yellowish-brown spots are seen on the leaves in the months of January and February. The spots also spread to petioles and branches where they are elongated and become dark brown in color. The affected plants finally dry up.</p> <p>CONTROL MEASURES</p> <ol style="list-style-type: none"> 1. Plant only healthy seed. Before planting treat the seed with fungicides like Thiram or Carbendazim (Bavistin) at the rate of 2.5 g/kg of seed. 2. Follow three year crop rotation. 3. Plant resistant varieties/tolerant varieties like G-543, Pusa-256, Gaurav, GNG-146, PBG-1 etc. 	
7	Harvesting		
	Methods of harvesting	Harvesting	
		<ul style="list-style-type: none"> • Crop becomes ready for harvest when leaves turn reddish-brown and start shedding. • Plants are either plucked out by hand or cut with sickle. • The crop is allowed to dry in sun on threshing floor for about five to six days. • Thereafter, threshing is done either by beating the plants with sticks or by trampling under the feet of bullocks. 	
8	Practices for improving Agro ecological services (bringing tree component / Bio diversity etc)		
	Motivation regarding transplantation of fruit and timber wood plantation		
9	If the PIA have any post harvest technology regarding storage of food grains, Seeds, value addition, please specify		
	<ul style="list-style-type: none"> • It is noticed that there is marked deterioration in weight, test, nutrients or nutritive value and germination of wheat grain when they are stored. Thus the grains should be thoroughly dried after harvesting and before storage and the storage pits; bins or godowns should be moisture free and should be fumigated to 		

keep away the pests including rats

TECHNICAL PROTOCOL UNDER MKSP

Name of the PIA: NM Sadguru water and development foundation

Districts: Dahod

Mention Agro-climate, soil condition, Cropping pattern, major crops of the Intervened area		
Agro Climatic Zones	Sub tropical	
Major Crops	Maize	
Major Agricultural Season	Kharif and Rabi	
Pattern of Agriculture		
Major Agricultural Activities	Practices (Please mention the name of specific practice/method/substance/equipment used)	Training module developed (write yes/No)
1	Pre Cultivation	
Crop selection	selection of crop will be done on the basis of interest of farmers and availability of inputs and resources	Yes
Variety (resistant variety / Improved variety etc)	GM-1-6, Mahi dhaval, Mahi kanchan, narmada Moti, HQPM	
Source of Seed (own /purchased etc)	Own seed and Certified seed will be used	
Seed selection	Improved varieties considering yield, quality, Duration, Tolerance /resistance against insect, pest and diseases	

	Seed rate	8Kg per acre		
	Seed Treatment	Carbendazim	1Gm	
		Chlorpyriphos	1 ML	
		Azotobactor culture	1 Packet	
		Phosphate culture	1 Packet	
		Boran	250gm	
2	Cultivation			
	Spacing	Maize is sown in rows, 60-75 cm apart, whereas the plants in the row are spaced at 20 to 25 cm.		YES
	sowing/ Transplanting	The best method of sowing is with a seed drill or dropping seed with a Chonga attached to a deshi plough. Dropping seeds in open furrows behind a deshi plough and broadcasting are found to be inferior to line sowing with seed drill.		
	Intercultural operations (weeding, thinning, etc)	<ul style="list-style-type: none"> • The weeding operations may be repeated 2-3 times but not after knee-height stage of the crop. • The crop is found to be infested with grassy and broad leaved weeds. Following control measures should be adopted for an efficient and effective control of weeds: • Pre-emergence application of Simazine or Atrazine @1 to 1.25 kg / ha of 50 % W.P. should be done but the field must be free from all established weeds. • If the broad-leaved weeds are posing problems, a post-emergence application of 2,4-D or Banvei-D (Dicamba) should be done @1.5 to 2.0 kg ai./ha. • Two to three weeding followed by earthing up for proper standability of crop takes complete care of " the weeds. • The most appropriate time for first weeding is when the maize seedlings become two weeks old. Two hoeings at a week interval should be given afterwards to keep the soil friable, clean and free from crust formation. 		
3	Water conservation and water management			
	Methods of water conservation	According to the slope appropriate channel will be prepared for irrigation		
	Methods of irrigation	Light irrigation		
	Plan of irrigation (irrigation at critical periods etc)	Irrigation and Water Management <ul style="list-style-type: none"> • Maize is grown in three seasons namely kharif, rabi, and zaid, of which rabi and zaid crops totally depend on irrigation while kharif crop is mostly grown rainfed. • A vigorously growing maize plant needs about 2-3 litres of water per day during peak growing period or on an average its consumptive use of water varies from 2.5 to 4.3 mm per day. • It is observed that a good crop of maize needs a rainfall or irrigation of 1.0 to 1.2 metres per hectare during its life 		

		<p>cycle and most of which is needed during the growth period.</p> <ul style="list-style-type: none"> • Irrigation scheduling during any season of cropping in maize on depletion of 25 to 30 % available moisture from field capacity has proved to be beneficial. • The crop should be irrigated at least four times viz. seedling stage, knee-height stage, tasselling and silking stage and grain filling stage, respectively. • However, under limited water supply it may be irrigated thrice at seedling, tasselling and grain-filling stages. 		
4	Soil fertility Mgmt. /Soil health enrichment and crop nutrient management			
Biofertilizer /Organic Manure/ Green manure crops etc	FYM and Zink			
Methods of application /Practices	Fertilizer will be applied according to recommendation along with observation of critical stages			
Duration/ Scheduling of application	As per Pop recommendation Before sowing of each and every crop			
Micro nutrient management	will be sprayed as and when required			
Methods of enhancement of soil biomass	after evaluation critical benefits of Biomass irrespective of crops those will be allowed			
5	Insect/Pest/ Management			
Insect/ Pest control methods/ practices (E.G. If NPM, please specify particular method of control under NPM)	Sl. No.	Pests & Diseases	Symptoms	Treatment
	1	Cut worm (Agrotis flammatra)	-The larva of this pest cuts the seedling at the ground level. -Caterpillars are grey in colour.	-Dust BHC 10% or Folidal 2% or Heptachlor 3% @ 0-25 kg per' hectare.
	2	Stem borer (Chilo partellus)	-The freshly hatched caterpillars move to the centre shoot,	-Collect and burn all the stubbles of the field after harvest.

			feed on the leaves and make the plant hollow. -It feeds on the base of the central whorl, that results in the drying up of the central root.	-Grow resistant varieties
		3	Grass hoppers (Hieroglyphus nigrorepletus)	-Both nymph and adult cause heavy damage. -Adults are green or dry grass coloured. -Destroy eggs in the soil by deep ploughing soon after harvest. Dust hoppers and adults with 5% and 10% BHC, respectively. -Dust BHC 10% @ 25-30 kg/ha or Malathion 5% @ 20 kg per hectare
		4	White grub	-The larvae feed on the roots of the plants resulting in the complete failure of the crop. -Collect the grubs and destroy them during ploughing or intercultural operations. -Use of insecticides namely 'BHC 10% dust at 150 kg per

				<p>ha, Phorate</p> <p>10% granules at 25 kg/ha should be</p> <p>put in the furrows at the time of sowing.</p>
5	Shoot fly (Atherigona spp)	-It causes the damage when the crop is in seedling stage.	<p>-Spray Metasystox 0.05 %, 3-5 days after germination.</p> <p>-Apply 10% Phorate granules or 5% Disulfotan granules in seed furrows at the time of sowing.</p>	
6	Anny worms (Mythimna seperata)	-Caterpillars move from field to field and voraciously feed on foliage.	<p>-Trap the caterpillars in grass heaps.</p> <p>Plough up the infested fields.</p> <p>-Dust BHC 10 %</p>	
7	Grey weevils (Myllocerus spp.)	-Adult 'beetles feed on green leaves.	<p>-Dust BHC 5 % or Heptachlor 3 %</p> <p>at the rate of</p>	

				20-25 kg per hectare.	
		8	Hairy caterpillar (Amsacta moorei and A. albistriga)	-they cause severe depletion of the plants.	-Dust BHC 10 per cent.
Insect/ Pest control substances (biopesticides/ others etc)	we will apply all the preventive measures but if occurrence will be observed in any case insecticide will be applied as per recommendation				
6 Disease Management					
Disease control methods/ Practices	Practices of IPM and INM will be followed in each and every crop				
Disease control substance (bio fungicide/ others)	Diseases of Maize Crop				
	1	Downy mildew (Sclerothora rayssiae Var. zea)	-Whitish coarse fungal growth mainly on the lower surface of the leaf, later turning brown, is observed.		
	2	Smut (Ustilago zea)	-Galls of different sizes on all the above ground parts of the plant, mostly on the cobs are formed when mature. -These galls rupture and release black masses of fungal spores.		
	3	Leaf spot (Cercospora sorghi)	-Irregular to circular brown spots appear on the leaves. -Later on, they turn green or dull green in colour.		
	4	Head smut (Sphacelotheca reiliana)	-In this disease the tassels and the ears are replaced by , fungus spores. -They turn into hard, black and sooty masses		

7	Harvesting	
Methods of harvesting	<ul style="list-style-type: none"> • Maize crop grown for grain purpose should be harvested when the grains are fully mature, nearly dry and do not contain more than 20-30 % moisture. • Clean the cobs by removing husk and then dry in the sun for 6-8 days till they get completely dry. <p>Remove the grains from the cobs by sticks or maize shellers</p>	
8	Practices for improving Agro ecological services (bringing tree component / Bio diversity etc) Motivation regarding transplantation of fruit and timber wood plantation	
9	If the PIA have any post harvest technology regarding storage of food grains, Seeds, value addition, please specify Post Harvest process <ul style="list-style-type: none"> • The grains should be properly dried before storage. • The grains can be stored in seed bins or earthen pots or jute bags. • The storage place should be free from moisture, insects, rodents, termites, etc. • The containers should be plastered with mud. 	

TECHNICAL PROTOCOL UNDER MKSP

Name of the PIA: NM Sadguru water and development foundation

Districts: Dahod

Mention Agro-climate, soil condition, Cropping pattern, major crops of the Intervened area			
Agro Climatic Zones	Sub tropical		
Major Crops	Soybean		
Major Agricultural Season	Kharif		
Pattern of Agriculture			
Major Agricultural Activities	Practices (Please mention the name of specific practice/method/substance/equipment used)	Training module developed (write yes/ No)	
1	Pre Cultivation		
	Crop selection	selection of crop will be done on the basis of interest of farmers and availability of inputs and resources	Yes
	Variety (resistant variety / Improved variety etc)	Gujarat soya-1 Gujarat soya-2,335	
	Source of Seed (own /purchased etc)	Own seed and Certified seed will be used	
	Seed selection	Improved varieties considering yield ,quality ,Duration ,Tolerance /resistance against insect ,pest and diseases	
	Seed rate	Bold seeded-80-90Kg/ha Medium seeded-70-75kg/ha Small seeded-55-60 kg/ha	
	Seed Treatment	1) Fungicidal/Bio-agent: Thiram 75 WP + Cabendazim 50 WP (2:1) @ 3 g/kg seed or Trichoderma viride @ 4-5 gm/kg seed. 2) Microbial: About 500 g/75 kg seed Bradyrhizobium japonicum culture + PSB/PSM 500 g/ 75 Kg seed.	
2	Cultivation		
	Spacing	Spacing (Depending on Sowing time)- 30-45 x 5-8 cm Depth of sowing-3 to 5 cm .	YES
sowing/ Transplanting	The best method of sowing is with a seed drill or dropping seed with a Chonga attached to a deshi plough. Dropping seeds in open furrows behind a deshi plough and broadcasting are found to be inferior to line sowing with seed		

		drill.	
	Intercultural operations (weeding, thinning, etc)	Two hand weedings at 21 and 45 DAS or Fluchloralin or Trifluralin @ 1 kg a.i./ha as pre-plant incorporation or Alachlor @ 2 kg a.i./ha or Pendimethalin @ 1 kg a.i./ha or Metolachlor @ 1 kg a.i./ha or Clomazone @ 1 kg a.i./ha as pre-emergence or Imazethapyr @ 75 to 100 g a.i./ha or quizalofop ethyl @ 50 g a.i./ha as post-emergence (15-20 DAS) in 750 to 800 liters water/ha.	
3	Water conservation and water management		
	Methods of water conservation	According to the slope appropriate channel will be prepared for irrigation	
	Methods of irrigation	Light irrigation	
	Plan of irrigation (irrigation at critical periods etc)	The soybean crop generally does not require any irrigation during <i>Kharif</i> season. However, if there were a long spell of drought at the time of pod filling, one irrigation would be desirable. During excessive rains proper drainage is also equally important. Spring crop would require about five to six irrigation.	
4	Soil fertility Mgmt. /Soil health enrichment and crop nutrient management		
	Biofertilizer /Organic Manure/ Green manure crops etc	For obtaining good yields of soybean apply 15-20 tonnes of farm yard manure or compost per hectare. A good crop of soybean yielding about 30 quintals per hectare will remove about 300 kg nitrogen per hectare from the soil. But soybean being a legume crop has the ability to supply their own nitrogen needs provided they have been inoculated and there it efficient nodulation in the plant. An application of 20-30 kg nitrogen per hectare as a starter dose will be sufficient to meet the nitrogen requirement of the crop in the initial stage in low fertility soils having poor organic matter. Soybean requires relatively large amounts of phosphorus than other crops. Phosphorus is taken up by soybean plant throughout the growing season. The period of great demand starts just before the pods begin to form	

		and continues until about ten days before the seeds are fully developed. The soil should be tested for the availability status of phosphorus to meet the requirement of the crop. With the application of phosphorus the number and density of nodules are stimulated and the bacteria become more mobile. Soybean also requires a relatively large amount of potassium than other crops. A crop of soybean yielding 30 quintals per hectare will remove about 100 kg potassium from the soil. The rate of potassium uptake climbs to a peak during the period of rapid vegetative growth then slows down about the time the bean begins to form. Soil test is the best guide for the application of potash in the soil. In the absence of soil test, 50-60 kg K ₂ O per hectare should be applied. The fertilizers should preferably be placed, at sowing time, about 5-7 cm away from the seed at a depth of 5-7 cm from seed level.	
	Methods of application/Practices	Fertilizer will be applied according to recommendation along with observation of critical stages	
	Duration/ Scheduling of application	As per Pop recommendation Before sowing of each and every crop	
	Micro nutrient management	will be sprayed as and when required	
	Methods of enhancement of soil biomass	after evaluation critical benefits of Biomass irrespective of crops those will be allowed	
5	Insect/Pest/ Management		
	Insect/ Pest control methods/ practices (E.G. If NPM, please specify particular method of control under NPM)	<u>Insect pest management</u> Furrow application of Phorate 10G @ 10 kg/ha, followed by 1 or 2 sprays of Quinalphos 25 EC (1.5 lit/ha) or Endosulfan 35 EC @ (1.5 lit./ha) or Monocrotophos 36 SC (0.8 lit./ha) or Triazophos 40 EC (0.8 lit./ha) or Methomil 40 SP (1 kg/ha) or Chlorpyriphos 20 EC (1.5 lit./ha) or Ethofenprox 10 EC (1 lit./ha), depending on the insect pest and intensity of damage. For one ha, the spray volume has to be 750 to 800 lit.	
	Insect/ Pest control	we will apply all the preventive measures	

	substances(biopesticide/ others etc)	but if occurrence will be observed in any case insecticide will be applied as per recommendation	
6	Disease Management		
	Disease control methods/ Practices	Practices of IPM and INM will be followed in each and every crop	
	Disease control substance (bio fungicide/others)	<p><u>Disease management</u></p> <p>For foliar diseases</p> <p>Myrothecium, Cercospora leaf spot and Rhizoctonia aeria blight: Two spray of carbendazim 50 WP or thiophanatemethyl 70 WP @ 0.5 kg in 1000 l water/ha at 35 and 50 DAS.</p> <p>For Bacterial pustule:</p> <p>Spray of Copper oxychloride 2 Kg + Streptomycin 200 g /1000 l water at the appearance of the disease.</p> <p>For the control of Yellow Mosaic :</p> <p>Spray of thiomethoxam 25 WG @ 100 g/ha or methyl deinaton @ 0.8 l/ha.</p> <p>For rust:</p> <p>Two to three sprays of hexaconazole or propiconazole or triadimefon or ocycarboxin @ 0.1%. First spray at the time of appearance of rust followed by subsequent sprays at 15 days control. For hot spot areas one prophylactic spray of any of above fungicide at 35 to 40 days after sowing.</p>	
7	Harvesting		
	Methods of harvesting	When soybean plants mature they start	

		<p>dropping their leaves. The maturity period ranges from 50 to 140 days depending on the varieties. When the plants reach maturity, the leaves turn yellow and drop and soybean pods dry out quickly. There is a rapid loss of moisture from the seed. At harvest, the moisture content of the seeds should be 15 per cent. Harvesting can be done by hand, breaking the stalks on the ground level or with sickle. Threshing can be done either with the mechanical soybean thresher or some conventional methods used in other legumes. Threshing should be done carefully and any kind of severe beating or trampling may damage the seed coat and thus reduce the seed quality and viability. Wheat thresher can also thresh soybean after a little modification. This would involve change of sieve, reduction of the cylinder speed and increase in fan speed. A moisture content of 13 to 14 per cent is ideal for threshing with thresher.</p>	
8	<p>Practices for improving Agro ecological services (bringing tree component / Bio diversity etc)</p> <p>Motivation regarding transplantation of fruit and timber wood plantation</p>		
9	<p>If the PIA have any post harvest technology regarding storage of food grains, Seeds, value addition, please specify</p> <ul style="list-style-type: none"> • It is noticed that there is marked deterioration in weight, test, nutrients or nutritive value and germination of wheat grain when they are stored. Thus the grains should be thoroughly dried after harvesting and before storage and the storage pits; bins or godowns should be moisture free and should be fumigated to keep away the pests including rats 		