

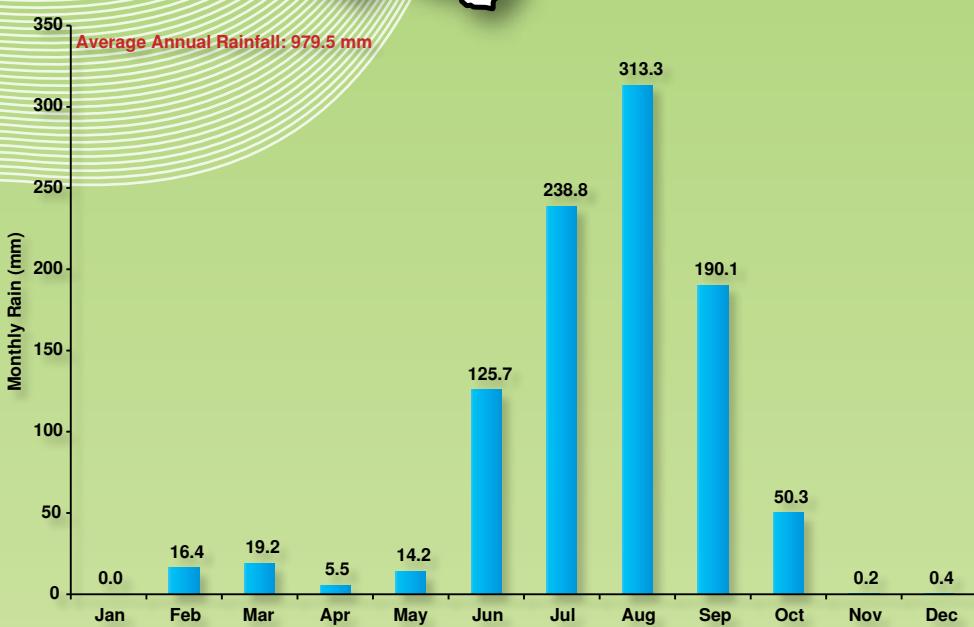
GARHWA - LATEHAR - PALAMAU



DISTRICT AGRICULTURE CONTINGENCY PLAN DACP - 2019



PALAMAU DIVISION



BIRSA AGRICULTURAL UNIVERSITY, KANKE, RANCHI, JHARKHAND
AND

CENTRAL RESEARCH INSTITUTE FOR DRY LAND AGRICULTURE (CRIDA), HYDERABAD



BIRSA AGRICULTURAL UNIVERSITY, RANCHI

P.O.: Kanke, Ranchi-834006, Jharkhand, India



FOREWORD

Agriculture in Jharkhand state has always been dependent on the mercy of South West monsoon. Production and productivity of crops in Rainfed agriculture of Jharkhand fluctuate year to year as per the time of monsoon arrival, amount of precipitation and distribution. The climate change in recent years has further augmented the problem keeping the farmers in great dilemma with respect to appropriate timing of agricultural operations and selection of right kind of crops and varieties for different land use situations. Even livestock rearing and forestry activities are being affected due to climatic vagaries in Jharkhand.

In this scenario of climatic change and climatic variability, farmers of the region need to have different sets of well defined farming options for different climatic and land situations. There was a need of having District Agriculture Contingency Plans (DACP) for all the districts, based on the probable climatic conditions and existing land situations.

In view of the prevailing agro-climatological constraints and on the initiative of ICAR-CRIDA, contingency plans for all the 24 districts of Jharkhand have been prepared by the Contingency Cell of Birsa Agricultural University under the technical guidance of Dr. D.N. Singh (Chairman, Contingency Cell) and Dr. A. Wadood (Nodal officer, Contingency Cell) involving scientists of all the Zonal Research Stations, Krishi Vigyan Kendras, concerned government officials and farmers. The District Agriculture Plans, so prepared, are fool proof documents published in 5 volumes (one each for 5 administrative divisions of Jharkhand having contingency plans for all the districts of the division concerned).

I hope the DACPs will serve as a ready reckoner and will be of great help to the farmers and other stakeholders in planning and carrying out the agricultural activities in a weather based and climate resilient manner which would certainly give sustenance to Jharkhand agriculture. I congratulate Dr. D. N. Singh, Dr. A. Wadood and entire team for their untiring efforts for bringing out such excellent and useful publication. I have all appreciation for ICAR-CRIDA for this initiative and also for financial support.

(Parvinder Kaushal)

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**DEPARTMENT OF AGROMETEOROLOGY AND ENVIRONMENTAL SCIENCE
BIRSA AGRICULTURAL UNIVERSITY, RANCHI**



PREFACE



Dr. A. Wadood
Chairman

The 28th state of India, Jharkhand came into existence on November 15th, 2000. The state has a total geographical area of 79.71 lakh hectares with a net cultivated area of about 28 lakh hectares (35.12%). The state is maintaining fairly a good forest cover of slightly over 23 lakh hectares. The remaining land falls under barren, cultivable waste, pasture and other categories. Jharkhand state falls in 7th Agroclimatic zone (out of 15 Agroclimatic zones as classified by planning commission), 8th Meteorological Subdivision (out of 36 meteorological subdivisions of India) and in 11th -13th Agro-Ecological zones (out of 20 AgroEcozones of India). For the ease of better agricultural planning based on climate and soil/land features India has been divided into 127 Agroclimatic zones (AZ1 -AZ127). The state of Jharkhand has 3 agroclimatic zones AZ57, AZ58 and AZ59, the corresponding agroclimatic sub zones are Central and North Eastern Plateau sub-zone (sub-zone IV), Western Plateau sub-zone (sub-zone V) and South Eastern Plateau sub-zone (sub-zone VI).

Jharkhand state being different from many other states of the country with respect to topography, physiography and climatic conditions needs special emphasis on water management, particularly

the rain water management in conjunction with underground water management. The state enjoying nature's favour receives fairly a high amount of annual rainfall, on an average 1234.3 mm annually, of which more than 80% is instantly lost through high speed surface and sub-surface run-off causing loss of fertile soil and gully formation. With this much of annual rainfall 79.71 lakh hectares land area of Jharkhand receives about 111 TMC rain water annually. In absence of proper and adequate water management practices crop failure during rainy season in case of prolonged dry spells, virtually no crop during rabi season and drinking/domestic water crisis in the months of March-mid June have become a common feature in Jharkhand. Mainly for the water related limitations, the Agriculture in the state of Jharkhand becomes a gamble, almost solely depending on the mercy of monsoon rainfall. Delay in monsoon onset, frequent dry spells during crop season (early and mid season droughts/dry spells) initiated the need of District Agriculture Contingency Plans (DACP). Hence, with the joint efforts of ICAR and BAU-DACPs were prepared for Jharkhand state in 2010-12. In view of the marked climate change and variations in monsoon rainfall in recent years the existing DACPs required to be updated precisely. Accordingly, Ministry of Agriculture, Govt. of India and ICAR-CRIDA requested to setup a Contingency Cell in BAU to update existing DACPs and to prepare DACPs for newly constituted districts. Birsa Agricultural University constituted a Contingency Cell at BAU with Director Research as Chairman and Dr. A. Wadood as nodal officer along with all Associate Directors of 3 Zonal Research Stations and programme coordinators/Heads of all KVks.

As proposed by ICAR-CRIDA, through DR. K.V. Rao, convenor Agriculture Contingency Cell, CRIDA an MoU was signed between ICAR-CRIDA and BAU on 12.06.2017. ICAR-CRIDA released a fund of Rs 3 lakhs (in two installments) to meet the expenses on DACP updation/modification.

Contingency Cell of BAU organised a series of meetings were conducted at ZRSs (on 20.04.2017 at ZRS Darisai, on 29.04.2017 at ZRS Chianki and on 23.06.2017 at ZRS Dumka) in which most of the stakeholders (ZRS and KVK scientists, officials of state department and farmers) of altogether 9 districts took part in day long discussions. Hard copies of existing DACPs were handed over to programme coordinators/heads of KVks of the rest districts to go through and give appropriate suggestions/advices.

A 3 days meeting was convened in the Department of Agrometeorology and Environmental Science (AMES), BAU on 25-27 September, 2017 having detailed discussions on contingency plans with active participation of Dr. A. Wadood, Dr. D. N. Singh, Dr. Ramesh Kumar, Dr. Pragyan Kumari, Sri Binod Kumar, Sri Sanjiv Kumar, Dr. BK Agarwal, Dr. PB Saha, Dr. MK Barnwal, Dr. Sudhir Kr. Jha, Dr. Shankar Kumar Singh, Dr. Ranjay Kr. Singh, Dr. Pramod Kumar, Dr. Devkant Prasad, Dr. Aarti Beena Ekka, Dr. Amrit Kr. Jha, Sri LK Das, and Dr. Ansar Ahmad. All the DACPs of 24 districts were updated/modified.

Again a 13-days brain storming exercise was done on 18-30 December, 2017 at AMES with a smaller expert-group consisting of Dr. MK Barnwal, Dr. Majid Ansari, Dr. Amrit Kr. Jha, Dr. Pramod Kumar, Dr. Ansar Ahmad, Dr. PK Singh, Dr. SN Karamakar, and Dr. Krishna Prasad along with Dr. A. Wadood and Sri Binod Kumar. All the DACPs were minutely discussed and modified in the light of discussions and obtained inputs. Soft copies of DACPs were sent to Dr. KV Rao and received back with his comments for printing. Contributions of all the scientists, farmers and supports received from ICAR-CRIDA (financial as well as technical) are gratefully acknowledged. Sri Binod Kumar (RA GKMS, Darisai) deserves special appreciation for his consistent efforts in making the DACPs in the present form.

The DACPs have been prepared/updated/modified for different conditions of monsoon and farm situations prevailing in different districts in a little different format as provided by ICAR-CRIDA to suit the conditions of the state. The DACPs have been published in 5 volumes, one for each administrative Divisions comprising the districts under each Division.


(A. Wadood)

DIRECTORATE OF RESEARCH
BIRSA AGRICULTURAL UNIVERSITY, RANCHI



MESSAGE



Dr. D. N. Singh
Director Research

Jharkhand state, carved out from undivided Bihar, came into existence on 15th Nov. 2000 and became 28th state of this country. The state occupies 46% of the geographical area of undivided Bihar. The geographical area of Jharkhand state is 79.7 lakh ha, out of that 38 lakh ha is cultivable but cultivation is done only in 28 lakh ha which is 35.13% of the total geographical area of the state. The state is predominantly a rainfed and dry land system of agriculture is prevailing because only 12% area is under assured irrigation. The land is of different type starting from Tanr to Don III, Don II and Don I. Nearly 60% of the area under cultivation is acidic and organic carbon ranges from 0.3 to 0.5 % coupled with poor water holding capacity of the soils. Because of these two characteristics (rainfed agriculture and acidity of soil) the cropping intensity of state is hardly 125%, the lowest in the country.

As per classification of world bank aided National Agricultural Research project (NARP), the entire country has been divided into 15 agroclimatic zones, out of which Bihar and Jharkhand falls under zone VII (Eastern hill and Plateau region). Again, the zone VII has been sub divided into six subzones of which zone I, II and III are falling in Bihar whereas subzone IV, V and VI is in the Jharkhand. Subzone IV is largest subzone consisting of 15 districts of the state and also known as a central north eastern plateau, whereas subzone V is consisting of seven districts and known as Western Plateau. The subzone VI is smallest zone of the state and consists of only 3 districts, known as South Eastern Plateau sub-zone.

Considering the above characteristics of agro ecological conditions existing in the state of Jharkhand the contingency crop planning is very important in view of increasing the cropping intensity as well as productivity and profitability per unit area per unit time. To meet the above challenges diversification of crops is recommended which is the need of time. In uplands, farmers are cultivating direct seeded Rice which needs to be gradually replaced with drought tolerant crops like finger millet, soybean and black gram etc, these crops could be easily and successfully grown in uplands in place of rice. These crops, being climate resilient ones, are not only helpful in providing better yield under drought like situations but are also useful in providing nutritional security as well. Further, Don III (medium upland) is also required to be diversified where transplanting of rice must be replaced with pigeonpea, maize, sorghum and pearl millet with a caution that sowing of above crop has to be done after following the ridge and furrow and broad bed furrow method. This will also provide food, nutrition and livelihood security. The hybrid rice cultivation needs to be promoted further in Don II (medium land) and Don I (low land) for harvesting better yield of rice under changing climatic condition. Cultivation of vegetables and flowers are required to be promoted under poly house condition which may enable for production of off season flower and vegetable for fetching good prices from the market which would ultimately be helpful in increasing the profitability and income of the farmers.

While congratulating Dr. Wadood and his team for preparing such useful documents I urge the farmers and other stakeholders of respective districts of Jharkhand to make fullest use of the District Agriculture Contingency Plans (DACP) for mitigating the drought and drought like situations prevailing in the state and to help farmers in doubling their income in years to come.

(D. N. Singh)



DISTRICT AGRICULTURE CONTINGENCY PLAN DACP - 2019



PALAMU DIVISION

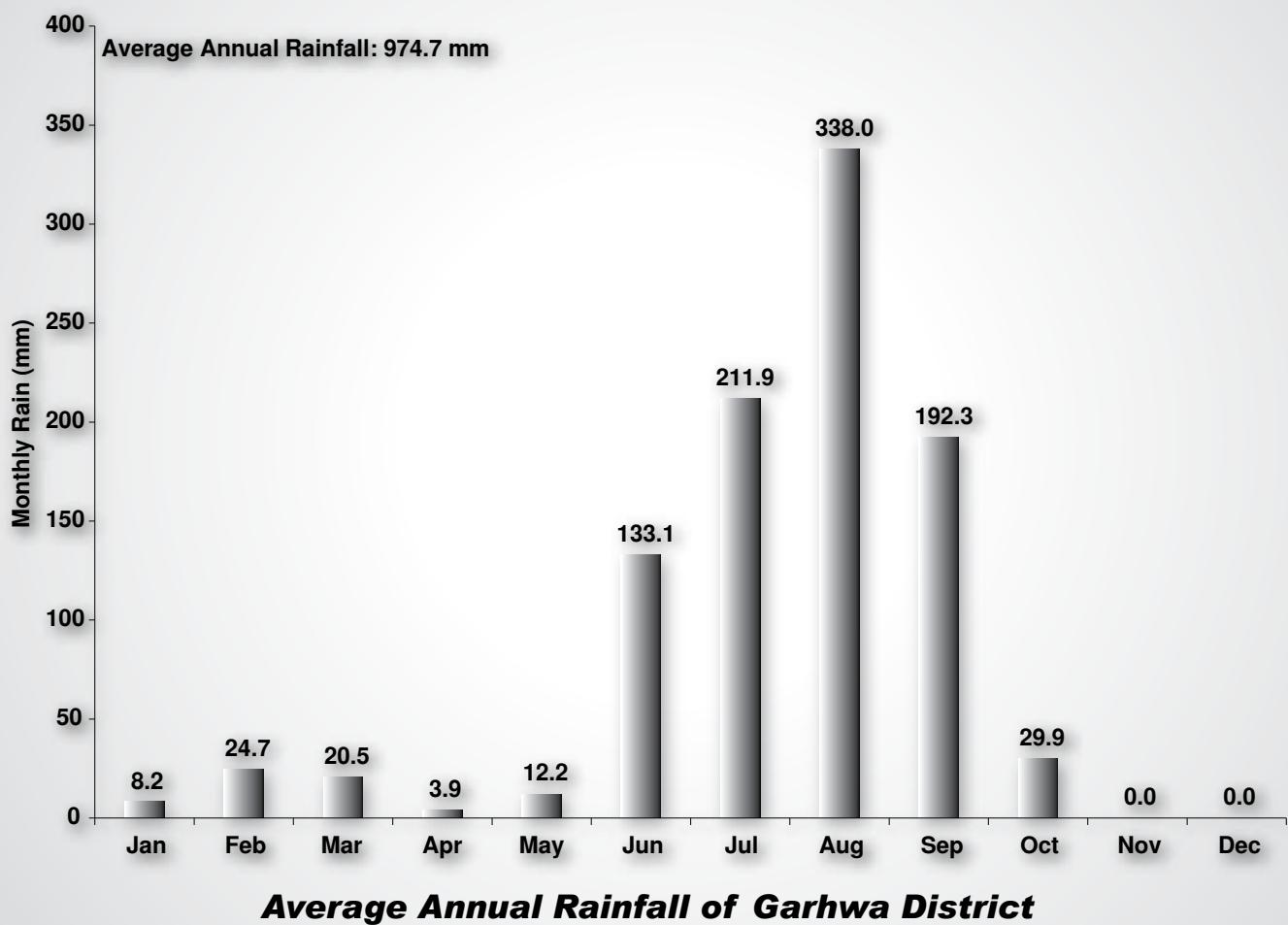
Garhwa - Latehar - Palamu



BIRSA AGRICULTURAL UNIVERSITY, KANKE, RANCHI, JHARKHAND
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GARHWA DISTRICT

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	a) Before the event	
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	c) After the event	





District Agriculture Plan

Agro-Climatic Zone	AZ - 58						
Agro Ecological Sub Region (ICAR)	Moderately To Gently Sloping ChattisgarhMahanadi Basin, Hot Moist/Dry Subhumid Transitional ESR (11.0)						
Agro-Climatic Zone (Planning Commission)	Weastern plateau and hills region (VII)						
Agro Climatic Zone (NARP)	Western Plateau Sub Zone - V						
List all the districts falling under the NARP Zone (>50% area falling in the zone)	Garhwa, Gumla, Latehar, Lohardaga, Palamau, Ranchi (1/3 rd), Simdega						
Meteorological Subdivision	8 th						
Geographic coordinates of district headquarters	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Latitude</td> <td style="width: 33%;">Longitude</td> <td style="width: 33%;">Altitude</td> </tr> <tr> <td>23°34'04" N- 24°32'11" N</td> <td>83°19' 44" E- 84°04' 10" E</td> <td>263m</td> </tr> </table>	Latitude	Longitude	Altitude	23°34'04" N- 24°32'11" N	83°19' 44" E- 84°04' 10" E	263m
Latitude	Longitude	Altitude					
23°34'04" N- 24°32'11" N	83°19' 44" E- 84°04' 10" E	263m					
Name and address of the concerned ZRS/ZARS/ RARS/ RRS/ RRTTS	Zonal Research Station (Z.R.S.), Chianki, Medinigar, Palamau, Pin - 822133 (Birsa Agricultural University, Ranchi) Pin - 834006.						
Mention the KVK located in the district with address	Krishi Vigyan Kendra, Palamau, Pin - 822133						
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Department of Agrometeorology and Environmental Science, Birsa Agricultural University, Ranchi						

Land use pattern of the district (area: '000 ha)

Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
428.826	113.95	191.161	24.957	2.965	9.78	3.05	26.867	70.017	56.096



CONTINGENCY PLAN FOR KHARIF

PART-I

A Monsoon/Weather Situation: 2 Weeks Delay (Onset: 4th Week of June) - Early Season Drought

A1. Major Farming Situation/Land Situation: Upland sandy lateritic soils

Normal Crop/cropping system	Maize + Pigeonpea, Pigeonpea + Groundnut, Maize + Groundnut , Blackgram/ Sesame, Finger millet
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice Crop	
<u>Sole crop</u>	
Maize, Cowpea, Pigeonpea, Groundnut, Blackgram, Finger millet, Soybean, Sorghum	
<u>Intercrop</u>	
Pigeonpea +Lady's finger (YVM resistant) (1:2), Maize + Groundnut (1:2), Maize + Cowpea (1:2), Pigeonpea +Sesame (1:2), Pigeonpea + Groundnut (1:2)	
<u>Horticulture</u>	
Tomato/Cucurbits/Brinjal(Aghanua)/Chili/Dolichos bean/Capsicum/Spinach	
<u>Variety</u>	
Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), Vivek hybrid 9 (80)	
Cowpea- Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90)	
Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)	
Groundnut- Birsa mungfali 3, 4, Girnar 3	
Blackgram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), WBU 109 (70-75), Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149	
Sorghum- CSV 20-110-20, MP cheri, CSV 1616	
Soybean- R 518 (110), JS 9752 (100), Birsa soybea	
Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)	
<u>Vegetable crops</u>	
Tomato- Hybrid- Swarn sampada, Swarn samridhi, Pusa hybrid 1 Suraksha	
Brinjal- Pusa purple long, Mukta keshi, Swarn pratibha, Swarn mani, hybrid-Swarn shakti , Vijay, Swarna sampada 6	
Chili- KA 2, California wonder, Chinese giant, Yellow wonder, Bharat	
Dolichos bean-Swarna utkrist, Swarna rituwar	
Capsicum-California wonder, Yellow wonder, Arka mohini, Arka gaurav, Hybrid- Bharat, Indra	
Spinach- Pusa jyoti, Allgreen, Deshi, Pusa madhwari	
Cucurbits-	
Bitter gourd- Arka harit, Pusa domausami,	
Bottle gourd- Pusa samar, local	
Sponge gourd- Pusa chikni, Pusa supriya, Rajendra nema, Long green,Long white	
Ridge gourd- Swarn manjari, Swarn uphar, Swarn baha, Pusa nasdar, Satputia,	
Red Pumpkin- CO 1, CO 2, Arka chandan, Arka suryamukhi	
b) Agronomic measures	
<ul style="list-style-type: none"> • Summer deep ploughing with Mouldboard or disc • Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations. • RD Spacing • Zero tillage practices • Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing • RDF and in case of Intercropping reduce 1/3rd dose for intercrop • Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Floclralin or Basalin and also for vegetables • Bund construction for unbunded uplands • Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables 	



- Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables
- Inter-cropping to meet the consequences of occasional Drought.
- Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.
- In case of phosph gypsum for soil application apply @ 120 kg/ha
- Lime or dolomite application for pulses and oilseed @ 3-5 q/ha in furrow at the time of sowing.
- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha, PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure

c) Remarks on Implementation

- Linkage with RKVY, ATMAs, and NFSM
- Vermicomposting through KVKS ATMAs and NHM
- Goatry and poultry rearing through KVKS, ATMAs and Veterinary Dept of. Govt. and BAU for livelihood support.
- Awareness about balanced use of fertilizers to increase their fertility, productivity and sustainability
- A special programme is needed to be launched in such areas to motivate the farmers to adopt improved technology.
- Awareness for more and more use of organic manures, bio-pesticides for organic cultivation with IFS (eight components linkages)
- Upland- 15-20 % upland area should be covered with orchard

1. Mango based orchard-

Variety- Amrapali (30 June-5 July), Mallika (15-20 June regular bearer), Sunder langra(15-20 May)

Spacing- 5 m X 5m

i) Recommended package of Practices- Intercrops

- a) Mango + Papaya (Filler crop for two years) + Blackgram (rainy)/ Chickpea
- b) Mango + Custard apple (for 10 years and renovate or remove after 10 years) + Blackgram/Chickpea

Variety- Langra (15 June)/Bombay green(15 May)/ Himsagar (20-25 May irregular bearer),

Spacing- 10 m X 10m

ii) Recommended package of practices

- a) Mango + Guava(Up to 10 years as filler) + Papaya (Less than 3 years) + Blackgram-Chickpea/Lentil
- b) Mango + Lemon + Papaya + Rabi pulses/vegetables
- c) Mango + Custard apple + Papaya + Blackgram - Pea/Chickpea/Lentil/ Vegetables

2. Guava base orchard-

Variety- Arka Mridula, Pant Prabhat, Allahabad safeda, L 49

Spacing- 5m X 5m

Recommended package of practices- Intercrops

- a) Guava + Papaya (For 3 years) + Blackgram-Chickpea
- b) Guava + Custard apple + Blackgram/Soybean- Pea/Vegetables

3. Ber Based Orchard -

Variety- Banarsi, Karakka, Gola, Apple ber

Spacing- 5m X 5m

Recommended package of practices Intercrops

Ber + Custard apple + Sesame/Blackgram- Toria/Linseed/Safflower

4. Beal Based orchard-

Variety- NB 2, 1, 5, 7, and 9 (NB- Narendra Beal) Kagezi beal

Spacing- 8m X 8m

Recommended package of practices Intercrops

Beal + Custard apple + Blackgram/ Sesame- Linseed/ Safflower

5. Citrus based orchard-

Crops- Lemon, Lime, Mosambi, Kinnow, Orange/Mandarine

Variety-Lemon- Kagazi Kalan, Banarsi; Lime- Limepatti; Sweet orange- Mosambi, Malta; Orange- Kinnow, Curg Mandarine, nagpur mandarine

Grape fruit- Duncan, Saharanpur, Marsh (seed less)



Spacing- 5 m X 5 m

Recommended package of practices Intercrops

- a) Citrus + Papaya + Blackgram/ Soybean/ Sesame-Chickpea/Lentil/toria/Linseed
- b) Citrus + Papaya + Blackgram- Vegetable (Pea/French bean-bush type/ Tomato/Brinjal/ Chili/ Capsicum

N.B.-

- Cucurbits, beans or any creeper or climber vegetable should be avoided
- Field crops having height more than one meter should be avoided such as Pigenpea, Maize, Sorghum
- After 3-5 years when shading effects started shade loving crops like ginger, Turmeric, Oel or leafy vegetables should be grown
- In citrus leaf minor and aphid susceptible crops should be avoided
- Aphid should be managed of mustard /toria taken in citrus orchard
- 6. Cassava should be grown for the requirement as feed for pig animals
- 7. Moringa should also be grown as fodder or vegetable purpose on upland main field bunds as shelter belt/ wind break. Every year pruning and thinning should be followed for bushy look.

A2. Major Farming Situation/Land Situation: Midland Medium deep sandy loam

Normal Crop/cropping system	Rice Hybrids
Suggested Contingency measures	

a) Change in crop/cropping system

Don2

DSR (Improved rice varieties) Var- IR 64 Drt 1, BVD 111, BVD 203, BVS 1, Shabhagi Dhan, Abhishek also Green manuring/ Brown manuring

Transplanting(Hybrid rice varieties) Var.-PAC 801, 807, 25P25, 27P31, DRRH 2, Arize Tej (Gold)

Don 3

Raised bed or ridge and Furrow method:Replace Rice with Pigeonpea/Finger millet/Sorghum/ Maize/ Cowpea/ Lady's finger/ Radish / Coriander leaf/ Dolichos bean

Variety

Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), ICPH 2671 (200)

Finger millet- BM 2, BM 3 (BBM 10), Sorghum- CSV 20-110-20, MP cheri, CSV 1616

Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Vivek hybrid 9 (80)

Cowpea- Birsa sweta(80-90)

Lady's finger- Pusa A 4, Hybrid- Sonal, Sarika

Coriander- Pant haritima, Rajendra swati

Radish- Pusa chetki, Pusa deshi,

Dolichos bean-Swarna utkrist, Swarna rituwar

b) Agronomic Measures

- Staggered Nursery raising by MAT/DAPOG method
- Follow community based nursery raising
- Follow RDF,INP
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P_2O_5 + 1 kg K_2O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P_2O_5 : K_2O (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P_2O_5 + 40 K_2O /ha ((Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O ; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K_2O

c) Remarks on Implementation

- A campaign trough RKVY , ATMAs, NFSM, KVKS, NHM and other State Govt. line departments are needed to be launched trough different district, block, panchayat and village level programme.
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.



- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.

A3. Major Farming Situation/Land Situation: Lowland deep clay

Normal Crop/cropping system	Rice, Arize -6444, Advanta-801, PHB-71(Hybrid), Blackgram
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree) with Medium duration rice variety of <u>Don 2</u> in <u>Don 1</u>	
DSR(Improved Rice variety)- Shabhagi Dhan, BVS 1IR 64-Drt 1, Abhishek (120 days)	
Transplanting(Hybrid rice varieties) var.-Arize 6444 (Gold), PHB 71, PAC 807, 25P25, US 312, MTU1010, MTU 1001 Uday 111	
b) Agronomic Measures	
<ul style="list-style-type: none"> Staggered Nursery raising by MAT/ DAPOG method Follow community based nursery raising Follow RDF,INPM Use Post emergence weedicide Use early to mid early duration of rice variety. Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice Topdressing above mentioned dose 10-15 days after sowing In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering. DSR-Use plastic drum seeder rice tools Use of post weedicide Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit. water Gundhi bug, leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha. Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water 	
c) Remarks on Implementation	
<ul style="list-style-type: none"> Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme Supply of Plastic drum seeder through line departments Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept. Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon. Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation. 	

B. Monsoon/Weather Situation: 4 Weeks Delay (Onset: 2nd Week of July) - Early Season Drought

B1. Major Farming Situation/Land Situation: Upland shallow, acidic, redsoil	
Normal Crop/cropping system	Maize + Pigeonpea, Maize + Groundnut , Maize + Blackgram
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice	
<u>Sole crop</u>	
Pigeonpea, Maize, Sesame, Sorghum, Cowpea	
<u>Intercrop :</u>	
Pigeonpea + Maize (1:1), Maize + Lady's finger (1:2), Pigeonpea + Lady's finger (1:2), Pigeonpea + Sesame (1:2)	
Pigeonpea + Blackgram (1:2, Maize + Cowpea (Pole type) (1:2), Maize + Ridge ground (1:2), Pigeonpea + Sorghum (1:1), Pigeonpea + Vegetables- Cucurbits (Sponge, Ridge and Bitter Gourd), Ridge Gourd (Satputia)(1:2)	



Horticulture

Vegetable-Cucurbits/ Lady's finger/Dolichos bean/ Brinjal (Aghanua)/ lobia (pole type)

Variety

Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)

Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), KDMH, P3544, LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)

Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)

Sorghum- CSV 20-110-20, MP cheri, CSV 1616

Cowpea-rainy - Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90)

Vegetable crops

Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika

Dolichos bean-Swarna utkrish, Swarna rituwar

Brinjal- Pusa purple long, Pusa purple round, Pusa purple cluster, Mukta keshi, Banaras giant, Swarn pratibha, Swarn mani, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6

Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati Creeper- Birsa sweta, Swarna sweta, Swarn harit

Cucurbits-

Bitter gourd- Arka harit, Pusa domausami,

Bottle gourd- Arka bahar, Pusa samar, Pusa Naveen, PusaMeghdoot, Coimbtur long green, local

Sponge gourd- Pusa chikni, Pusa supriya, Rajendra nema, Long green,Long white

Ridge gourd- Swarn manjari, Swarn uphar, Swarn baha, Pusa nasdar, Satputia,

Red Pumpkin- CO 1, CO 2, Arka chandan, Arka suryamukhi

b) Agronomic Measures

- Summer deep ploughing with Mouldboard or disc
- Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.
- RD Spacing
- Zero tillage practices
- Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing
- RDF and in case of Intercropping reduce 1/3rd dose for intercrop
- Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin@ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables
- Bund construction for unbundled uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables
- Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables
- Inter-cropping to meet the consequences of occasional Drought.
- Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.
- In case of phosphogypsum for soil application apply @ 120 kg/ha
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyrifos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility. Apply Borax @ 10 kg/ha
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges and furrows



- Cultivate vegetables like Brinjal Tomato, Cucurbits, Lady's finger, Chili, Coriander leaf, Amaranthus leaf, Oel, Arvi, Dolichos bean, Cole crop, French bean Cowpea etc.
- Gap filling and resowing should be done If mortality is more than 50 per cent and even if necessary replace the crops with short duration high yielding low water requiring crops like: Greengram, Blackgram, Horsegram, Niger, Cowpea Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour.
- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/t. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/lit. water, Mosaic- Methyl Demeton @ 1.5 ml/lit. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit. water; vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/lit. water

c) Remarks on Implementation

- Linkage with RKVY , ATMAs and NFSM
- Vermicomposting awareness through KVks, ATMAs and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVks, ATMAs and Veterinary Dept of Govt. and BAU for livelihood support.
- A special programme is needed to be launched in such areas on priority basis to motivate the farmers to adopt improved technology for stress management through ATMAs, KVks, Govt. Dept., NGOs
- Campaign for awareness of crop-weather insurance to meet the losses due to drought/cyclone like weather vagaries.

B2. Major Farming Situation/Land Situation: Midland deep sandy loam soil

Normal Crop/cropping system	Rice - IR - 36, IR - 64
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> DSR (Improved rice varieties) Var.-IR- 64 Drt 1, Shabhagi Dhan, Abhishek, BVS 1, BVD 203 Transplanting (Hybrid rice varieties) Var.-ArizeTez (Gold), PAC 801, 807 <u>Don 3</u> Replace rice with Pulses/vegetable/ Fodder crop : Pulses-Blackgram/ Soybean/Cowpea /Pigeonpea+ Fodder (2:1)/ Pigeonpea + Blackgram (1:2)/Maize (1:1)/Lady's finger (1:1)/Finger Millet (1:2) <u>Vegetables-</u> Ladys's Finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ <u>Fodder Crop</u> Brachiaria grass/ Ginuea grass /Rice bean (Moth bean)/ Maize/ Cowpea/ Sorghum/Pearl millet/ Soybean Variety Blackgram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), WBU 109 (70-75), Uttara (75-80 small grain) Soybean- R 518 (110), JS 9752 (100), Birsa soybean 1 black(120-125), JS 335 Birsa safed soybean 2 (105-110), RKS 18, RAUS 5 Cowpea- Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200) Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 67, VL 149 Lady's finger- Pusa A 4, Varsa uphar, Hybrid- Sonal, Sarika Coriander- Pant haritima, Rajendra swati Dolichos bean-Swarna utkrist, Swarna rituwar <u>Fodder crop</u> Maize- African tall, JS-1006 and Vijaya composite. Cowpea- UPC-287, GFC-1, GFC-2 and GFC-4. Pear millet-Giant Bajara, APFB-2, Rajco, HB 3, 4, 5 are grain hybrids suitable for fodder production. Sorghum-PC-1, PC-6, Pant Chari-6 and Sorghum Sudan hybrid. Soybean- R 518 (110), JS 335	

b) Agronomic Measures

- Summer deep ploughing with Mouldboard or disc
- Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.
- RD Spacing
- Zero tillage practices
- Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing
- RDF and in case of Intercropping reduce 1/3rd dose for intercrop
- Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables
- Bund construction for unbunded uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables
- Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables
- Inter-cropping to meet the consequences of occasional Drought.
- Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.
- In case of phosphogypsum for soil application apply @ 120 kg/ha
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility.
- Apply Borax @ 10 kg/ha
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges and furrows
- Cultivate vegetables like Brinjal Tomato, Cucurbits, Lady's finger, Chili, Coriander leaf, Amaranthus leaf, Oel, Arvi, Dolichos bean, Cole crop, French bean Cowpea etc.
- Gap filling and resowing should be done If mortality is more than 50 per cent and even if necessary replace the crops with short duration high yielding low water requiring crops like: Greengram, Blackgram, Horsegram, Niger, Cowpea Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour.
- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/lit. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/lit. water, Mosaic- Methyl Demeton @ 1.5 ml/lit. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt. water; vegetables- Nursery managemnt- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/lit. water.
- Rice pest and disease management -Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha. Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lt water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign trough RKVY , ATMAS, NFSM, KVKS, NHM programme and other State Govt. line departments are needed to be awarded trough different district, block, panchayat and village level programme.
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.



B3. Major Farming Situation/Land Situation: Lowland Deep, heavy clay soil

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree) Replace Late duration with Medium duration rice variety of <u>Don 2 in Don 1</u>	
DSR (Improved rice) Var- IR- 64 Drt 1, Shabhagi Dhan, BVD 203, Abhishek Transplanting (Hybrid rice varieties) Var.- PAC 801, 807, Arize 6444 (Gold), 25P25, 27P31, 27P36 MTU 1010, 1001	
b) Agronomic Measures	
<ul style="list-style-type: none"> • Staggered Nursery raising by MAT/ DAPOG method • Follow community based nursery raising • Follow RDF,INPM • Use Post emergence weedicide • Use early to mid early duration of rice variety. • Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² • Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice • Topdressing above mentioned dose 10-15 days after sowing • In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling • Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm • Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering. • DSR-Use plastic drum seeder rice tools • Use of post weedicide • Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr. water, Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha, Falsesmut 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %, Blast- Beam or Tricyclazole @ 0.6 gm /lt water 	
c) Remarks on Implementation	
<ul style="list-style-type: none"> • Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme • Supply of Plastic drum seeder through line departments • Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept. • Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon. • Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates • Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation 	

C. Monsoon/Weather Situation: 6 Weeks Delay (Onset: 6th Week of July) - Early Season Drought

C1. Major Farming Situation/Land Situation: Upland Sandy lateritic soils	
Normal Crop/cropping system	Maize + Pigeonpea, Sesame/ Blackgram, Finger millet
Suggested Contingency measures	
a) Change in crop/cropping system	
<p>Discard Rice</p> <p><u>Sole crop</u></p> <p>Niger, Horsegram, Sorghum, Sweet potato, Blackgram, Gundli, Kodo, Guarfalli, Sesame, Finger millet</p> <p><u>Intercrop</u></p> <p>Maize + Cowpea (1:2)</p> <p><u>Horticulture Crop</u></p> <p><u>Vegetable</u></p> <p>French bean/ Lady's finger/ Tomato/ Brinjal/ Chili/ Cowpea/ Radish</p> <p><u>Fodder Crop</u></p> <p>Sorghum/ Lobia/ Maize/Deenanath grass / Stylo Hemata/ Rice bean/ Hybrid Napier</p> <p><u>Variety</u></p> <p>Sorghum- CSV 20-110-20, MP chari, CSV 1616</p> <p>Sweet potato-Shribhadra (80-90), Kalinga, Birsa sakarkand 1, Gauri</p> <p>Blackgram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), Uttara (75-80)</p> <p>Gundli- Birsa gundli 1</p>	



Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)
Cowpea- Birsa sweta(80-90), Swarn harit (80-90)
French bean- Pant anupma, Swarna priya, Arka Komal, Lady's finger- Pusa A 4, Arka anamika, Varsa uphar,
Hybrid- Sonal, Sarika
Tomato- Samrat, Hybrid- Swarn sampada, Swarn samridhi, Pusa hybrid 1 Suraksha
Brinjal- Swarn pratibha, Swarn mani, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6
Chili- California wonder, Chinese giant, Yellow wonder, Bharat
Radish- Kashi hansi, Jaunpur/ Pusa himani, Japanese whitei
Vegetable crops
French bean- Pant anupma, Birsa priya, Swarna lata
Lady's finger- Hybrid- Sonal, Sarika
Tomato- Swarn vaibhav, Samrat, Hybrid- Swarn sampada, Swarn samridhi, Pusa hybrid 1 Suraksha
Brinjal- Pusa purple long, Pusa purple round, Pusa purple cluster, Mukta keshi, Banaras giant, Swarn sampada 6
Chili- Chinese giant, Yellow wonder, Bharat
Cowpea-Pusa barsati Birsa sweta
Radish- Pusa himani, Japanese white, Pusa roshni,
<u>Fodder crop</u>
Sorghum-PC-1, PC-6, PC-23, HC-136, HC-171, PSC-1, Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid
Cowpea-EC-4216, UPC-287, UPC-5286, GFC-1, GFC-2 and GFC-4.
Maize- African tall, JS-1006 and Vijaya composite

b) Agronomic Measures

- Top dressing of urea and DAP after receipt of the rain for all crops
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility. Apply Borax @ 10-15 kg/ha
- Replace the crops with short duration high yielding low water requiring crops like : Greengram, Blackgram, Soybean, Sesame, Horsegram , Niger, Cowpea, Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour
- Follow mulch after cultural operations to control the weeds in vegetables.
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges
- Foliar application of 2 % DAP or 0.5 to 1 % potassium chloride (KCl) +0.3 % Boric acid or 2% urea at pre-flowering and flowering stage in pulses and vegetables
- 2 % DAP spray for pulses.
- Use antitranspirants : Stomatal closure (Growth hormones like ABA, Ethrel, TIBA, succinic acid, ascorbic acid and Cycocel (CCC), Reflectant (Calcium bicarbonate, Lime water) Thin film (Hexadecanol (Higher alcohols) Cetyl alcohol, Methanol
- Acidic soils should be reclaimed by application of soil ameliorants.
- Follow integrated pest management.
- Weed control by applying pre-emergence 5-6 DAS (Pendimethalin) or Post-emergence 18-28 DAS (Bispyribac)
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/l.t. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/t. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/l.t. water, Mosaic- Methyl Demeton @ 1.5 ml/l.t. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/l.t. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt. water; vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/l.t. water

c) Remarks on Implementation

- A special programme is needed to be launched in such areas to motivate the farmers to adopt improved technology for stress management through ATMAS, KVKS, Govt. Dept., NGOs and others. Soybean and fodder crops may be promoted.
- Promote Knowingness about climate resilient agriculture at district, block, panchayat and village level through involvement of KVKS, ATMAS, DAO, NGOs and other State Agril. Govt. line departments.
- Awareness of mechanization and Supply of Mouldboard and disc chisel/harrow through govt. scheme on subsidized way.
- Promote for double their income by curtailing cost of cultivation by introduction of early duration crops variety.
- Campaign for Awareness programme about crop-weather insurance



C2. Major Farming Situation/Land Situation: Midland sandy loam with medium depth

Normal Crop/cropping system	Rice, maize, Vegetable
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Suggested Contingency measures

a) Change in crop/cropping system

Don 2

Direct seeded rice (DSR) Medium duration rice variety-Shabhagi Dhan, BVD 203, 111, BVS 1 IR 64 DRT 1, Abhishek Transplanting Hybrid rice varieties) Var.- PAC 801, 807, 25P25, 27P31, ArizeTej (Gold)

Don 3

Raised or ridge and furrow method :Replace rice with pulses and cereals/vegetables/ Fodder crop
Pulses and cereals- Pigeonpea/Maize/Niger/Horsegram/Cowpea

Vegetables

Tomato,/ Brinjal/Cucurbits/Chili/Amaranthus leaf/Dolichos bean

Pulses as and Fodder Crop

Sorghum/ Maize/ Rice bean(Moth bean)/Thin Napier (Un shadow condition)/ Late August-September- Berseem (MC) Variety

Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)

Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), KDMH, P3544, LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)

Niger- Birsa niger 1, 2 and 3 (95-105), Puja 1 (90), VLG 19

Horsegram- Birsa kulthi1 (90-95)

Cowpea-rainy - Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90)

Vegetable crops-

Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika

Tomato- Swarn lalima, amrat, Hybrid- Swarn sampada, Swarn samridhi, Pusa hybrid 1 Suraksha

Brinjal- Pusa purple long, Pusa purple round, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6

Cucurbits

Bitter gourd- Arka harit, Pusa domausami,

Bottle gourd- Arka bahar, Pusa samar, Pusa Naveen,

Sponge gourd- Long green,Long white

Ridge gourd- Swarn baha, Pusa nasdar, Satputia,

Red Pumpkin- CO 2, Arka chandan,

Chili- NP 46, KA 2, California wonder, Yellow wonder

Dolichos bean-Swarna utkrist, Swarna rituwar

Fodder crop-

Sorghum-PC-1, PC-6, PC-23, HC-136, HC-171, PSC-1, Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid.

Maize- African tall, JS-1006 and Vijaya composite

Berseem (MC)-Vardan

b) Agronomic Measures

- Staggered Nursery raising by MAT/DAPOG method
- Follow community based nursery raising
- Follow RDF,INPM
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P_2O_5 + 1 kg K_2O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P_2O_5 : K_2O (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P_2O_5 + 40 K_2O /ha ((Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O ; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K_2O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- INPM
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr. water; Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha; Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %; Blast- Beam or Tricyclazole @ 0.6 gm /lt water; Termite- Methyl parathion dust @ 25 kg/ha



- Pest and disease management- Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/l. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/l. water, Mosaic- Methyl Demeton @ 1.5 ml/l. water; S vegetables- Nursery management Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/l. water

c) Remarks on Implementation

- Campaign for awareness improved technology through RKVY, ATMAs, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be at different district, block, panchayat and village level
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds of contingency crops through Lamps within one months.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.

C3. Major Farming Situation/Land Situation: Lowland sandy clay loam soils

Normal Crop/cropping system	Transplanting of Rice
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree)	
Replace Late duration with Medium duration rice variety of <u>Don 2</u> in <u>Don 1</u>	
DSR-(Improved rice varieties) Var.- Shabhagi Dhan, IR 64-Drt 1, Abhishek, BVD 110, BVD 111	
Transplanting(Hybrid rice varieties) Var.- PAC 801, 807, 25P25, Arize Tej (Gold), KRH 2, DRRH 2	
Fodder crop- In case of fallow (Late heavy rainfall) Para Grass	
b) Agronomic Measures	
<ul style="list-style-type: none"> Staggered Nursery raising by MAT/ DAPOG method Follow community based nursery raising Follow RDF,INPM Use Post emergence weedicide Use early to mid early duration of rice variety. Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice Topdressing 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² at 10-15 days after sowing In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering. DSR-Use plastic drum seeder rice tools Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/l. water; Gundhi bug,leaf folder and BPH -Quinolophos 25 EC(Ekalux) dust @ 25 kg/ha; Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %; Blast- Beam or Tricyclazole @ 0.6 gm /l water 	
c) Remarks on Implementation	
<ul style="list-style-type: none"> Awareness programme of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme Supply of Plastic drum seeder through line departments in case of DSR Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept. Supply of improved and hybrid seeds of contingency mid early rice varieties through Lamps within one month Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation Contingency technology awareness programme through KVKs, ATMAs, NGOs and DAOs Achieve maximum fallow area in case of late drought and suggest to go for cultivation of early duration rabi and fodder crops. 	

PART-II

Monsoon/Weather Situation: Normal onset followed by 15-20 days dry spell after sowing
(Early Season Drought-Normal onset)

A1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management Cultivate drought tolerant promising non paddy crops like pigeonpea, blackgram, greengram, rice bean, finger millet, guar, sesame, soyabean, sorghum, pearl millet, sweet potato, castor and vegetables like radish, tomato, brinjal, creeper bean, chili, lady's finger wherever possible in place of upland rice	
<ul style="list-style-type: none"> • Maximum use of organic manures for early seedling vigour along with RDF (N:P₂O₅:K₂O) • Recommend to resow with subsequent rains for better plant stand. • When damage is Less than 30 per cent then go for Gap filling in all upland crops • When damage is More than 50 per cent then go resowing in all upland crops • Removing excess plants where are overcrowded, reduce crop stand to conserve soil moisture • Water spraying during evening and early morning 	
b) Soil nutrient & moisture conservation measures <ul style="list-style-type: none"> • Avoid top dressing of Urea during dry spell and wait till downpour • Go for in-situ moisture conservation • One hand weeding followed by hoeing and simultaneous eartingup after 20 DAS is highly recommended in all upland crops. 	
c) Remarks on Implementation Awareness for Construction of rain water harvesting structures for recycling of water during dry spell like DOVAS through SHG or on subsidized basis through State Govt. schemes.	
A2. Major Farming Situation/Land Situation: MID LAND Sandy loam solis	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change management <u>Don 2</u> <ul style="list-style-type: none"> • If possible, go for staggered raising of nursery in rice crop • If possible, raise community nursery of rice at a reliable water source to save time for further delay. • In case, if rice population is less than 40-50 percent, gap filled by retransplanting the rice crop and for more than 50 per cent mortality use fresh seeding for fresh transplanting. • Follow gap filling by removing seedlings from profuse tillers to have a uniform distribution of same aged plants • For termite and disease management in nursery spray Indofil M 45 and Chlorpyriphos @ 0.2 per cent life saving irrigation • DSR on receipt of rain by using Paddy drum seeder or • High yielding varieties- follow transplanting while, Improved varieties - follow DSR • In case of DSR- Use sprouted seeds in plastic drum seeder with increased seed rate by 20-25 per cent for good crop stand • Late transplanted rice during early season drought results in the occurrence of sheath rot and grain discoloration diseases. • Follow pre emergence and post emergence weedicide to disturb/check the crop-weed competition for nutrient • Provide life saving and protective irrigation to over aged seedling in nursery through dovas (harvested rain water). Also, take care of blast disease in nursery and avoid using urea in nursery. • Strengthen the bunds to check the drainage holes and seepage loss in transplanted and direct sown medium land rice regularly <u>Don3</u> <ul style="list-style-type: none"> • Follow raised bed broad furrow or Ridge and furrow method for Maize/ Pigeonpea/ Lady's finger/ Blackgram/ Soybean • Adopt surface mulching with crop residue or tree lopping of <i>Glyricidia</i> wherever possible. If farm waste is not available, use blade to form a thin layer of soil mulch to avoid cracks • Life saving irrigation • In case of transplanting of over aged seedling (35-45 days), increase number of seedling per hill (5-6 seedling/hill) 	



b) Soil nutrient & moisture conservation measures

- Dry seeding of rice with application of pre and post emergence weedicide in over aged seedlings (>25 DOS)
- Split application of Urea fertilizer
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells

c) Remarks on Implementation

Awareness for Construction of rain water harvesting structures for recycling of water during dry spell like DOVAS through SHG or on subsidized basis through State Govt. schemes.

A3. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Change management

- If possible, go for staggered nursery raising in rice crop
- If possible, raise community nursery of rice at a reliable water source to save time for further delay.
- In case, if rice population is less than 40-50 percent, gap filled by retransplanting the rice crop and for more than 50 per cent mortality use fresh seeding for fresh transplanting.
- Follow gap filling by removing seedlings from profuse tillers to have a uniform distribution of same aged plants
- Prefer mid early rice variety instead of late variety
- Use pre and post emergence weedicide
- Over aged seedling should be top cut and treat the seedlings root by Dursban/Chlorpyrifos @ 5 ml per lt water and transplant immediately after treated seedlings with 2 per cent Urea solution
- In case of transplanting over aged seedling (35-45 days), increase number of seedling per hill (5-6 seedling/hill)
- In fallow land go for cultivation of mid early duration rice variety through DSR @ 70-80 Kg/ha

b) Soil nutrient & moisture conservation measures

- Split application of Urea fertilizer
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells

c) Remarks on Implementation

Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidized basis through State Govt. schemes.

B. Monsoon/Weather Situation: Mid season drought (long dry spell, consecutive 2 weeks rainless (<2.5 mm) period

B1. At vegetative phase

B1.1 Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
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Suggested Contingency measures

a) Change management

- Use organic mulches such as tree leaves, straw and other available crop residue to conserve soil moisture
- Avoid top dressing of fertilizers till sufficient moisture is available in soil
- Use reflectant or antitranspirant like Kaolin @ 3-5 kg/100 lt or
- In pulses, at weekly interval foliar spray of KCl @ 0.5- 1 % + 100 ppm Boric acid followed by foliar spraying of 2 percent urea during evening time
- Spray wax emulser
- Manual weeding followed by hoeing for germinating weeds.
- For termite and leaf folder control spraying or drenching of Chlorpyrifos @ 2ml/lt water and for all pulses and cereals.
- For leaf folder control in Maize (Stem borer) and Pigeonpea apply Carbofuran 3 G @ 12 Kg/acre or Phorate 10 G @ 4 kg/acre or Quinolphos @ 1 ml/lt water in Maize for leaf folder
- Also, spray @ 20/40/60 ppm CaCl₂ in pulses
- Vegetables- Foliar spray of water with 2 per cent KCl + 100 ppm Boron
- Tomato- Foliar spray of CaCl₂ @ 20/40/60 ppm
- Gap filling may be done with pigeonpea to maintain adequate plant stand.
- For termites in pigeonpea, maize and other standing cereal crops which can be controlled by soil drenching with Chlorpyrifos 20 EC @ 2 ml/lt water or by adding Chlorpyrifos 1.5% dust @ 8–10 kg/ha or Carbofuran 3G @ 12 kg or Phorate 10 G @ 4 kg.acre before final land preparation and also control Gallmidge
- In green and blackgram, cowpea, bean and lady's finger the spread of YMV by insect vector may increase. Hence, to control insect vectors spray Dimethoate @1ml/ lt. water or Imidacloprid 4 ml/10 lt. water twice at 10 days interval



- In groundnut crop termites and white grub incidence is expected to be more. Methods suggested in rice may be followed to reduce the pest infestation.
- Incidence of leaf miner in groundnut may increase which can be managed by spraying Monocrotophos 36 SL or Triazophos 40 EC @ 1 ml/lit. water twice at fortnight intervals.
- Under dry condition incidence of mites is expected to be more in vegetable crops which can be brought down by spraying of dicofol @ 2 ml/lit water.
- Early and mid season drought favours disease like brown spot of rice, bacterial wilt of brinjal and other vegetables

b) Soil nutrient & moisture conservation measures

- Foliar spraying of DAP @ 2 per cent along with Boric acid @ 0.3 per cent. Also, spray Urea @ 1 per cent
- Provide micro- irrigation with drip for wide spaced crops such as chilies and vegetables and Sprinklers for groundnut, maize and vegetables wherever ground/ surface water is available.
- Go for life saving and protective irrigation from constructed dovas.

c) Remarks on Implementation

Promote construction of Rain water harvesting structure watershed programme and MNREGA

B2. At flowering/ fruiting stage

B2.1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
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Suggested Contingency measures

a) Change management

- Maize- Harvest it for fodder use
- Pulses- and vegetables- At 2-3 days interval spraying of water followed by 2 per cent KCl + 100 ppm Boron during evening time is recommended.
- In case of groundnut maturing in the month of September which can be harvested after providing light irrigation through dovas to lose the soil.

b) Soil nutrient & moisture conservation measures

Go for life saving and protective irrigation from constructed DOVAS.

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA

B3. At vegetative phase

B3.1. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Crop management

Don 2

- Manual weeding followed by hoeing for germinating weeds
- Take care of mealy bug and termite attack which are more prevalent in dry weather.
- Top dressing should be followed only after receipt of rain.
- No urea should be top dressed until receipt of rainfall in rice crop.
- For BPH, dusting field bunds and around with Carbaryl (Savin)4% or malathion 5% @ 10 - 12 kg/acre

Don 3

- One manual weeding for germinating weeds
- Apply 4 Kg N/acre in sorghum and oilseed crops soon after receipt of rains.
- In pigeonpea, if the drought affected plants to recoup with the revival of the rains, spray 2 to 3% urea after the foliage is wetted with the rains.
- Foliar application of Sulphur @ 1ppm to mitigate the stress condition in oilseed is necessary after receipt of rainfall
- Apply post emergence weedicide for controlling weeds in oilseed (Groundnut) to undisturb the pegging process.
- During 40-45 DAS, if there is a severe moisture stress, thinning may be done in kharif sorghum and pearl millet.

b) Soil nutrient & moisture conservation measures

- Foliar spray of KCl or ZNSO₄ @ 2 per cent
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells
- Life saving irrigation through dovas,wells, ponds, check dams and bora bandh

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA



B4. At flowering/ fruiting stage

B4.1. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
Don 2 and Don 3	
<ul style="list-style-type: none"> • Life saving irrigation with harvested water • Spray of urea @ 1-2 percent • Drought condition during the month of August-September onwards shall result in severe incidence of foliar blast and brown spot diseases in rice. It is advised to spray Tricyclazole (Tilt) @ 6 g/ 10 lt. water or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period. 	
b) Soil nutrient & moisture conservation measures	
<ul style="list-style-type: none"> • Foliar spray of KCl or ZNSO₄ @ 2 per cent • Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells • Life saving irrigation through dovas, wells, ponds, check dams and bora bandh 	
c) Remarks on Implementation	
Promote for the construction of Rain water harvesting structure watershed programme and MNREGA	

B5. At vegetative phase

B5.1. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
<ul style="list-style-type: none"> • Foliar spray of 2 per cent KCL followed by 1-2 per cent Urea. • Weeding should be done • Drought makes the crop vulnerable to sheath rot and sheath blight diseases. Maintenance of field sanitation followed by twice spraying at 10 days interval with validamycin 2-3 ml/lt water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/lt water are advised. • Life saving irrigation 	
b) Soil nutrient & moisture conservation measures	
Foliar spray of Foliar spray of Urea @ 2 per cent	
Foliar spray of 2% KNO ₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells	
Life saving irrigation through dovas, wells, ponds, check dams and bora bandh	
c) Remarks on Implementation	
Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidized basis through State Govt. schemes.	

B6. At flowering/ fruiting stage

B6.1. Major Farming Situation/Land Situation: LOW LAND Sandy clayloam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
(a) Crop management	
<ul style="list-style-type: none"> • Drought condition during flowering and fruiting and onwards shall result in severe incidence of foliar blast and brown spot diseases in rice. It is advised to spray Tricyclazole (Tilt) @ 6 g/ 10 lt. water or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period. • Life saving irrigation • During drought, attack of gundhi bug shall be more . Apply Quinolphos or Monocrotophos @ 1-2 ml per lt. water. 	
b) Soil nutrient & moisture conservation measures	
<ul style="list-style-type: none"> • Weeding and foliar spray of urea @ 2 per cent • Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells • Life saving irrigation through dovas, wells, ponds, check dams and bora bandh 	
c) Remarks on Implementation	
Promote for the construction of Rain water harvesting structure watershed programme and MNREGA	



Monsoon/Weather Situation: Terminal drought (Early withdrawal of monsoon)

C1. At fruiting/pre physiological maturity stage	
C1.1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management <ul style="list-style-type: none"> Life saving irrigation to vegetables through stored moisture from constructed DOVA If not possible to make survival harvest it for fodder use 	
b) Rabi Crop planning <ul style="list-style-type: none"> Cultivation of Niger, Horsegram, Toria, linseed as relay/paira cropping In case of availability of irrigation, go for cultivation of early Potato and pea (early Arkel group) Prepare kachha check dam or Bora Bandh for Water conservation Mid early variety of radish cultivation is recommended 	
c) Remarks on Implementation Promote for the construction of Farm ponds through watershed management programme and MNREGA	
C1.2. Major Farming Situation/Land Situation: MID LAND Sandy loam soils	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management <u>Don 2</u> <ul style="list-style-type: none"> At milking , soft and dough stage spray KCL @ 2 per cent In case of gundhi bug attack found more than ETL(>2 gundhibug /m²), spray Chlorpyriphos dust or Monocrotophos @ 1 ml/ltr. water If possible go for life saving irrigation Late season drought generally results in outbreak of foliar, node, collar or neck blast of rice depending on the stage of crop. 	
<u>Don 3</u> Instead of grain purpose crops like sorghum, pearl millet, maize, cowpea, black and greengram that can be harvested for fodder use	
b) Rabi crop planning <ul style="list-style-type: none"> Ensure for all inputs required for rabi season in advance. In case of failure of kharif crops prefer sowing of pre rabi catch crops like, Toria, Niger, Horsegram, blackgram, sesame linseed in uplands to medium lands 	
c) Remarks on Implementation Promote construction of Rain water harvesting structure watershed programme and MNREGA	
C1.3. Major Farming Situation/Land Situation: LOW LAND Sandy loam soils	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management <ul style="list-style-type: none"> Life saving irrigation. The land should be tilled properly in case <i>kharif</i> crop fails sow <i>rabi</i> crops like safflower, pigeonpea in sept-Oct (Short duration) Spray KCL @ 2 per cent followed by urea @ 2 per cent Mid early rice crop may be harvested at Physiological maturity Cultivate vegetables like Tomato, Brinjal, Capsicum, Shimla mirch, Broccoli, Cabbage and Cauliflower, green pea and potato as per suitability near and around tributaries 	
b) Rabi crop planning Prefer early sowing of wheat, Mustard, Chickpea, linseed and lentil as sole or intercrop Wheat + Chickpea (4:2) Wheat+ Mustard (4:3)	
c) Remarks on Implementation Promote construction of Rain water harvesting structure watershed programme and MNREGA	

PART-III

Unusual rains: Continuous high rainfall in a short span leading to water logging

Suggested Contingency measures
a) Crop management
Pigeonpea /Sorghum/Pearl millet
Vegetative stage- Prefer ridge and furrow method of sowing. Ensure for proper drainage through channel. Collect runoff water in Dovas for further use.
Flowering stage- Ensure for proper drainage through channel. Collect runoff water in Dovas for further use.
Crop maturity stage- No such situation at the time of maturity
Post harvest- After Sun drying follow grading and storing
Blackgram and other pulses/Oilseeds
Vegetative stage- Follow Ridge and furrow sowing
Ensure for proper drainage through channel
Collect runoff water in Dovas for further use
Avoid application of fertilizer
Flowering stage- Ensure for proper drainage through channel
Collect runoff water in Dovas for further use
Avoid application of fertilizer
Prophylactic measure for jassid and YMV
Crop maturity stage-
Post harvest-
Rice
Vegetative stage- Safe disposal of excess water from rice field. Bund repairing and strengthen. Application of insecticides in the afternoon hours is preferred seeing the weather condition or after spraying weather should remain rain free for at least 4-5 hrs. Retransplant to maintain plant population in case of mortality more than 50 %
In partially damaged crop, allow to withstand upright. Flood occurs due to heavy storm in mid and lowland which when recedes probability of occurrence of swarming caterpillar on field bunds and around of rice crop is more. So, when it crosses the Economic Threshold Limit (ETL) i.e., one larva / hill then spray the crop with Chlorpyriphos/ Triazophos/ Profenophos @ 2 ml/lt water or dust the crop with Quinalphos @ 1.5% D @ 10kg/ acre. To prevent migration of larvae from one field to other, bunds should be heavily dusted with the dust formulation mentioned above. In partially ponded field, rice caseworm and in general leaf folder attack is expected. If 1-2 cases or folded leaves/hill is seen spray the crop with Monocrotophos / Chlorpyriphos @ 1 ml/lt water or with Cartap Hydrochloride 50 SP / Fipronil 5 SP @ 200 g/acre. Rain storms during <i>kharif</i> may result in severe occurrence of bacterial leaf streak and bacterial blight in rice. It is advised to spray the crop immediately after every rainspell with streptocycline @ 1g/10 lt water or plantomycin @ 1g/lt water or bacterinol @ 2g/lt. water. Control snail occurrence by Acaricide
Flowering stage- Safe disposal of excess water from rice field. Bund repairing and strengthen. Avoid application of fertilizer. Flood occurs due to heavy storm in mid and lowland which when recedes probability of occurrence of swarming caterpillar, BPH and cut worm on field bunds and around of rice crop is more. So, when it crosses the Economic Threshold Limit (ETL) i.e., one larva / hill then spray Chlorpyriphos/ Triazophos/ Profenophos @ 2 ml/lt water or dust the crop with Quinalphos @ 1.5% D @ 10kg/ acre. To prevent migration of larvae from one field to other, bunds should be heavily dusted with the dust formulation mentioned above. In partially ponded field, rice caseworm and in general leaf folder attack is expected. If 1-2 cases or folded leaves/hill is seen spray the crop with Monocrotophos / Chlorpyriphos @ 1 ml/lt water or with Cartap Hydrochloride 50 SP / Fipronil 5 SP @ 200 g/acre. Unusual and heavy rain during <i>kharif</i> may result in severe occurrence of bacterial leaf streak and bacterial blight in rice. It is advised to spray the crop immediately after every rain spell with streptocycline @ 1g/10 lt water or plantomycin @ 1g/lt water or bacterinol @ 2g/lt. water. Control snail occurrence by Acaricide.
Crop maturity stage- Provide drainage for fast removal of water from the field to favour harvesting
Post harvest- Protect the grain from rain and store it after sun drying for 2-3 days
Maize
Vegetative stage- Prefer ridge and furrow method of sowing. Ensure for proper drainage through channel. Earthingup after downpour. At Knee stage apply thimate 10 G @ 4-6 grains in whirl
Flowering stage- Ensure for proper drainage through channel. At flowering and silking stage for ant attack apply dust on silks @ 0.5 g / cob
Crop maturity stage- Provide drainage for fast removal of water from the field to favour harvesting
Post harvest- Protect grains from rain and store it after sun drying for 2-3 days



Horticulture

Vegetative stage- Prefer ridge and furrow method for sowing and proper drainage. Ensure for proper drainage through water ways. Collect runoff water in Dovas for further use. Soil drenching Carbofuran 3G @ 3 g/lt water against insects. In case of web formation with leaves apply (Nuvan)DDVP @ 1 ml/lt water as a fumigant

Flowering stage- Apply hormone to prevent flower drop. Ensure for proper drainage. Take precaution against wilting and fruit rot. In Tomato and Brinjal-drenching Bavisting @ 2 ml/lit. water + Streptocycline @ 1-2 g/lit water. In Cauliflower -In case of Incidence of collar rot -Spraying of Saaf (Metalaxyl + Mancozeb) @ 2 g/lit water solution. Drainage of excess water. In Lady's finger- YVMV- Spray insecticide followed by fungicide. Soil drenching Carbofuran 3G @ 3 g/lt water against insects. In case of web formation with leaves apply (Nuvan) DDVP @ 1 ml/lt water as a fumigant

Crop maturity stage- Take precaution against wilting and fruit rot. For wilting– Soil drenching with Bavistin @ 2 ml/lit + Streptocycline @ 1-2 g/lit water. In YMVM- Insecticide followed by fungicide

Post harvest- Immediate harvest and safe disposal of produce

Vegetables- (Cucurbits,/ Tomato/ Brinjal/ Cauliflower/ Cabbage/ Lady's finger/Dolichos bean/Amaranthus leaf/ Coriander leaf/Radish)

Vegetative stage- Sowing on ridge and drainage through furrow. Prophylactic measures against pest and diseases.

Damaged twigs and leaves may be removed and follow fungicide spraying and stacking

Flowering stage- Apply hormone to prevent flower drop. Ensure for proper drainage. Take precaution againsts wilting and fruit rot. In Tomato and Brinjal-drenching Bavisting @ 2 ml/lit. water

+ Streptocycline @ 1-2 g/lit water. In Cauliflower -In case of Incidence of collar rot -Spraying of Saaf (Metalaxyl + Mancozeb) @ 2 g/lit water solution. Drainage of excess water. In Lady's finger- YVMV- Spray insecticide followed by fungicide. Provide support through stacking

Crop maturity stage- Take precaution against wilting and fruit rot. In Wilting– Soil drenching with Bavistin @ 2 ml/lit + Streptocycline @ 1-2 g/lit water. In YMVM- Insecticide followed by fungicide

Provide support through stacking.

Post harvest- Immediate harvest and sell produce safely in the market

b) Pest and disease management

Rice

Vegetative stage- Sheath blight- Hexaconazole @ 1ml/lit wate. Blast- Tricyclazole @ 6 g/10 lt water

Flowering stage- Sheath blight- Hexaconazole @ 1ml/lit water. Blast- Tricyclazole @ 6 g/10 lt water. Falsesmut- Nativo @ 4g/10 lt water

Crop maturity stage- False Smut - Control- Nativo @ 4g/10 lt water or Propiconazole + Tricyclazole 52.5 SE @ 1ml/lit water. In case of grain discolourness (Grain blast). Spray Tricyclazole @ 6 ml / 10 liter water

Post harvest- Store grains after proper sun drying to minimize the incidence of stored grain pest

Maize

Vegetative stage- Stem borer Control- Carbofuran 3 G @ 12 Kg/acre or Phorate 10G@ 4 kg/acre

Flowering stage- Sheath blight Control- Hexaconazole1-2 ml/lit water

Vegetables- (Cucurbits,/ Tomato/ Brinjal/ Cauliflower/ Cabbage/ Lady's finger/Dolichos bean/Amaranthus leaf/ Coriander leaf/Radish)

Vegetative stage- Before sowing apply in soil, Carbofuran 3 G @2-3 g/m². Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lit. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lit water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lit. water against downy mildew diseases of cucurbits.

Flowering stage- Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lit. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lit water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lit. water against downy mildew diseases of cucurbits. YVM Control- Carbofuran 3G @ 3 or Phorate 10 G @ 1 g/m² followed by any fungicide

Crop maturity stage- Stop spraying 1 week before harvesting

Post harvest- Harvest and sell produce in the market



French bean-

Vegetative stage- Rust disease Control- Mancozeb 2g/ lt water. Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lt. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lt. water against downy mildew diseases of cucurbits.

Flowering stage- Take care of pod borer and aphid attack. Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lt. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lt. water against downy mildew diseases of cucurbits.

Crop maturity stage- Stop spraying 1 week before harvesting

Post harvest- Harvest and sell produce in the market

B. Extreme Weather Events

Suggested Contingency measures

Hail storm

Seedling / nursery stage- Vegetable nursery should be raised in poly house or make proper arrangement of low height Polly tunnels in open area or cover with plastic sheet or thatching should be done

Vegetative stage- In vegetables-Remove damages parts immediately and apply insecticide followed by fungicide as prophylactic measures. Follow fertilization through foliar as well as broadcasting

Reproductive stage- n vegetables- Remove damaged parts immediately and apply insecticide followed by fungicide as prophylactic measures. Follow fertilization through foliar as well as broadcasting for proper fruiting

At harvest- Safely sell in the market after grading for immediate returns

Heat Wave

Wheat Chickpea/pea

Seedling / nursery stage- For protection from heat and cold wave there is intervention to sow the rabi crops in between 2nd week of October to 2nd week of November to protect theirs vegetative phase from ground/radiation frost results from cold wave/wind chill injury and reproductive phase from terminal heat stress on Mustard, Chickpea, Wheat, Lentil, Linseed and pea crops. Life saving irrigation

Vegetative stage- Timely sown crop never face heat stress while very late sown(January) crop face heat stress hence only one option is to provide life saving irrigation and water spray during evening time frequently at 2-3 days intervals. Take care of termite attack by spraying Chlorpyriphos @ @ 1 ml/lt and drenching @ 3-5 ml/lt water

In Chickpea because of high soil and ambient temperature (> 35 °C) favours the dry root rot disease starts during flowering/reproductive stage (spraying Captan or thiram or carbendazim or ridomil MZ or Saaf @ 1,5-2 g/lt water)

Reproductive stage- To minimize the terminal heat stress during the month of March and April the only and only way is to provide frequent protective irrigation irrespective of theirs stages (Life saving irrigation). Take care of termite attack by spraying Chlorpyriphos @ @ 1 ml/lt and drenching @ 3-5 ml/lt water. In Chickpea because of high soil and ambient temperature (> 35 °C) favours the dry root rot disease starts during flowering/reproductive stage (spraying Captan or thiram or carbendazim or ridomil MZ or Saaf @ 1,5-2 g/lt water)

At harvest- Frequent irrigation should be provided to meet the evaporative losses.

Tomato/Brinjal/ lady's finger/Cucurbits

Seedling / nursery stage- Due to heat stress wilting and mortality is more hence frequent irrigation and cover the nursery with mulch(Straw/leaves)

Vegetative stage- Due to heat stress wilting and mortality is more hence frequent irrigation and cover the nursery with mulch(Straw/leaves)

Reproductive stage- Drying of flower- Spray PCOA. Follow mulching after irrigation

At harvest- Immediate harvest after irrigation and shift it to safer place

Cold wave

Wheat

Seedling / nursery stage- Cold environment during tillering or branching stage favours more number of tillers in wheat and more branching in mustard, chickpea, lentil and linseed crops which prospects for high yield but it is detrimental for potato, tomato, brinjal, pea, creeper vegetables and fruits. Irrigation. Balanced fertilizer application.

Foliar spray of nutrients

Vegetative stage- Light irrigation. Mulching with crop residue \ weeds. Fertilizer application

Reproductive stage- Irrigation, fertilizer application



At harvest- N/A

Pigeonpea/Mustard/Linseed/Chickpea/pea

Seedling / nursery stage- In Mustard because of cool weather aphid insects attack is more prominent (spraying Rogor (Dimethoate) @ 2 ml or or Monocrotophos 36 EC @ 1 ml /lt water during evening time is advised).

In linseed Alternaria blight (For blight spray Double dose (Iprodione 25 % WP + Carbendazim 25 % WP) @ 2 g per lt. water) and powdery mildew (prophylactic spraying of Sulfex @ 3 g or Kairathen 1 ml per lt water twice at weekly interval during evening time) disease are more common. For powdery mildew in pea (spraying Calixin (Tridemorph 80 % EC @ 5 ml per 10 lt water twice are highly recommended).

In Chickpea-Cold and wet environment (High humidity) during seedling stage cause collar rot, black root rot, wet rot, Pythium root and seed rot in Chickpea, while in potato, pea and tomato favours late blight (spraying of Krilaksil or Ridomil MZ chemical@ 1.5 g per liter water), powdery mildew (spraying newly emerged fungicide Double dose (Iprodione 25 % WP + Carbendazim 25 % WP) 2 g per lt water twice at weekly interval) and bacterial wilt, leaf spot and canker (spraying carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP) diseases in respective vegetable crops. Anthracnose in cucurbitaceous species. Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves. In Mustard because of cool weather aphid insects attack is more prominent (spraying Rogor (Dimethoate) @ 2 ml or or Monocrotophos 36 EC @ 1 ml /lt water during evening time is advised)

Reproductive stage- Pigeonpea- During flowering and pod formation stage attack of Pod borer/sucking bug, mites, blister beetle insects as well as sterility disease may occur more (spraying Profenophos 50 EC, methomyl 40 SP or monocrotophos 36 SL kill the larvae but as the webs protect them from contact insecticides hence along with contact insecticides, mixing of fumigant insecticide such as DDVP @ 0.5 ml/l is required to make the larvae come out from the web. For Mites and Aphids, Dimethoate 30 EC @ 2ml/l and acaricides such as Dicofol 18.5 EC @ 2.5 ml/l water , for Blister beetle synthetic pyrethroids such as Cypermethrin 10 EC @ 1.0 ml/l or Lamda cyhalothrin 5 EC @ 1.0 ml/l water; for sterility mosaic Dicofol 18.5 EC 2.5 ml or Oxydemeton methyl 25 EC or Dimethoate 30 EC 2.0 ml or ml/l water on alternate row twice at an interval of 10 days are recommended).

Vegetables

Seedling / nursery stage- Raising seedling in Poly house, re sowing if damage is more. Provide shelter belt (Wind break) at appropriate spacing with Sisham, Ghamhar. Provide irrigation and mulching with straw and leaves

Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves. Disease and pest control, care for chilling injury or replanting

Reproductive stage- Drying of flower- Spray PCOA. Follow mulching after irrigation

At harvest- Grading and safely dispose produce in the marketing

Frost

Wheat

Seedling / nursery stage- N/A

Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves

Pigeonpea

Seedling / nursery stage- Exposure of crop to smoke by burning waste material during night time

Vegetative stage- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

Reproductive stage- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

At harvest- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

Tomato & Potato and Horticultural crops (fruit)

Seedling / nursery stage- Create smoke around the field by using waste materials or set afire with used mobile oil in north-west or west-north direction towards incoming cold waves. Use polythene or bamboo hoogli in small horticultural /nursery/cash vegetable crops during morning hour and remove it during daytime. In Perennial or Horticulture crop (Fruit) also frequent irrigation followed by mulching, thatching , creating smoke screen s and lighting of fire should be practiced in availability of irrigation facility

Vegetative stage- Earthing up, Irrigation and create smoke around the field by using waste materials or set a fire with used mobile oil in north-west or west-north direction towards incoming cold waves. Use polythene or bamboo hoogli in small horticultural /nursery/cash vegetable crops during morning hour and remove it during daytime. In Perennial or Horticulture crop (Fruit) also frequent irrigation followed by mulching, thatching , creating smoke screen s and lighting of fire should be practiced

Reproductive stage- Immediate harvesting and disposal

At harvest- Harvest in dry weather

Cyclone- Not applicable



CONTINGENCY PLANS FOR RABI

1. Sowing window information

Land type	Cropping system	Crop name	Optimum sowing window (Please mention along with week)
1.Upland	Maize based (Early)	Toria, Linseed, Safflower Fodder crop- Oat, Lathyrus	Toria- 3 rd week of September- 4 th week of September Linseed- 2 nd week of October - 4 th week of October Safflower- 3 rd week of October - 4 th week of October Fodder- 2 nd week of October - 4 th week of October
2.Mid Land	Rice Based (Mid early)	Irrigated- Barley, Wheat (Zero tillage) Potato, Vegetables Rainfed (Zero tillage)- Barley, Mustard, Chickpea, Lentil, Linseed (Normal) Fodder Crop- Oat, maize	Barley/Wheat - 3 nd week of October - 2 nd week of November Potato- 4 th week of October - 2 nd Week of November Linseed- 2 nd week of October - 4 th week of October Chickpea - 2 nd week of October - 1 st week of November Lentil- 3 rd week of October- 2 nd week of November Vegetables- 1 st week of October - 4 th week of November Mustard- 1 st week of October - 4 th week of October Fodder - 2 nd week of October - 1 st week of November
3.Low Land	Rice based (Mid early)	Chickpea (Zero tillage) Linseed(Utera/paira cropping) Wheat (Surface seeding in marshy land) Vegetables near stream line/rivulet (Onion, Garlic, Tomato, Chili, Brinjal, Capsicum, Cucurbits) Fodder crop- Oat, Maize	Chickpea - 1 st week of November - 3 rd week of November Linseed- 4 th week of October - 2 nd week of November Barley/Wheat- Timely- 1 st week of November- 3 rd week of December Late Sown Wheat- 1 st week of December- 4 th week of December Vegetables- 1 st week of November - 4 th week of December Cucurbits- 1 st week of January - 1 st week of February Fodder- 1 st week of November - 4 th week of November

2. Contingency measures for Field crops grown with residual moisture under rainfed condition

2 (A) Optimal residual moisture	
2A1. Land type- UPLAND	
a)	Cropping system- Maize- Toria, Maize-vegetables
b)	Crop name- Zero Tillage-Toria, Linseed , Vegetables (Pea, French bean, Cabbage, Cauliflower, Broccoli with harvested water facility), Fodder- Berseem, Oat, Lucern, Maize, Sudan grass, Rizka
c)	Sowing Window- Toria- 3 rd week of September– 4 th week of September, Linseed- 2 nd week of October - 4th week of October, Vegetables- 1 st week of October - 4 th week of October
d)	Variety- Toria- PT 203, Panchali; Linseed- Dibya, Priyam, Sharda
e) Agronomic management practices	
<ul style="list-style-type: none"> • Rain water harvesting and recycling. • Deeping of water storing structure(Shallow and deep) in April and May month. • Deep summer ploughing in April and May month. • Strengthing and raising of field bunds in April and May months • Sowing in defined window for better establishment • Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population) • Application of Lime or Dolomite (3-5 q/ha) in soil • Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables. • Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses • Follow seed priming (warm water for 4-6 hrs.) before sowing • Follow seed treatment with fungicide-insecticide-rhizobium • Follow deep summer ploughing • Irrigate only at critical stages • Pre and post emergence weedicide application • Follow hoeing after manual weeding • Follow RDF, INM and IPM • For Water use efficiency use antitranspirant, reflectant and mulches • Regular monitoring of field for disease and insect attack 	



- Use pheromone trap and attractant
- Promote protected vegetable cultivation under naturally ventilated polyhouse and net house.

Toria - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2A.2 Land type- MEDIUM LAND

- a) Cropping system- Rice-Wheat, Rice-potato, Rice- Pulses, Rice- Oilseeds, Rice-vegetables
- b) Crop name- (Zero tillage) Potato, Vegetables (Tomato, Chili, Brinjal, capsicum, Pea, French bean, Cabbage, Cauliflower, Broccoli with harvested water facility), Rainfed -(Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal)
- c) Sowing Window- Wheat - 3rd week of October - 2nd week of December, Potato- 4th week of October -2nd Week of November, Chickpea - 2nd week of October - 1st week of November, Lentil- 3rd week opf October- 2nd week of November, Mustard- 1st week of October - 4th week of October, Vegetables- 1st week of October - 4th week of November
- d) Variety- Wheat- HUW 468, K 9107, Birsa Genhu 3; Potato- Kufri Surya, Kufri Arun, Kufri Sutlej, Kufri Laukar, Kufri Lalima; Chickpea- JAKI 9218, Pusa 372, KWR 108, KPJ 59, Lentil- HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25, NRCHB101, NRCHYs 05-02

e) Agronomic management practices

- Follow deep summer ploughing
- Seed treatment with Azotobacter and Azospirillum and also soil application in wheat
- Follow seed treatment with fungicide-insecticide-rhizobium in pulses
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Irrigate only at critical stages
- Pre emergence weedicide application
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow RDF, INM and IPM
- Follow hoeing after hand weeding
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

Potato- Seed treatment. Proper spacing. Frequent irrigation. Take care for leaf curling, Early, late blight and grub infestation. Irrigate during cold day and night to get relief from frost attack. Produce smoke during cooler day and nigh

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment. Pre emergence weedicide application. Irrigate a critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)



Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

2A.3 Land type- LOW LAND

- a) Cropping system- Rice –Chickpea, Rice-Lentil, Rice-Wheat
- b) Crop name- Chickpea (Zero tillage), Linseed (Utera/pair cropping), Wheat (Surface seeding in marshy land, Vegetables near streamline/rivulet (Onion, Garlic, Tomato, Chili, Brinjal, Capsicum, Cucurbits)
- c) Sowing Window- Chickpea - 1st week of November - 3rd week of November, Linseed- 4th week of October - 2nd week of November, Wheat- 2nd week of November- 2nd week of December, Late Sown Wheat- 1st week of December- 4th week of December, Vegetables- 1st week of November - 4th week of December, Cucurbits- 1st week of January - 1st week of February
- d) Variety- Chickpea- JAKI 9218, Pusa 372, KWR 108, KPJ 59; Linseed- Dibya, Priyam, Sharda; Wheat- K 9107, K 8027, HD 2643 (Ganga), HDR 77; Late sown wheat- PBW 373, DBW 14

e) Agronomic management practices

Chickpea - Seed treatment with Rhizobium culture and Phosphate solubilizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Be cautious for pod borer, bud fly insect and powdery mildew disease management.

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

2 (B) Less than optimum moisture i.e., 25% less than normal, which can happen due to insufficient rainfall during September/October months. Deficit of 20-40% rainfall

2B1 Land type- UP LAND

- a) Cropping system- Maize- Toria, Maize- Linseed
- b) Crop name- Zero Tillage-Toria, Linseed
- c) Sowing Window- Toria- 3rd week of September– 4th week of September, Linseed- 2nd week of October - 4th week of October
- d) Variety- Toria- PT 203, Panchali ; Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

- Rain water harvesting and recycling.
- Deeping of water storing structure(Shallow and deep) in April and May month
- Deep summer ploughing in April and May month.
- Strengthening and raising of field bunds in April and May months
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Application of Lime or Dolomite (3-5 q/ha) in soil
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow seed priming (warm water for 4-6 hrs.) before sowing
- Follow seed treatment with fungicide-insecticide-rhizobium
- Follow deep summer ploughing
- Irrigate only at critical stages
- Pre and post emergence weedicide application
- Follow hoeing after hand weeding



- Follow RDF, INM and IPM
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant
- Promote protected vegetable cultivation under naturally ventilated polyhouse and net house.

Toria— Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2B.2 Land type- MEDIUM LAND

- a) Cropping system- Rice- Pulses, Rice- Oilseeds, Rice-Linseed, Rice-vegetables (Tomato, Pea)
- b) Crop name- Rainfed (Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal), Vegetables (Tomato, Pea with harvested water facility)
- c) Sowing Window- Chickpea - 2nd week of October - 1st week of November, Lentil- 3rd week opf October- 2nd week of November, Mustard- 1st week of October - 4th week of October, Linseed- 2nd week of October - 4th week of October, Vegetables- 1st week of October - 4th week of November
- d) Variety- Chickpea- JAKI 9218, Pusa 372, Pusa 256, KWR 108, KPJ 59; Lentil- HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25,NRCHB 101, NRCHYS 05-02; Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate a Critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)

Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2B3 Land type- LOW LAND

- a) Cropping system- Rice-Wheat, Rice- Potato Rice-vegetables, Rice- Pulses, Rice- Oilseeds, (Utera/Paira cropping)
- b) Crop name- Irrigated-Wheat (Zero tillage) Potato, Vegetables (Tomato, Chili, Brinjal, capsicum, Pea, French bean, Cabbage, Cauliflower, Broccoli, Cucurbits with harvested water facility), Rainfed (Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal)



c) Sowing Window- Wheat Timely sown– 1st week of November– 4th week of November, Late sown- 1st week of December– 3rd week of December, Potato- 1st week of November– 4th week of November, Vegetables- 1st week of November– 4th week of December, Cucurbits- 1st week of January - 2nd week of February, Chickpea - 1st week of November– 3rd week of November, Lentil- 1st week of November– 2nd week of November, Mustard- 1st week of November– 4th week of November

d) Variety- Irrigated Wheat-Timely sown (120-125)- HD2967, WH 1105, K307, HD2733; Late sown (105-110)- HD 3059, DBW 14, HI 1563 (seed rate 25 % more than timely sown); Potato-Kufri Surya, Kufri Arun, Kufri Sutlej, Kufri Laukar, Kufri Lalima; Chickpea- JAKI 9218, Pusa 372, Pusa 256, KWR 108, KPJ 59; Lentil-HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25, NRCHB 101, NRCHYs 05-02; Linseed- T 397, Priyam

e) Agronomic management practices

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

Potato- Seed treatment. Proper spacing. Frequent irrigation. Take care for leaf folder, early, late blight and grub infestation. Irrigate during cold day and night to get relief from frost attack. Produce smoke during cooler day and night

Chickpea - Seed treatment with Rhizobium culture and Phosphate solubilizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)

Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.



CONTINGENT STRATEGIES FOR LIVESTOCK, POULTRY & FISHERIES

1 Livestock

Suggested contingency measures under DROUGHT event

a) Before the event

Feed and fodder availability

Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage supply of molasses to cattle feed plants

- Preservation of surplus fodder

Green grass is a good source of vitamin A which is present in the form of Carotene. One kg of green grass provides 50mg of vitamin A and 15 to 20g protein to the animal. Cowpea, beans, subabul leaves etc. give 30 to 40g of protein. From grass fodder herbivorous animals get the carbohydrates (energy source), proteins ("building material" of the body) and vitamins (especially carotene), which are the main drives of sustainable operation of the body.

Two methods are available for preserving or conserving the seasonal excess of green fodder, viz. hay making and silage making. Each method has its own limitations and advantageous. Ensiling is preferred on the basis of fodder quality.

Hay making

Hay -refers to cereals, grasses or legumes that are harvested at appropriate stage, dried and stored

Ensilage / Silage making

Silage may be defined as the green succulent roughage preserved under controlled anaerobic fermentation in the absence of oxygen by compacting green chops in air and watertight receptacles.

- Complete Feed Blocks

Supply enriched complete feed blocks containing dry roughage, concentrates/ unconventional supplements 50:50 ratio. Complete feed blocks may be sourced from different commercial sources.

Feeding practices for livestock in India at present separate feeding of roughage and concentrate

- ❖ Chopped roughage and soaked concentrate mixed together

- ❖ Chopped roughage mechanically mixed with concentrate as mash

- ❖ Chopped roughage and concentrate ingredients mixed and densified as Complete Feed Block

Concept of densified complete feeds with fibrous crop residues is a noble way to increase the intake and improve the nutrients utilization. A complete feed block has been defined as a system of feeding all ingredients including roughages, processed and mixed uniformly, to be made available ad lib to the animals.

- Urea molasses mineral block licks

Urea-molasses mineral block lick can sustain the animals by providing protein, energy and essential minerals. It is cost effective, easy to handle and transport and available commercially through milk cooperatives. Therefore, it is required that urea molasses blocks stocks (UMBS) are made available in the rain-deficient areas.

- Methods used for improving nutritive quality of straws and other crop residues like urea treatment

Spray dry roughages such as paddy and wheat straw with about 10% molasses and 2% urea for maintenance of animals in fodder deficit areas.

Preparation of 100 kg roughage-based enriched feed containing 88.8 kg wheat straw or any other straw/stover, 10 kg molasses, 1 kg urea and 0.5 kg mineral mixture will cost about Rs. 375-450 per quintal.

- Utilization of forest byproducts for feeding of livestock

Use of dry and fallen tree leafs like Pipal, Neem, Mango and Kathal etc.

- Making Leaf meal

- Use of conventional and non conventional feeds

- Rice Mills

The main by-products of rice are rice straw, rice husk or hull, and rice bran. Rice straw is produced when harvesting paddy. Rice husks generated during the first stage of rice milling, when rough rice or paddy rice is husked.

- Aquatic plants

- ❖ One kg DM/100 kg BW

- ❖ Water hyacinth, aquatic spinach, Stalks & leaves of lotus plant, Hydrilla, Pistia etc.

- Encourage supply of molasses to cattle feed plants

Molasses and Bagasse are the byproducts from sugarcane industry and are available in abundance. They can be used as cattle feed after supplementation with urea. Such a ration is a ready feed during drought and scarcity conditions when nothing else is available for feeding to animals.

- Crop Residue Enrichment & Densification

Crop residues can be fortified with feed ingredients like cakes, barns, grains, molasses, hay, minerals and then densified into blocks or pellets to save on storage and transport costs. Also balanced ration in the form of complete diet or total mixed ration as per need of animals can be supplied for improved productivity.

- Demonstration of Re-vegetation of Common Grazing Land

The grazing lands play an important role in the lives of rural people who are getting fodder, fuel, drinking water from commons. However, such lands are being continuously degraded due to overgrazing and overexploitation by locals. Re-vegetation of such lands on scientific lines suiting to agro-climatic conditions is to be demonstrated through strengthening institutional arrangement at village level. Fodder production from such lands can be enhanced substantially by introducing high yielding cultivated fodder crops, grasses and pasture legumes. An integrated approach of growing cultivated crops, grasses, trees and shrubs under silvi-pastoral/ horti - silvipasture system will improve overall productivity of such land.

Drinking water

Repairs of tube wells, clear off the sludge in the canals and local water catchments and clean the water tanks, large ponds and lakes

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - Vaccinate the cattle against tick-borne diseases
- Tick-borne diseases- Vaccination is best done in calves under 6 months of age and one dose is sufficient
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over long distances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1 packet mixed with 12.5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal)
- Sarcoptic Mange in pigs- Not applicable before event

Diseases caused by biting insects

- Trypanosomiasis- Fly control is important for prevention of the disease.
- Three-day stiff sickness- Prevention is by vaccination
- Lumpy-skin disease- Prevention is by vaccination

Diet related Disease problems

- Eating plastic bags and wire(Pica)- Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are grazing. Mineral mixture supplement should be given to the animal
- Poisonous plants- Not applicable before event
- Botulism- Prevention involves vaccination and good nutrition. Burn or bury all carcasses, bones or decaying material

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Not applicable before event
- Calcium, Phosphorous & Vit. D- Not applicable before event
- Vitamin A- Not applicable before event

Infectious Diseases

- Foot and Mouth Disease (FMD)- Vaccination at the age 4 months and above. Booster should be given 1 month after first dose then every six monthly
- Haemorrhagic Septicaemia (HS)- Vaccination at the age 6 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June.
- Black Quarter (BQ)- Vaccination at the age 6 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June
- Anthrax- Vaccination at the age 4 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June.
- Rabies (Post bite therapy only)- Not applicable
- Enterotoxaemia (pulpy kidney)- Vaccinate the animal at the age of 3-4 months, repeat after 15 days and then annually.
- Pneumonia- Not applicable

Non-Infectious Diseases

- Ruminant tympany (Bloat)- Not applicable
- Rumen acidosis- Not applicable
- Intussusception- Deforming should be give
- Pregnancy toxemia (Ketosis)- Fed the pregnant animal with balanced ration.

Poisoning

- Organochlorine compounds- Not applicable
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Not applicable

b) During the event

Feed and fodder availability

- Lactating and pregnant animals need to be provided enriched feed to meet the requirements and rest of animals be provided the maintenance diet. In case of acute shortage, lactating animals be provided feed meeting 50% of the requirements to maintain minimum level of production.
- Drought tolerant fodder crops (like sorghum PC 6 and MP chari, cowpea - BL 1 and 2) and fodder grasses (like stylo, *cenchrus ciliaris*, *athropogan*, etc.) should be cultivated. Under the mini kit programme, the developmental department need to provide fodder crop seeds in the drought-affected areas.
- Provide salt dose daily through feed (40-50 g of salt per adult animal and 10-20 g for small ruminants and calves).
- Issue
- Large scale migration -Creating additional resources in drought prone area
- Grazing of poisonous plants/toxicity problems -Inventory of anti nutritional/toxic factors. Creating awareness in farmer for avoiding nitrate/nitrite HCN poisoning.
- Transport of fodder from normal DPA-Establishing feed and fodder banks. Effective mechanism for distribution of fodder/feed to productive animals. Densification/baling/briquette technologies

Drinking water

Harnessing water through the existing reservoirs and exploitation of groundwater.

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - If disease occurs Treat the cattle against tick-borne diseases. Consult Veterinarian.
- Tick-borne diseases- Prevention is by tick control, treatment of diseased animal and vaccination. Consult Veterinarian.
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over long distances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1 packet mixed with 12,5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal). Consult Veterinarian.
- Sarcoptic Mange in pigs- Itching; dermatitis; rubbing; scratching; reduced growth rate. Miticidal sprays; pour-ones injection and in-feed premix. Consult Veterinarian.

Diseases caused by biting insects

- Trypanosomiasis- Treated with SURAMIN through intramuscular injection or intravenous infusion if sufficient observation is possible. Consult Veterinarian.
- Three-day stiff sickness- It is important that the animal is given food and water if it is unable to stand
- Animal should be treated by Veterinarian
- Lumpy-skin disease- If your cattle get this disease, you should speak to your state veterinarian

Diet related Disease problems

- Eating plastic bags and wire (Pica) - Mostly occurring in those animals which are having shortage of feeds and fodder and deficiency of Phosphorus. Prevention involves the following: - Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are Grazing. Mineral mixture supplement should be given to the animal. Once the cow has eaten plastic bags or wire, the only effective treatment is an operation. Consult Veterinarian.
- Poisonous plants- Due to scarcity of feed s and fodder animals used to consume poisonous plans and are more likely to get toxicity. Poisoning can also happen when owner or animal handler move cattle to new paddocks where toxic plants occur. Consult Veterinarian.
- Botulism- Botulism can occur when cattle eat carcass and bone material when there is a lack of feed during drought or if they have a phosphorus deficiency
- Treatment is only possible in the early stages and requires an antitoxin. Consult Veterinarian.

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Characterized by anorexia and wasting. Deficiency affects growth and fertility of the cattle. Anemia, diarrhoea and unthriftiness occur in extreme cases. Copper or cobalt sulphate in the form of mineral mixture supplement causes rapid disappearance of the symptoms
- Calcium, Phosphorous & Vit. D- Deficiency may result in rickets in calves and osteomalacia in adults. Mineral supplementation in diet is essential to prevent this deficiency.
- Vitamin A- Vit. A deficiency occurs in cattle on dry countryside during periods of drought. Symptoms include night blindness, corneal keratinization, ptyriasis, hoof defects, loss of weight and infertility. Animals should have access to green pasture and should be supplied with Vit. A in feed to prevent deficiency.

Infectious Diseases

- Foot and Mouth Disease (FMD)- If outbreak occurs then the animal should be treated. Foot lesion should be washed with soap / detergent and apply Povidon iodine lotion while in mouth lesion boroglyserine should be applied. Consult Veterinarian.
- Haemorrhagic Septicaemia (HS)- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Black Quarter (BQ)- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Anthrax- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Rabies (Post bite therapy only)- Vaccinate the animal immediately after suspected bite. Booster should be given on 3, 7, 14, 28 and 90 (optional) days after first dose.
- Enterotoxaemia (pulpy kidney)- Not applicable
- Pneumonia- Not applicable

Non-Infectious Diseases

- Ruminant tympany (Bloat)- Not applicable
- Rumen acidosis- Ingestion of large amounts of highly fermentable carbohydrate feeds causes an acute illness due to excess production of lactic acid in the rumen. Clinically, the disease is manifested by dehydration, blindness, recumbency, complete rumen stasis and a high mortality rate. Normal saline, sodium bicarbonate and antihistaminic are advised.
- Intussusceptions- It occurs commonly due to nodular worms, change in feed and local intestinal problems. The animal is dull, off-feed, kicking at the belly with no rise of temperature, frequent straining with no defecation, colic symptoms, and at later stages, recumbency. Emergency surgery is the only rational treatment.
- Pregnancy toxæmia (Ketosis)- It is a highly fatal disease caused due to a decline in the plane of nutrition and short periods of starvation (40 hrs) during the last two months of pregnancy. Treatment comprises intravenous administration of 50% glucose. Supply of molasses in the ration and concentrate in the last two months of pregnancy helps in preventing the condition.

Poisoning

- Organochlorine compounds- Not applicable
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Usually bitten on the scrotum or udder. The presence of hair may obscure the typical fang marks. Prolonged pain, muscular weakness, impaired vision, nausea and paralysis are generally exhibited along with symptoms of shock. If anti-venin is not available and the bite is located in an area where a tourniquet cannot be applied, excision of an area of skin and sub-cutaneous tissue can be life-saving

c) After the event

Feed and fodder availability

Promotion of fodder seed production, cultivation and storage, establishment of fodder block making machines in fodder surplus areas

Post flood feeding management

- Animal should not be allowed to graze in water logged area
- Feeds to be protected from fungal contamination & wet feeds to be dried & fed
- Provides clean drinking water to animals
- Provide ready to eat feed blocks particularly the pregnant and lactating animals
- Requirement of energy may be met providing crude molasses
- Top feeds/ tree leaves available in the area to be provided to meet the DM requirement

Specific contingencies can be adopted for livestock feeding depending upon availability as under in different regions during drought situation

Neem seed kernel cake (NSKC), Saw dust, Paper waste, Agave (Ketki), Cactus, Tree leaves and vegetable leaves, Cher leaves and fruits, Straw and gotars, Sugarcane bagasse as animal feed and Use of damaged grains as feed

Drinking water

To strengthen reservoirs by promoting recharging of water and rain water harvesting during rainy season.



Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - Treat the cattle against tick-borne diseases. Consult Veterinarian.
- Tick-borne diseases- Prevention is by tick control, treatment of diseased animal and vaccination. Consult Veterinarian.
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over longdistances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1packet mixed with 12.5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal). Consult Veterinarian.
- Sarcoptic Mange in pigs- Not applicable after event

Diseases caused by biting insects

- Trypanosomiasis- Treated with SURAMIN through intramuscular injection or intravenous infusion if sufficient observation is possible. Consult Veterinarian
- Three-day stiff sickness- It is important that the animal is given food and water if it is unable to stand.
- Animal should be treated by Veterinarian
- Lumpy-skin disease- If your cattle get this disease, you should speak to your state veterinarian

Diet related Disease problems

- Eating plastic bags and wire (Pica)- Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are grazing. Mineral mixture supplement should be given to the animal
- Poisonous plants- Not applicable
- Botulism- Prevention involves vaccination and good nutrition. Burn or bury all carcasses, bones or decaying material

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Not applicable
- Calcium, Phosphorous & Vit. D- Not applicable
- Vitamin A- Not applicable

Infectious Diseases

- Foot and Mouth Disease (FMD)- If outbreak occurs then the animal should be treated. Foot lesion should be washed with soap / detergent the apply Povidon iodine lotion while in mouth lesion boroglyserine should be applied. Consult Veterinarian.
- Haemorrhagic Septicaemia (HS)- Not applicable
- Black Quarter (BQ)- Not applicable
- Anthrax- Not applicable
- Rabies (Post bite therapy only)- Not applicable
- Enterotoxaemia (pulpy kidney) - It affects the animals in a high state of nutrition on a lush feed, grass or grain. Morbidity rates seldom exceed 10% but mortality rate approximates 100%. Under certain conditions, the organism proliferated rapidly in the intestines and produces lethal quantity of toxin. Suphadimidine with other supportive medicine may be effective for treatment
- Pneumonia- It is one of the most common and important pathological conditions. It is characterized clinically by increased respiration, coughing and abdominal breathing. Treatment with broad spectrum antibiotic, nebulization and other supportive drugs is effective.

Non-Infectious Diseases

- Ruminal tympany (Bloat)- It is the over-distension of the left flank either due to free gas or froth. This is generally encountered in "greedy feeders" when lush green pasture is available. Oral administration of sweet oil with turpentine oil or at times with formalin is advised.
- Rumen acidosis- Not applicable
- Intussusceptions- Not applicable
- Pregnancy toxæmia (Ketosis)- Not applicable

Poisoning

- Organochlorine compounds- This group includes DDT, BHC, lindane, aldrin, dieldrin, chlordane, toxaphane, methocyclor etc. which are used as pesticides on crops. Toxicity symptoms include increased excitability and irritability followed by muscle tremors, weakness, paralysis etc. Treatment consists of administering antidote, usually short-acting barbiturates.



- Organophosphorous compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Usually bitten on the scrotum or udder. The presence of hair may obscure the typical fang marks. Prolonged pain, muscular weakness, impaired vision, nausea and paralysis are generally exhibited along with symptoms of shock. If anti-venin is not available and the bite is located in an area where a tourniquet cannot be applied, excision of an area of skin and sub-cutaneous tissue can be life-saving

2 Poultry

Suggested contingency measures under DROUGHT event

a) Before the event

Shelter management

Optimum space should be provided. Orientation of shed (Long axis) should be in North - South. Plantation of tree around shed to provide cool environment. Provision of ad lib. Fresh water

Shortage of feed ingredients

Storage of feed

Drinking water

Manage clean drinking water. Storage facility should be made. Water quality should be checked before drinking to animal

Health and disease management

- Newcastle Disease- regular vaccination - Broiler birds should be with RD vaccine (Lasota 'F' strain) at the age of 4-7 days through Intra-nasal or Intra-ocular route. Layer birds should be vaccinated with NDV vaccine at the age of 9-14 day, 4 weeks, 13-14 weeks in drinking water/eye drop. Then at the age of 17 week with NDV vaccine through Intra-muscular (IM) route
- Marek's disease Marek's disease- Birds should be vaccinated with Herpes virus turkey vaccine at the age of 1 day through Subcutaneous route.
- Fowl pox- Chick embryo adopted fowl pox vaccine at the age 6-8 weeks. It important for the layer and broiler birds.
- Drop in Egg Production or Quality- Not applicable
- Nervous Signs and Lameness- Not applicable
- Diarrhoea- Not applicable
- Upper Respiratory Diseases- Vaccination against the some of the viral diseases like Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis which are also responsible for the respiratory symptoms can prevent this syndrome. Antifungal and antiparasitic drugs should be given.

Heat Wave

Plantation of tree around shed to provide cooler environment. Proper ventilation should be provided. Optimum space should be provided. Orientation of shed (Long axis) should be in East- West. Plantation of tree around shed to provide cool environment. Provision of ad lib. Fresh water. Manage green fodder and silage preparation. Height of roof should be minimum 220 - 240 cm. Roof of shed should be painted with white.

Cold Wave

Provide ad lib fresh water. Proper ventilation should be provided. Optimum space should be provided. Orientation of shed (Long axis) should be in North - South. Plantation of tree around shed to provide break cold wave. Provision of ad lib. Fresh water. Manage green fodder and silage preparation. Height of roof should be minimum 220 - 240 cm

Roof of shed should be painted with Black Floor of shed should be Dry

b) During the event

Shelter management

Optimum space should be provided, there must not be overcrowded. Protect the animal from direct sun light. Try to provide them cool water. Proper ventilation should be maintained. Allow for grazing during night/early morning. Provision of ad lib. Fresh water

Shortage of feed ingredients

Provide non conventional feed, supplement anti oxidant and anti stress

Drinking water

Provide clean fresh and cold drinking water all the time. Water availability may increase by 20-50% depending upon feed quality and environmental temperature. Soft drinking water should be preferred. Add vit-C and other anti stress ingredients with water

Health and disease management

- Newcastle Disease- Vaccination and treatment of diseased one. Newcastle disease is the most important disease for poultry farmers around the world. This disease causes a large number of deaths in chickens and huge losses to farmers and the industry. Diseased birds should be slaughtered immediately. Consult Veterinarian.
- Marek's disease Marek's disease- It is one of the important diseases of poultry caused by virus. Mortality is very high and causes economic losses to the farmer and poultry industry.
- Fowl pox- It is a viral infection of chickens and turkeys characterized by proliferative lesions in the skin (Cutaneous form), it also affect the GI tract and respiratory tract (Diphtheritic form)
- Drop in Egg Production or Quality- There are many different types of organisms that can cause a drop in egg production or quality. These include: Bacteria (E. coli, Salmonella), Mycoplasma, Viruses (Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis, avian encephalomyelitis, egg drop syndrome). The Parasites, lack of Nutrition and Stress factor also support the onset of this condition. Adding vitamins and minerals to the water or feed may help. Consult Veterinarian
- Nervous Signs and Lameness- Chickens lie down because they cannot stand up. They also walk with a limp or are reluctant to move. Nervous signs may include staring into the sky, pulling the head and neck over their backs, paralysis. Sores on the breast muscles from lying down
- Diarrhoea- The stool or droppings of the chickens are not firm but very loose, watery, not of the normal colour and may contain blood. This may cause the feathers of the vent to be soiled and caked together, Depression, reluctance to eat, drink and move about, poor growth and death. Use an antibiotic or coccidiostatic drug in the water that was recommended by the animal health technician or veterinarian in the water for 3 to 5 days. Stress preparations that contain electrolytes, vitamins and minerals can be added to the water
- Upper Respiratory Diseases- Not applicable

Heat Wave

Water sprinkling to animal. Prevent the animal from direct sunlight. Optimum space should be provided, there must not be overcrowded. Fan should be provided to make the body cool. Try to provide them cool drinking water all time

Proper ventilation should be maintained. Allow for grazing during night/early morning. Try to provide green fodder and silage. Stocking density should be less. Roof should be covered with tiles, paddy, dry leaves to protect from direct sun light

Cold Wave

Luke worm water should be provided at least 4-6 times a day. Prevent the animal from direct cold wave by closing the windows and doors. Optimum space should be provided, there must not be overcrowded. Proper ventilation should be maintained. Allow for grazing during sunny day time. Try to provide green fodder and silage. During extreme cold condition electric heater of wood fire heat should be provided. Try to make the environment inside and outside the shed dry. Gunny bags or blanket may be used to cover the body. Bedding material like paddy straw, Gunny Bag, Bhusa should be provided specially to young one shed.

c) After the event

Shelter management

Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

Shortage of feed ingredients

Not applicable

Drinking water

Provide adlib. Drinking water

Health and disease management

- Newcastle Disease- Disposal of dead birds
- Marek's disease Marek's disease- Disposal of dead birds
- Fowl pox- Disposal of dead birds
- Drop in Egg Production or Quality-Not applicable
- Nervous Signs and Lameness- A complete hygiene and disinfection programme should be planned together with the animal health technician or veterinarian. Antibiotics will only be effective against bacteria and can be used as recommended. If it is a viral disease, such as Newcastle disease, urgent steps have to be taken to prevent possible spread because it causes serious production losses
- Diarrhoea- Disposal of dead birds

- Upper Respiratory Diseases- There is many different types of organisms that can cause disease in the upper respiratory tract. These include: Mycoplasma Bacteria (E. coli, Pasteurella, Haemophilus), Viruses (Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis), Parasites (mites and worms) And Fungi (Aspergillus). Cold stress is also one of the predisposing factors for the occurrence of respiratory problems. Use an antibiotic drug that was recommended by your animal health technician or veterinarian in the water for 3 to 5 days
- Stress preparations that contain electrolytes, vitamins and minerals can be added to the water

Heat Wave

Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

Cold Wave

Provide ad lib. Normal drinking water. Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

3 Fisheries

Suggested contingency measures under DROUGHT event

a) Before the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Increase depth of pond, Repair dyke, outlet and inlet of pond; Prepare duck/pig house & stock pig @ 50-60,duck @ 450-500 no/ha if farmer involve in Integrated fish farming, Allow manure and urine directly in pond, Remove unwanted, predatory & old fishes and for this apply Mahua oil cake @ 2500kg/ha. Fixed net in outlet & inlet to prevent escaping of fish, Plough the pond and apply lime @ 250 kg/ha, Check the natural feed (plankton)@ 1.0 1.5 ml/50 lt. water; otherwise apply organic manure, Stock yearling (stunted grow fish) @ 6,000-8,000 no/ha
- Impact of salt load build up in ponds / change in water quality- Prevent entry of polluted water or apply lime at inlet.

Heat wave and cold wave

- Changes in pond environment (water quality) - Increase depth of pond. Reduce application of organic manure and supplementary feeds
- Health and Pest and disease management- Apply lime @ 50 kg/ha

b) During the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Reduce the stocking density from 25000 fry (1inches size) to 10000-15000/ha, fingerling 6,000-8,000 no/ha. Check the availability of natural food, if it is not sufficient provide supplementary feed at fixed place, time, amount and ratio & if it is more greenish stop supplementary feed & manure, store manure in separate place for agricultural purpose. Check the growth & health status by regular netting, Apply lime @ 50kg/ha.
- Impact of salt load build up in ponds / change in water quality- Apply lime @ 50 kg/ha on every 15-30 days. Aerate the water as per need

Heat wave and cold wave

- Changes in pond environment (water quality) - Stop or reduce supplementary feed and manure, Remove bigger size fishes. Reduce/stop application of feed and fertilizer.
- Health and Pest and disease management- Apply lime/salt as per need

c) After the event

Aquaculture

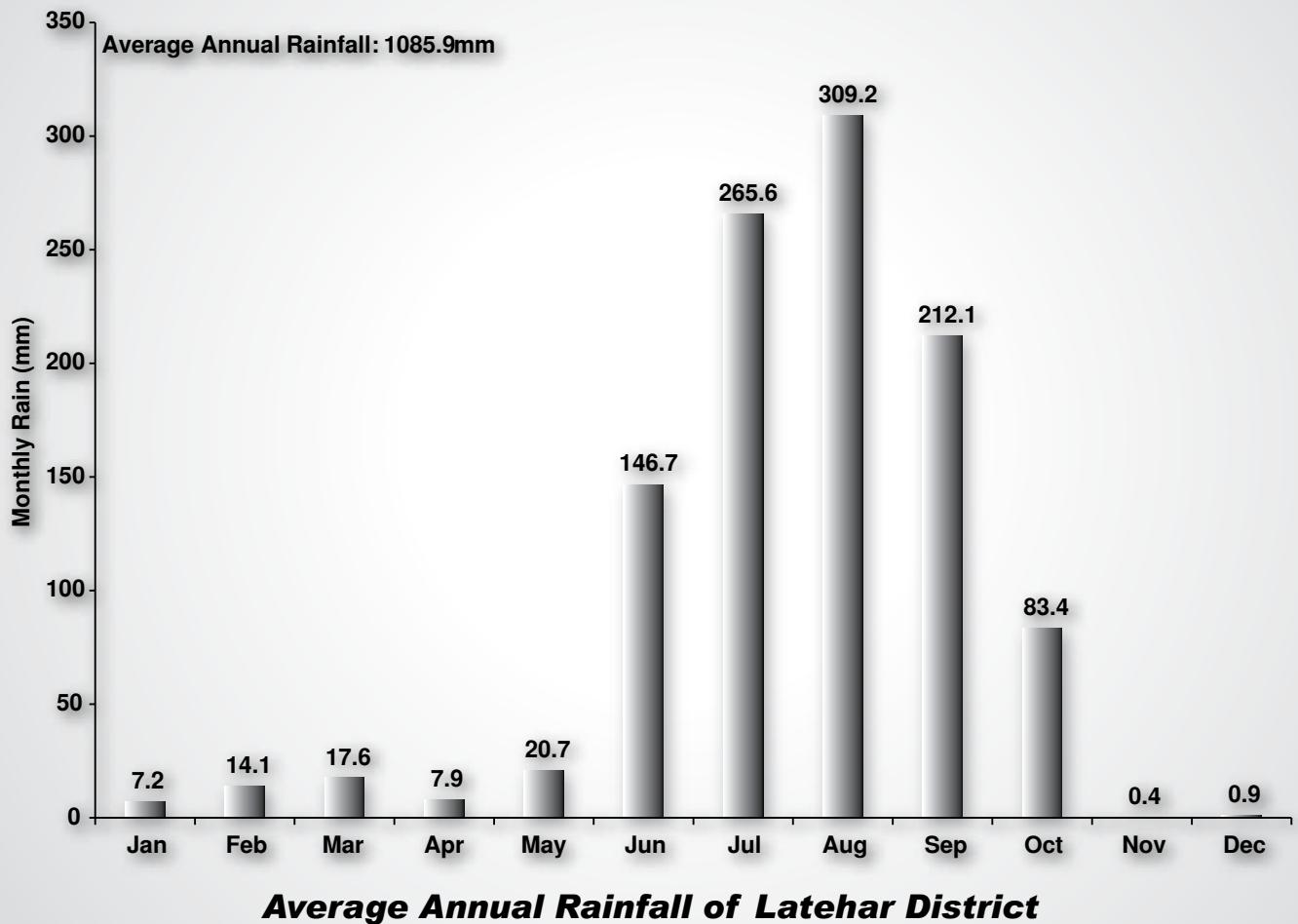
- Shallow water in ponds due to insufficient rains/inflow- Remove the bigger size fishes (0.5kg). In winter season fish reduces feed consumption so reduce supplementary feed, duck start egg laying so they should not allow before 9 O'clock otherwise loss of egg is possible, pig may attain 50 - 60 kg so that can be sell out and again stock same no of piglets. Apply bleaching powder @ 10kg/ha at place of litter deposition.
- Impact of salt load build up in ponds / change in water quality- Apply lime as per need @ 50 kg/ha

Heat wave and cold wave

- Changes in pond environment (water quality) - Stop or reduce supplementary feed and manure, Remove bigger size fishes. Harvest the bigger fishes, Reduce/stop application of supplementary feed, Apply lime @ 50 kg/ha and potassium per magnet in perforated plastic ball- 5-10g in each ball
- Health and Pest and disease management- Apply lime/salt as per need

LATEHAR DISTRICT

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District Agriculture Plan

Agro-Climatic Zone	AZ - 58						
Agro Ecological Sub Region (ICAR)	Moderately To Gently Sloping ChattisgarhMahanadi Basin, Hot Moist/Dry Subhumid Transitional ESR (11.0)						
Agro-Climatic Zone (Planning Commission)	Weastern plateau and hills region (VII)						
Agro Climatic Zone (NARP)	Western Plateau Sub Zone - V						
List all the districts falling under the NARP Zone (>50% area falling in the zone)	Garhwa, Gumla, Latehar, Lohardaga, Palamau, Ranchi (1/3 rd), Simdega						
Meteorological Subdivision	8 th						
Geographic coordinates of district headquarters	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Latitude</td> <td style="width: 33%;">Longitude</td> <td style="width: 33%;">Altitude</td> </tr> <tr> <td>23° 19' 27" N-24° 02' 55" N</td> <td>83° 58' 02" E-84° 58' 00" E</td> <td>608 m</td> </tr> </table>	Latitude	Longitude	Altitude	23° 19' 27" N-24° 02' 55" N	83° 58' 02" E-84° 58' 00" E	608 m
Latitude	Longitude	Altitude					
23° 19' 27" N-24° 02' 55" N	83° 58' 02" E-84° 58' 00" E	608 m					
Name and address of the concerned ZRS/ZARS/ RARS/ RRS/ RRTTS	ZRS, Medininagar,Chianki, Palamu,Jharkhand						
Mention the KVK located in the district with address	Krishi Vigyan Kendra, Seed Multiplication Farm, Balumath, Distt. Latehar						
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Department of Agrometeorology and Environmental Science, Birsa Agricultural University, Ranchi						

Land use pattern of the district (area: '000 ha)

Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
153.621	56.414	44.355	9.689	0.025	7.324	2.078	10.145	16.694	23.591



CONTINGENCY PLAN FOR KHARIF

PART-I

A Monsoon/Weather Situation: 2 Weeks Delay (Onset: 4th Week of June) - Early Season Drought

A1. Major Farming Situation/Land Situation: Upland Undulated red lateritic soils

Normal Crop/cropping system	Up land paddy, Maize, Blackgram, Groundnut, Pigeonpea Finger millet, Tomato
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice Crop	
<u>Sole crop</u>	
Maize, Pigeonpea, Kharif Potato, Sesame, Arvi, Sweet Potato, Groundnut, Blackgram, Finger millet	
<u>Intercrop</u>	
Pigeonpea + Lady's finger(1:2), Maize + Lady's finger (1:2)	
<u>Horticulture</u>	
<u>Vegetable:</u> Lady's finger/ Brinjal/ Tomato/ Radish/ Lobia/Chili	
<u>Variety-</u>	
Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), KDMH, P3544, LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)	
Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)	
Rainy potato- Utimus, Kufri ashoka, Kufri pukhraj	
Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)	
Arvi- Birsa arvi (80) - Arka anamika, Sonal, Shakti, Green long	
Sweet potato-Shribhadra (80-90), Kalinga, Birsa sakarkand 1, Gauri	
Groundnut- Birsa mungfali 3, 4, Girnar 3	
Blackgram- Birsa urd 1 (75-80), WBU 109 (70-75), Uttara (75-80 small grain)	
Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149	
<u>Vegetable crops</u>	
Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika	
Brinjal- Pusa purple long, Pusa purple cluster, Banaras giant, Swarn pratibha, Swarn mani, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6	
Tomato- Hybrid- Swarn sampada, Swarn samridhi, Pusa hybrid 1 Suraksha	
Radish- Kashi hansi, Jaunpur/ Pusa himani, Japanese white, Pusa roshni	
Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati	
Chili- Spices- Andhra jyoti, Pusasadabahar, NP 46, Jwala	
b) Agronomic measures	
<ul style="list-style-type: none">• Summer deep ploughing with Mouldboard or disc• Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.• RD Spacing• Zero tillage practices• Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing• RDF and in case of Intercropping reduce 1/3rd dose for intercrop• Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables• Bund construction for unbundled upland• Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables• Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables• Inter-cropping to meet the consequences of occasional Drought.• Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.• In case of phosphogypsum for soil application apply @ 120 kg/ha• Lime or dolomite application for pulses and oilseed @ 3-5 q/ha in furrow at the time of sowing.	



- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure

c) Remarks on Implementation

- Linkage with RKVY, ATMAS, and NFSM
- Vermicomposting through KVKs ATMAS and NHM
- Goatry and poultry rearing through KVKs, ATMAS and Veterinary Dept of. Govt. and BAU for livelihood support.
- Awareness about balanced use of fertilizers to increase their fertility, productivity and sustainability
- A special programme is needed to be launched in such areas to motivate the farmers to adopt improved technology.
- Awareness for more and more use of organic manures, bio-pesticides for organic cultivation with IFS (eight components linkages)
- Upland- 15-20 % upland area should be covered with orchard

1. Mango based orchard-

Variety- Amrapali (30 June-5 July), Mallika (15-20 June regular bearer), Sunder langra(15-20 May)

Spacing- 5 m X 5m

i) Recommended package of Practices- Intercrops

- a) Mango + Papaya (Filler crop for two years) + Blackgram (rainy)/ Chickpea
- b) Mango + Custard apple (for 10 years and renovate or remove after 10 years) + Blackgram/Chickpea

Variety- Langra (15 June)/Bombay green(15 May)/ Himsagar (20-25 May irregular bearer),

Spacing- 10 m X 10m

ii) Recommended package of practices

- a) Mango + Guava(Up to 10 years as filler) + Papaya (Less than 3 years) + Blackgram-Chickpea/Lentil
- b) Mango + Lemon + Papaya + Rabi pulses/vegetables
- c) Mango + Custard apple + Papaya + Blackgram - Pea/Chickpea/Lentil/ Vegetables

2. Guava base orchard-

Variety- Arka Mridula, Pant Prabhat, Allahabad safeda, L 49

Spacing- 5m X 5m

Recommended package of practices- Intercrops

- a) Guava + Papaya (For 3 years) + Blackgram-Chickpea
- b) Guava + Custard apple + Blackgram/Soybean- Pea/Vegetables

3. Ber Based Orchard -

Variety- Banarsi, Karakka, Gola, Apple ber

Spacing- 5m X 5m

Recommended package of practices Intercrops

Ber + Custard apple + Sesame/Blackgram- Toria/Linseed/Safflower

4. Beal Based orchard-

Variety- NB 2, 1, 5, 7, and 9 (NB- Narendra Beal) Kagezi beal

Spacing- 8m X 8m

Recommended package of practices Intercrops

Beal + Custard apple + Blackgram/ Sesame- Linseed/ Safflower

N.B.-

- Cucurbits, beans or any creeper or climber vegetable should be avoided
 - Field crops having height more than one meter should be avoided such as Pigenpea, Maize, Sorghum
 - After 3-5 years when shading effects started shade loving crops like ginger, Turmeric, Oel or leafy vegetables should be grown
 - In citrus leaf minor and aphid susceptible crops should be avoided
 - Aphid should be managed of mustard /toria taken in citrus orchard
5. Cassava should be grown for the requirement as feed for pig animals
6. Moringa should also be grown as fodder or vegetable purpose on upland main field bunds as shelter belt/ wind break. Every year pruning and thinning should be followed for bushy look.



A2. Major Farming Situation/Land Situation: Midland

Normal Crop/cropping system	Paddy, Soybean, Sesame
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u>	
DSR (Improved rice varieties) Var- IR 64 Drt 1, BVD 203, Shabhagi Dhan, Abhishek also Green manuring/ Brown manuring	
Transplanting(Hybrid rice varieties)Var.-PAC 801, 807, 25P25, 27P31, DRRH 2, Arize Tej (Gold)	
<u>Don 3</u>	
Raised bed or ridge and Furrow method :Replace Rice with Pigeonpea/Finger Millet/Soybean/ Maize/ Sesame/ Cowpea/ Lady's Finger/ Radish / Coriander leaf	
<u>Variety</u>	
Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 (240-250), Asha (200-220), ICPH 2671 (200	
Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149	
Soybean-Birsa soybean 1 black(120-125), JS 335	
Birsa safed soybean 2 (105-110), RKS 18, RAUS 5	
Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)	
Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)	
Cowpea-rainy - Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90)	
<u>Vegetable crops</u>	
Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika	
Radish- Pusa chetki (summer), Pusa deshi, Kashi hansi, Jaunpur/ Pusa himani, Japanese white, Pusa roshni,	
Coriander- Pant haritima, Rajendra swati	
b) Agronomic Measures	
<ul style="list-style-type: none"> Staggered Nursery raising by MAT/DAPOG method Follow community based nursery raising Follow RDF,INP Use early to mid early duration of rice variety. Nursery management- 1 kg N + 1kg P_2O_5 + 1 kg K_2O for 100 m² Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice Topdressing above mentioned dose 10-15 days after sowing In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm Fertilizer dose- 80:40:20 kg/ha N : P_2O_5 : K_2O (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P_2O_5 + 40 K_2O/ha ((Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K_2O 	
c) Remarks on Implementation	
<ul style="list-style-type: none"> A campaign trough RKVY, ATMAS, NFSM, KVKS, NHM and other State Govt. line departments are needed to be launched trough different district, block, panchayat and village level programme. Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme Supply of Plastic drum seeder through line departments Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept. Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon. Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation. 	

A3. Major Farming Situation/Land Situation: Lowland

Normal Crop/cropping system	Paddy
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree) with Medium duration rice variety of Don 2 in Don 1	
DSR (Improved variety) - Shabhagi Dhan , Abhishek, BVD 203	
Transplanting (Hybrid rice) Var.- ArizeTez (Gold), Arize 6444 (Gold), PHB 71 PAC 807, 25P25, US 312 , MTU 1001, MTU 1010	

b) Agronomic Measures

- Staggered Nursery raising by MAT/ DAPOG method
- Follow community based nursery raising
- Follow RDF,INPM
- Use Post emergence weedicide
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr. water Gundhi bug, leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha. Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /ltr water

c) Remarks on Implementation

- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation.

B. Monsoon/Weather Situation: 4 Weeks Delay (Onset: 2nd Week of July) - Early Season Drought

B1. Major Farming Situation/Land Situation: Upland	
Normal Crop/cropping system	Up land paddy, Maize, Blackgram, Pigeonpea, Sorghum (AH) Finger millet, Tomato
Suggested Contingency measures	
Change in crop/cropping system	
<u>Discard Rice crop</u> <u>Sole Crop</u> Pigeonpea, Maize, Finger millet, Gundli, Sorghum, Blackgram, Kharif potato, Sweet potato <u>Intercrop</u> Pigeonpea/ Maize + lady's Finger (1:2), Pigeonpea + Maize (1:1), Maize + Beans (1:2), Maize + Lobia (1:2), Pigeonpea + Guarfalli (1:2), Pigeonpea+ Blackgram (1:2)/Greengram (1:2) <u>Horticulture Crop</u> Vegetables: Brinjal/ Tomato/ Cucurbits/ Cowpea/Beans/ Lady's Finger/ Chili <u>Variety</u> Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Maize- Birsa makka (Vikash) 2 (75-80), HOPM 1 (90-100), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80) Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149 Blackgram- Birsa urd 1 (75-80), WBU 109 (70-75), Uttara (75-80 small grain) Rainy potato- Utimus, Kufri ashoka, Kufri pukhraj Sweet potato-Shribhadra (80-90), Kalinga, Birsa sakarkand 1, Gauri <u>Gundli- Birsa gundli 1</u> Cowpea- bushy- Pusa komal, Pusa barsati ,Birsa sweta, Greengram- HUM 16, IPM-02-03-60-65, SML 668 Sorghum- CSV 20-110-20, MP cheri, CSV 1616 <u>Vegetable crops</u> Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika	



Brinjal- Pusa purple long, Pusa purple round, Pusa purple cluster, Mukta keshi, Banaras giant, Swarn pratibha, Swarn mani, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridhi, Pusa hybrid 1 Suraksha French bean- Bushy- Stringless, Kentucky wonder, Birsa priya, Swarna lata

Chili- Spices- Andhra jyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat

Cucurbits-

Bitter gourd- Arka harit, Pusa domausami,

Bottle gourd- Arka bahar, Pusa samar, Pusa Naveen, PusaMeghdoot, Coimbtur long green, local

Sponge gourd- Pusa chikni, Pusa supriya, Rajendra nema, Long green, Long white

Ridge gourd- Swarn manjari, Swarn uphar, Swarn baha, Pusa nasdar, Satputia,

Red Pumpkin- CO 1, CO 2, Arka chandan, Arka suryamukhi

b) Agronomic Measures

- Summer deep ploughing with Mouldboard or disc
- Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.
- RD Spacing
- Zero tillage practices
- Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing
- RDF and in case of Intercropping reduce 1/3rd dose for intercrop
- Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables
- Bund construction for Unbunded uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables
- Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables
- Inter-cropping to meet the consequences of occasional Drought.
- Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.
- In case of phosphogypsum for soil application apply @ 120 kg/ha
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyrifos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility. Apply Borax @ 10 kg/ha
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges and furrows
- Cultivate vegetables like Brinjal Tomato, Cucurbits, Lady's finger, Chili, Coriander leaf, Amaranthus leaf, Oel, Arvi, Dolichos bean, Cole crop, French bean Cowpea etc.
- Gap filling and resowing should be done If mortality is more than 50 per cent and even if necessary replace the crops with short duration high yielding low water requiring crops like : Greengram, Blackgram, Horsegram, Niger, Cowpea Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour.
- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/ltr. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 ltr. water; vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Tricoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/ltr. water



c) Remarks on Implementation

- Linkage with RKVY , ATMAs and NFSM
- Vermicomposting awareness through KVKS, ATMAs and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKS, ATMAs and Veterinary Dept of Govt. and BAU for livelihood support.
- A special programme is needed to be launched in such areas on priority basis to motivate the farmers to adopt improved technology for stress management through ATMAs, KVKS, Govt. Dept., NGOs
- Campaign for awareness of crop-weather insurance to meet the losses due to drought/cyclone like weather vagaries.

B2. Major Farming Situation/Land Situation: Midland red lateritic sandy soils

Normal Crop/cropping system	Rice - IR-36, IR-64, Birsa Dhan 201, Lalat
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> DSR (Improved rice varieties) Var-IR- 64 Drt 1, Shabhagi Dhan, Abhishek, BVD 111, BVS 1, BVD 203 Transplanting : Hybrid rice varieties) var.-ArizeTez (Gold), PAC 801, 807	
<u>Don 3</u> Replace rice with Pulses/vegetable/ Fodder crop : Pulses-Blackgram/ /Cowpea /Pigeonpea+ Fodder (1:2)/ Pigeonpea + Blackgram (1:2) /Maize (1:1)/Lady's finger(1:2)/ Finger millet (1:1) <u>Vegetables</u> - Ladys's finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ Arvi <u>Fodder Crop</u> Sorghum/Brachiaria grass/ Ginuea grass /Rice bean (Moth bean)/ Maize/Cowpea <u>Variety</u> Blackgram- Birsa urd 1 (75-80), PU 19 (70-75), WBU 109 (70-75), Uttara (75-80) Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200) Maize- Birsa makka (Vikash) 2 (75-80), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80) Cowpea-rainy - Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149 <u>Vegetable crops</u> Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika Dolichos bean-Swarna utkrist, Swarna rituwar Coriander- Pant haritima, Rajendra swati Arvi- Birsa arvi (80) - Arka anamika, Sonal, Shakti, Green long <u>Fodder crop-</u> Sorghum- Pant Chari-6 and Sorghum Sudan hybrid Maize- African tall, JS-1006 and Vijaya composite. Cowpea GFC-2 and GFC-4	

b) Agronomic Measures

- Summer deep ploughing with Mouldboard or disc
- Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.
- RD Spacing
- Zero tillage practices
- Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing
- RDF and in case of Intercropping reduce 1/3rd dose for intercrop
- Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables
- Bund construction for unbunded uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables
- Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables
- Inter-cropping to meet the consequences of occasional Drought.
- Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.

- In case of phosphogypsum for soil application apply @ 120 kg/ha
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility.
- Apply Borax @ 10 kg/ha
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges and furrows
- Cultivate vegetables like Brinjal Tomato, Cucurbits, Lady's finger, Chili, Coriander leaf, Amaranthus leaf, Oel, Arvi, Dolichos bean, Cole crop, French bean Cowpea etc.
- Gap filling and resowing should be done if mortality is more than 50 per cent and even if necessary replace the crops with short duration high yielding low water requiring crops like : Greengram, Blackgram, Horsegram, Niger, Cowpea Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour.
- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/ltr. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 ltr. water; vegetables- Nursery management- Application of carbofuran 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/ltr. water.
- Rice pest and disease management -Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha. Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lt water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign through RKVY, ATMAs, NFSM, KVks, NHM programme and other State Govt. line departments are needed to be awarded through different district, block, panchayat and village level programme.
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates.
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.

B3. Major Farming Situation/Land Situation: Lowland

Normal Crop/cropping system	Paddy
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree) Replace Late duration with Medium duration rice variety of <u>Don 2</u> in <u>Don 1</u>	
DSR (Improved rice varieties) Var.- IR- 64 Drt 1, Shabbagi Dhan, Abhishek	
Transplanting (Hybrid rice varieties)Var. - PAC - 807, Uday - 111, 27P31, Arize 6444 (Gold), MTU 1010, 1001 (130 days)	
b) Agronomic Measures	
<ul style="list-style-type: none"> • Staggered Nursery raising by MAT/ DAPOG method • Follow community based nursery raising 	



- Follow RDF,INPM
- Use Post emergence weedicide
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit. water, Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha, Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %, Blast- Beam or Tricyclazole @ 0.6 gm /lit water

c) Remarks on Implementation

- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation

C. Monsoon/Weather Situation: 6 Weeks Delay (Onset: 6th Week of July) - Early Season Drought

C1. Major Farming Situation/Land Situation: Upland red lateritic soils	
Normal Crop/cropping system	Upland paddy, Upland Maize, Upland Blackgram, Upland Pigeonpea, Upland Finger millet, Upland Tomato, Sorghum (AH)
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Discard Rice Crop</u>	
<u>Sole crop</u>	
Niger, Horsegram, Sorghum, Kharif potato, Blackgram, Gundli, Kodo, Guarfalli	
<u>Intercrop:</u>	
Pigeonpea + Blackgram (1:2),Pigeonpea + Sesame (1:2)	
<u>Horticulture Crop</u>	
Vegetable -French bean/ Lady's Finger/Tomato/ Brinjal/Chili/ Cowpea/Radish	
<u>Fodder Crop</u>	
Sorghum/ Lobia/ Maize/Deenanath grass / Stylo Hemata/ Rice bean/ Hybrid Napier	
<u>Variety</u>	
Niger- Birsa niger 1, 2 and 3 (95-105), Puja 1 (90), VLG 19	
Horsegram- Birsa kulthi1 (90-95)	
Sorghum- CSV 20-110-20, MP cheri, CSV 1616	
Rainy potato- Utimus, Kufri ashoka, Kufri pukhraj	
Blackgram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), Gundli- Birsa gundli 1	
Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)	
French bean- Stringless, Kentucky wonder, Birsa priya, Swarna lata	
Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika	
Tomato- Swarn lalima, Hybrid- Swarn sampada, Swarn samridh, Pusa hybrid 1 Suraksha	
Brinjal- Pusa purple long, Pusa purple round, hybrid-Swarn shakti , Vijay, Swarna sampada 6	
Chili- Spices- NP 46, Jwala, KA 2, Yellow wonder	
Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati	
Radish- Kashi hansi, Jaunpur/ Pusa himani, Japanese white, Pusa roshni	



Fodder crop

Sorghum-PC-1, PC-6, PC-23, HC-136, HC-171, PSC-1, Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid. Maize- African tall, JS-1006 and Vijaya composite. Cowpea-EC-4216, UPC-287, UPC-5286, GFC-1, GFC-2 and GFC-4

b) Agronomic Measures

- Top dressing of urea and DAP after receipt of the rain for all crops
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility. Apply Borax @ 10-15 kg/ha
- Replace the crops with short duration high yielding low water requiring crops like : Greengram, Blackgram, Soybean, Sesame, Horsegram , Niger, Cowpea, Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour
- Follow mulch after cultural operations to control the weeds in vegetables.
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges
- Foliar application of 2 % DAP or 0.5 to 1 % potassium chloride (KCl) +0.3 % Boric acid or 2% urea at pre-flowering and flowering stage in pulses and vegetables
- 2 % DAP spray for pulses.
- Use antitranspirants : Stomatal closure (Growth hormones like ABA, Ethrel, TIBA, succinic acid, ascorbic acid and Cycocel (CCC); Reflectant (Calcium bicarbonate, Lime water) Thin film (Hexadecanol (Higher alcohols) Cetyl alcohol,Methanol
- Acidic soils should be reclaimed by application of soil ameliorants.
- Follow integrated pest management.
- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac)
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/lt water; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/lt water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/lt water., Mosaic- Methyl Demoton @ 1.5 ml/lt water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lt water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt water; vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/lt. water

c) Remarks on Implementation

- A special programme is needed to be launched in such areas to motivate the farmers to adopt improved technology for stress management through ATMAS, KVKS, Govt. Dept., NGOs and others. Soybean and fodder crops may be promoted.
- Promote Knowingness about climate resilient agriculture at district, block, panchayat and village level through involvement of KVKS, ATMAS, DAO, NGOs and other State Agril. Govt. line departments.
- Awareness of mechanization and Supply of Mouldboard and disc chisel/harrow through govt. scheme on subsidized way.
- Promote for double their income by curtailing cost of cultivation by introduction of early duration crops variety.
- Campaign for Awareness programme about crop-weather insurance

C2. Major Farming Situation/Land Situation: Midland red lateritic sandy soils

Normal Crop/cropping system	Paddy, Soybean, Sesame
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don 2</u>	
DSR (Medium duration rice varieties) Var.-Shabhagi Dhan, BVD 110, 111, IR 64 Drt 1, Abhishek, Transplanting(Hybrid rice varieties) Var.- PAC 801, 807, 25P25, 27P31	
<u>Don 3</u>	
Raised bed or ridge and furrow method :Replace rice with Pulses and cereals/ vegetables/ Fodder crop : Pulses and cereals - Pigeonpea/ Maize/ Niger/Horsegram/ Cowpea	
<u>Vegetables</u>	
Ladys's finger/Tomato,/ Brinjal/Cucurbits/Chili/ /Amaranthus leaf/ Arvi/ Dolichos bean/Radish/ Sweet potato	



Fodder Crop

Sorghum/ Maize/ Rice bean(Moth bean)/ Thin Napier (Un shadow condition)/Pearl millet, Late August-September- Berseem (MC)/ Oat (MC)

Variety

Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)

Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), KDMH, P3544, LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)

Niger- Birsa niger 1, 2 and 3 (95-105), Puja 1 (90), VLG 19

Horsegram- Birsa kulthi1 (90-95)

Cowpea-rainy - Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90)

Vegetable crops

Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridh, Pusa hybrid 1 Suraksha Brinjal- Pusa purple long, Pusa purple round, Pusa purple cluster, Mukta keshi, Banaras giant, Swarn pratibha, Swarn mani, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6

Chili- Spices- Andhra jyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat

Arvi- Birsa arvi (80) - Arka anamika, Sonal, Shakti, Green long

Dolichos bean-Swarna utkrist, Swarna rituwar

Radish- Pusa chetki (summer), Pusa deshi, Kashi hansi, Jaunpur/ Pusa himani, Japanese white, Pusa roshni Sweet potato-Shribhadra (80-90), Kalinga, Birsa sakarkand 1, Gauri

Cucurbits

Bitter gourd- Arka harit, Pusa domausami,

Bottle gourd- Arka bahar, Pusa samar, Pusa Naveen, PusaMeghdoot, Coimbtur long green, local

Sponge gourd- Pusa chikni, Pusa supriya, Rajendra nema, Long green,Long white

Ridge gourd- Swarn manjari, Swarn uphar, Swarn baha, Pusa nasdar, Satputia,

Red Pumpkin- CO 1, CO 2, Arka chandan, Arka suryamukhi

Fodder Crop

Maize- African tall, JS-1006 and Vijaya composite.

Giant Bajara, APFB-2, Rajco, HB 3, 4, 5 are grain hybrids suitable for fodder production.

Sorghum-PC-1, PC-6, PC-23, HC-136, HC-171, PSC-1, Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid. Berseem (MC)-Vardan..

b) Agronomic Measures

- Staggered Nursery raising by MAT/DAPOG method
- Follow community based nursery raising
- Follow RDF,INPM
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P_2O_5 + 1 kg K_2O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P_2O_5 : K_2O (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P_2O_5 + 40 K_2O /ha ((Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O ; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K_2O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- INPM
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre, Gall midge- Monocrotophos @ 1ml/ltr. water; Gundhi bug,leaf folder and BPH -Quinolophos 25 EC(Ekalux) dust @ 25 kg/ha; Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %; Blast- Beam or Tricyclazole @ 0.6 gm /ltr water; Termite- Methyl parathion dust @ 25 kg/ha
- Pest and disease management- Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/ltr water., Mosaic- Methyl Demeton @ 1.5 ml/ltr water; S vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/ltr. water



c) Remarks on Implementation

- Campaign for awareness improved technology through RKVY, ATMAS, NFSM, KVKS, NHM programme and other State Govt. line departments are needed to be at different district, block, panchayat and village level
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds of contingency crops through Lamps within one months.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.

C3. Major Farming Situation/Land Situation: Lowland sandy clay loam soils

Normal Crop/cropping system	Paddy
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree)	
Replace Late duration with Medium duration rice variety of <u>Don 2 in Don 1</u>	
DSR-(Improved rice varieties) Var.- Shabhagi Dhan, IR 64-Drt 1, Abhishek, BVD 111, BVD 203, BVS 1	
Transplanting(Hybrid rice) PAC 801, 807, 25P25, Arize Tej (Gold)	
b) Agronomic Measures	
<ul style="list-style-type: none"> • Staggered Nursery raising by MAT/ DAPOG method • Follow community based nursery raising • Follow RDF,INPM • Use Post emergence weedicide • Use early to mid early duration of rice variety. • Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² • Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice • Topdressing 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² at 10-15 days after sowing • In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling • Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm • Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering. • DSR-Use plastic drum seeder rice tools • Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit. water; Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha; Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %; Blast- Beam or Tricyclazole @ 0.6 gm /lt water 	
c) Remarks on Implementation	
<ul style="list-style-type: none"> • Awareness programme of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme • Supply of Plastic drum seeder through line departments in case of DSR • Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept. • Supply of improved and hybrid seeds of contingency mid early rice varieties through Lamps within one month • Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates • Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation • Contingency technology awareness programme through KVKS, ATMAS, NGOs and DAOs • Achieve maximum fallow area in case of late drought and suggest to go for cultivation of early duration rabi and fodder crops. 	

PART-II

Monsoon/Weather Situation: Normal onset followed by 15-20 days dry spell after sowing
(Early Season Drought-Normal onset)

A1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management Cultivate drought tolerant promising non paddy crops like pigeonpea, blackgram, greengram, rice bean, finger millet, guar, sesame, soyabean, sorghum, pearl millet, sweet potato, castor and vegetables like radish, tomato,, brinjal, creeper bean, chili, lady's finger wherever possible in place of upland rice	
<ul style="list-style-type: none"> • Maximum use of organic manures for early seedling vigour along with RDF (N:P₂O₅:K₂O) • Recommend to resow with subsequent rains for better plant stand. • When damage is Less than 30 per cent then go for Gap filling in all upland crops • When damage is More than 50 per cent then go resowing in all upland crops • Removing excess plants where are overcrowded reduce crop stand to conserve soil moisture • Water spraying during evening and early morning 	
b) Soil nutrient & moisture conservation measures <ul style="list-style-type: none"> • Avoid top dressing of Urea during dry spell and wait till downpour • Go for in-situ moisture conservation • One hand weeding followed by hoeing and simultaneous eartingup after 20 DAS is highly recommended in all upland crops. 	
c) Remarks on Implementation Awareness for Construction of rain water harvesting structures for recycling of water during dry spell like DOVAS through SHG or on subsidized basis through State Govt. schemes.	
A2. Major Farming Situation/Land Situation: MID LAND Sandy loam solis	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change management <u>Don 2</u> <ul style="list-style-type: none"> • If possible, go for staggered raising of nursery in rice crop • If possible, raise community nursery of rice at a reliable water source to save time for further delay. • In case, if rice population is less than 40-50 percent, gap filled by retransplanting the rice crop and for more than 50 per cent mortality use fresh seeding for fresh transplanting. • Follow gap filling by removing seedlings from profuse tillers to have a uniform distribution of same aged plants • For termite and disease management in nursery spray Indofil M 45 and Chlorpyriphos @ 0.2 per cent • life saving irrigation • DSR on receipt of rain by using Paddy drum seeder or • High yielding varieties- follow transplanting while, Improved varieties - follow DSR • In case of DSR- Use sprouted seeds in plastic drum seeder with increased seed rate by 20-25 per cent for good crop stand • Late transplanted rice during early season drought results in the occurrence of sheath rot and grain discoloration diseases. • Follow pre emergence and post emergence weedicide to disturb/check the crop-weed competition for nutrient • Provide life saving and protective irrigation to over aged seedling in nursery through dovas (harvested rain water). Also, take care of blast disease in nursery and avoid using urea in nursery. • Strengthen the bunds to check the drainage holes and seepage loss in transplanted and direct sown medium land rice regularly 	
<u>Don3</u> <ul style="list-style-type: none"> • Follow raised bed broad furrow or Ridge and furrow method for Maize/ Pigeonpea/ Lady's finger/ Blackgram/ Soybean • Adopt surface mulching with crop residue or tree lopping of <i>Glyricidia</i> wherever possible.If farm waste is not available, use blade to form a thin layer of soil mulch to avoid cracks • Life saving irrigation • In case of transplanting of over aged seedling (35-45 days), increase number of seedling per hill (5-6 seedling/hill) 	



b) Soil nutrient & moisture conservation measures

- Dry seeding of rice with application of pre and post emergence weedicide in over aged seedlings (>25 DOS)
- Split application of Urea fertilizer
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells

c) Remarks on Implementation

Awareness for Construction of rain water harvesting structures for recycling of water during dry spell like DOVAS through SHG or on subsidized basis through State Govt. schemes.

A3. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Change management

- If possible, go for staggered nursery raising in rice crop
- If possible, raise community nursery of rice at a reliable water source to save time for further delay.
- In case, if rice population is less than 40-50 percent, gap filled by retransplanting the rice crop and for more than 50 per cent mortality use fresh seeding for fresh transplanting.
- Follow gap filling by removing seedlings from profuse tillers to have a uniform distribution of same aged plants
- Prefer mid early rice variety instead of late variety
- Use pre and post emergence weedicide
- Over aged seedling should be top cut and treat the seedlings root by Dursban/Chlorpyrifos @ 5 ml per lt water and transplant immediately after treated seedlings with 2 per cent Urea solution
- In case of transplanting over aged seedling (35-45 days), increase number of seedling per hill (5-6 seedling/hill)
- In fallow land go for cultivation of mid early duration rice variety through DSR @ 70-80 Kg/ha

b) Soil nutrient & moisture conservation measures

- Split application of Urea fertilizer
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells

c) Remarks on Implementation

Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidized basis through State Govt. schemes.

B. Monsoon/Weather Situation: Mid season drought (long dry spell, consecutive 2 weeks rainless (<2.5 mm) period

B1. At vegetative phase

B1.1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
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Suggested Contingency measures

a) Change management

- Use organic mulches such as tree leaves, straw and other available crop residue to conserve soil moisture
- Avoid top dressing of fertilizers till sufficient moisture is available in soil
- Use reflectant or antitranspirant like Kaolin @ 3-5 kg/100 lt or
- In pulses, at weekly interval foliar spray of KCl @ 0.5- 1 % + 100 ppm Boric acid followed by foliar spraying of 2 percent urea during evening time
- Spray wax emulser
- Manual weeding followed by hoeing for germinating weeds.
- For termite and leaf folder control spraying or drenching of Chlorpyrifos @ 2ml/lt water and for all pulses and cereals.
- For leaf folder control in Maize (Stem borer) and Pigeonpea apply Carbofuran 3 G @ 12 Kg/acre or Phorate 10 G @ 4 kg/acre or Quinolphos @ 1 ml/lt water in Maize for leaf folder
- Also, spray @ 20/40/60 ppm CaCl₂ in pulses
- Vegetables- Foliar spray of water with 2 per cent KCl + 100 ppm Boron
- Tomato- Foliar spray of CaCl₂ @ 20/40/60 ppm
- Gap filling may be done with pigeonpea to maintain adequate plant stand.
- For termites in pigeonpea, maize and other standing cereal crops which can be controlled by soil drenching with chlorpyrifos 20 EC @ 2 ml/lt water or by adding Chlorpyrifos 1.5% dust @ 8– 10 kg/ha or Carbofuran 3G @ 12 kg or Phorate 10 G @ 4 kg. acre before final land preparation and also control Gallmidge
- In green and blackgram, cowpea, bean and lady's finger the spread of YMV by insect vector may increase. Hence, to control insect vectors spray Dimethoate @ 1ml/ lt or Imidacloprid 4 ml/10 lt twice at 10 days interval
- In groundnut crop termites and white grub incidence is expected to be more. Methods suggested in rice may be followed to reduce the pest infestation.



- Incidence of leaf miner in groundnut may increase which can be managed by spraying Monocrotophos 36 SL or Triazophos 40 EC @ 1 ml/lit. water twice at fortnight intervals.
- Under dry condition incidence of mites is expected to be more in vegetable crops which can be brought down by spraying of dicofol @ 2 ml/lit water.
- Early and mid season drought favours disease like brown spot of rice, bacterial wilt of brinjal and other vegetables

b) Soil nutrient & moisture conservation measures

- Foliar spraying of DAP @ 2 per cent along with Boric acid @ 0.3 per cent. Also, spray Urea @ 1 per cent
- Provide micro- irrigation with drip for wide spaced crops such as chilies and vegetables and Sprinklers for groundnut, maize and vegetables wherever ground/ surface water is available.
- Go for life saving and protective irrigation from constructed dovas.

c) Remarks on Implementation

Promote construction of Rain water harvesting structure watershed programme and MNREGA

B2. At flowering/ fruiting stage

B2.1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
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Suggested Contingency measures

a) Change management

- Maize- Harvest it for fodder use
- Pulses- and vegetables- At 2-3 days interval spraying of water followed by 2 per cent KCl + 100 ppm Boron during evening time is recommended.
- In case of groundnut maturing in the month of September which can be harvested after providing light irrigation through dovas to lose the soil.

b) Soil nutrient & moisture conservation measures

Go for life saving and protective irrigation from constructed DOVAS.

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA

B3. At vegetative phase

B3.1. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Crop management

Don 2

- Manual weeding followed by hoeing for germinating weeds
- Take care of mealy bug and termite attack which are more prevalent in dry weather.
- Top dressing should be followed only after receipt of rain.
- No urea should be top dressed until receipt of rainfall in rice crop.
- For BPH, dusting field bunds and around with Carbaryl (Savin)4% or malathion 5% @ 10 - 12 kg/acre

Don 3

- One manual weeding for germinating weeds
- Apply 4 Kg N/acre in sorghum and oilseed crops soon after receipt of rains.
- In pigeonpea, if the drought affected plants to recoup with the revival of the rains, spray 2 to 3% urea after the foliage is wetted with the rains.
- Foliar application of Sulphur @ 1ppm to mitigate the stress condition in oilseed is necessary after receipt of rainfall
- Apply post emergence weedicide for controlling weeds in oilseed (Groundnut) to undisturb the pegging process.
- During 40-45 DAS, if there is a severe moisture stress, thinning may be done in kharif sorghum and pearl millet.

b) Soil nutrient & moisture conservation measures

- Foliar spray of KCl or ZNSO₄ @ 2 per cent
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells
- Life saving irrigation through dovas,well, ponds, check dams and bora bandh

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA



B4. At flowering/ fruiting stage

B4.1. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
Don 2 and Don 3	
<ul style="list-style-type: none"> • Life saving irrigation with harvested water • Spray of urea @ 1-2 percent • Drought condition during the month of August-September onwards shall result in severe incidence of foliar blast and brown spot diseases in rice. It is advised to spray Tricyclazole (Tilt) @ 6 g/ 10 lt. water or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period. 	
b) Soil nutrient & moisture conservation measures	
Foliar spray of KCl or ZNSO ₄ @ 2 per cent	
Foliar spray of 2% KNO ₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells	
Life saving irrigation through dovas, wells, ponds, check dams and bora bandh	
c) Remarks on Implementation	
Promote for the construction of Rain water harvesting structure watershed programme and MNREGA	

B5. At vegetative phase

B5.1. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
<ul style="list-style-type: none"> • Foliar spray of 2 per cent KCL followed by 1-2 per cent Urea. • Weeding should be done • Drought makes the crop vulnerable to sheath rot and sheath blight diseases. Maintenance of field sanitation followed by twice spraying at 10 days interval with validamycin 2-3 ml/lt water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/lt water are advised. • Life saving irrigation 	
b) Soil nutrient & moisture conservation measures	
<ul style="list-style-type: none"> • Foliar spray of Foliar spray of urea @ 2 per cent • Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells • Life saving irrigation through dovas, wells, ponds, check dams and bora bandh 	
c) Remarks on Implementation	
Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidized basis through State Govt.schemes.	

B6. At flowering/ fruiting stage

B6.1. Major Farming Situation/Land Situation: LOW LAND Sandy clayloam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
<ul style="list-style-type: none"> • Drought condition during flowering and fruiting and onwards shall result in severe incidence of foliar blast and brown spot diseases in rice. It is advised to spray Tricyclazole (Tilt) @ 6 g/ 10 lt. water or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period. • Life saving irrigation • During drought, attack of gundhi bug shall be more. Apply Quinolphos or Monocrotophos @ 1-2 ml per lt. water. 	
b) Soil nutrient & moisture conservation measures	
<ul style="list-style-type: none"> • Weeding and foliar spray of urea @ 2 per cent • Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells • Life saving irrigation through dovas,wells, ponds, check dams and bora bandh 	
c) Remarks on Implementation	
Promote for the construction of Rain water harvesting structure watershed programme and MNREGA	



Monsoon/Weather Situation: Terminal drought (Early withdrawal of monsoon)

C1. At fruiting/pre physiological maturity stage	
C1.1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management <ul style="list-style-type: none"> Life saving irrigation to vegetables through stored moisture from constructed DOVA If not possible to make survival harvest it for fodder use 	
b) Rabi Crop planning <ul style="list-style-type: none"> Cultivation of Niger, Horsegram, Toria, linseed as relay/paira cropping In case of availability of irrigation, go for cultivation of early Potato and pea (early Arkel group) Prepare kachha check dam or Bora Bandh for Water conservation Mid early variety of radish cultivation is recommended 	
c) Remarks on Implementation Promote for the construction of Farm ponds through watershed management programme and MNREGA	
C1.2. Major Farming Situation/Land Situation: MID LAND Sandy loam soils	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management <u>Don 2</u> <ul style="list-style-type: none"> At milking , soft and dough stage spray KCL @ 2 per cent In case of gundhi bug attack found more than ETL(>2 gundhibug /m²), spray Chlorpyriphos dust or Monocrotophos @ 1 ml/ltr. water If possible go for life saving irrigation Late season drought generally results in outbreak of foliar, node, collar or neck blast of rice depending on the stage of crop. 	
<u>Don 3</u> Instead of grain purpose crops like sorghum, pearl millet, maize, cowpea, black and greengram that can be harvested for fodder use	
b) Rabi crop planning <ul style="list-style-type: none"> Ensure for all inputs required for rabi season in advance. In case of failure of kharif crops prefer sowing of pre rabi catch crops like, Toria, Niger, Horsegram, blackgram, sesame linseed in uplands to medium lands 	
c) Remarks on Implementation Promote construction of Rain water harvesting structure watershed programme and MNREGA	
C1.3. Major Farming Situation/Land Situation: LOW LAND Sandy loam soils	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management <ul style="list-style-type: none"> Life saving irrigation. The land should be tilled properly in case <i>kharif</i> crop fails sow <i>rabi</i> crops like safflower, pigeonpea in sept-Oct (Short duration) Spray KCL @ 2 per cent followed by urea @ 2 per cent Mid early rice crop may be harvested at Physiological maturity Cultivate vegetables like Tomato, Brinjal, Capsicum, Shimla mirch, Broccoli, Cabbage and Cauliflower, green pea and potato as per suitability near and around tributaries 	
b) Rabi crop planning Prefer early sowing of wheat, Mustard, Chickpea, linseed and lentil as sole or intercrop Wheat + Chickpea (4:2) Wheat+ Mustard (4:3)	
c) Remarks on Implementation Promote construction of Rain water harvesting structure watershed programme and MNREGA	

PART-III

Unusual rains: Continuous high rainfall in a short span leading to water logging

Suggested Contingency measures
a) Crop management
Pigeonpea /sorghum/Pearl millet
Vegetative stage- Prefer ridge and furrow method of sowing. Ensure for proper drainage through channel. Collect runoff water in Dovas for further use.
Flowering stage- Ensure for proper drainage through channel. Collect runoff water in Dovas for further use.
Crop maturity stage- No such situation at the time of maturity
Post harvest- After Sun drying follow grading and storing
Blackgram and other pulses/Oilseeds
Vegetative stage- Follow Ridge and furrow sowing
Ensure for proper drainage through channel
Collect runoff water in Dovas for further use
Avoid application of fertilizer
Flowering stage- Ensure for proper drainage through channel
Collect runoff water in Dovas for further use
Avoid application of fertilizer
Prophylactic measure for jassid and YMV
Crop maturity stage-
Post harvest-
Rice
Vegetative stage- Safe disposal of excess water from rice field. Bund repairing and strengthen. Application of insecticides in the afternoon hours is preferred seeing the weather condition or after spraying weather should remain rain free for at least 4-5 hrs. Retransplant to maintain plant population in case of mortality more than 50 %
In partially damaged crop, allow to withstand upright. Flood occurs due to heavy storm in mid and lowland which when recedes probability of occurrence of swarming caterpillar on field bunds and around of rice crop is more. So, when it crosses the Economic Threshold Limit (ETL) i.e., one larva / hill then spray the crop with Chlorpyriphos/ Triazophos/ Profenophos @ 2 ml/lt water or dust the crop with Quinalphos @ 1.5% D @ 10kg/ acre. To prevent migration of larvae from one field to other, bunds should be heavily dusted with the dust formulation mentioned above. In partially ponded field, rice caseworm and in general leaf folder attack is expected. If 1-2 cases or folded leaves/hill is seen spray the crop with Monocrotophos / Chlorpyriphos @ 1 ml/lt water or with Cartap Hydrochloride 50 SP / Fipronil 5 SP @ 200 g/acre. Rain storms during <i>kharif</i> may result in severe occurrence of bacterial leaf streak and bacterial blight in rice. It is advised to spray the crop immediately after every rainspell with streptocycline @ 1g/10 lt water or plantomycin @ 1g/lt water or bacterinol @ 2g/lt. water. Control snail occurrence by Acaricide
Flowering stage- Safe disposal of excess water from rice field. Bund repairing and strengthen. Avoid application of fertilizer. Flood occurs due to heavy storm in mid and lowland which when recedes probability of occurrence of swarming caterpillar, BPH and cut worm on field bunds and around of rice crop is more. So, when it crosses the Economic Threshold Limit (ETL) i.e., one larva / hill then spray Chlorpyriphos/ Triazophos/ Profenophos @ 2 ml/lt water or dust the crop with Quinalphos @ 1.5% D @ 10kg/ acre. To prevent migration of larvae from one field to other, bunds should be heavily dusted with the dust formulation mentioned above. In partially ponded field, rice caseworm and in general leaf folder attack is expected. If 1-2 cases or folded leaves/hill is seen spray the crop with Monocrotophos / Chlorpyriphos @ 1 ml/lt water or with Cartap Hydrochloride 50 SP / Fipronil 5 SP @ 200 g/acre. Unusual and heavy rain during <i>kharif</i> may result in severe occurrence of bacterial leaf streak and bacterial blight in rice. It is advised to spray the crop immediately after every rain spell with streptocycline @ 1g/10 lt water or plantomycin @ 1g/lt water or bacterinol @ 2g/lt. water. Control snail occurrence by Acaricide.
Crop maturity stage- Provide drainage for fast removal of water from the field to favour harvesting
Post harvest- Protect the grain from rain and store it after sun drying for 2-3 days
Maize
Vegetative stage- Prefer ridge and furrow method of sowing. Ensure for proper drainage through channel. Earthingup after downpour. At Knee stage apply thimate 10 G @ 4-6 grains in whirl
Flowering stage- Ensure for proper drainage through channel. At flowering and silking stage for ant attack apply dust on silks @ 0.5 g / cob
Crop maturity stage- Provide drainage for fast removal of water from the field to favour harvesting
Post harvest- Protect grains from rain and store it after sun drying for 2-3 days



Horticulture

Vegetative stage- Prefer ridge and furrow method for sowing and proper drainage. Ensure for proper drainage through water ways. Collect runoff water in Dovas for further use. Soil drenching Carbofuran 3G @ 3 g/lt water against insects. In case of web formation with leaves apply (Nuvan)DDVP @ 1 ml/lt water as a fumigant

Flowering stage- Apply hormone to prevent flower drop. Ensure for proper drainage. Take precaution against wilting and fruit rot. In Tomato and Brinjal-drenching Bavisting @ 2 ml/lt + Streptocycline @ 1-2 g/lt water. In Cauliflower -In case of Incidence of collar rot -Spraying of Saaf (Metalaxyl + Mancozeb) @ 2 g/lt water solution. Drainage of excess water. In Lady's finger- YVMV- Spray insecticide followed by fungicide. Soil drenching Carbofuran 3G @ 3 g/lt water against insects. In case of web formation with leaves apply (Nuvan)DDVP @ 1 ml/lt water as a fumigant

Crop maturity stage- Take precaution against wilting and fruit rot. For wilting– Soil drenching with Bavistin @ 2 ml/lt + Streptocycline @ 1-2 g/lt water. In YMVM- Insecticide followed by fungicide

Post harvest- Immediate harvest and safe disposal of produce

Vegetables- (Cucurbits,/ Tomato/ Brinjal/ cauliflower/ cabbage/ lady's finger/Dolichos bean/Amaranthus leaf/ Coriander leaf/Radish)

Vegetative stage- Sowing on ridge and drainage through furrow. Prophylactic measures against pest and diseases.

Damaged twigs and leaves may be removed and follow fungicide spraying and stacking

Flowering stage- Apply hormone to prevent flower drop. Ensure for proper drainage. Take precaution againsts wilting and fruit rot. In Tomato and Brinjal-drenching Bavisting @ 2 ml/lt. water + Streptocycline @ 1-2 g/lt water. In Cauliflower -In case of Incidence of collar rot -Spraying of Saaf (Metalaxyl + Mancozeb) @ 2 g/lt water solution. Drainage of excess water. In Lady's finger- YVMV- Spray insecticide followed by fungicide. Provide support through stacking

Crop maturity stage- Take precaution against wilting and fruit rot. In Wilting– Soil drenching with Bavistin @ 2 ml/lt + Streptocycline @ 1-2 g/lt water. In YMVM- Insecticide followed by fungicide

Provide support through stacking.

Post harvest- Immediate harvest and sell produce safely in the market

b) Pest and disease management

Rice

Vegetative stage- Sheath blight- Hexaconazole @ 1ml/lt wate. Blast- Tricyclazole @ 6 g/10 lt water

Flowering stage- Sheath blight- Hexaconazole @ 1ml/lt water. Blast- Tricyclazole @ 6 g/10 lt water. Falsesmut-Nativo @ 4g/10 lt water

Crop maturity stage- False Smut - Control- Nativo @ 4g/10 lt water or Propiconazole + Tricyclazole 52.5 SE @ 1ml/lt water. In case of grain discolourness (Grain blast). Spray Tricyclazole @ 6 ml / 10 liter water

Post harvest- Store grains after proper sun drying to minimize the incidence of stored grain pest

Maize

Vegetative stage- Stem borer Control- Carbofuran 3 G @ 12 Kg/acre or Phorate 10G@ 4 kg/acre

Flowering stage- Sheath blight Control- Hexaconazole1-2 ml/lt water

Vegetables- (Cucurbits,/ Tomato/ Brinjal/ cauliflower/ cabbage/ lady's finger/Dolichos bean/Amaranthus leaf/ Coriander leaf/Radish)

Vegetative stage- Before sowing apply in soil, Carbofuran 3 G @2-3 g/m². Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lit. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lit. water against downy mildew diseases of cucurbits.

Flowering stage- Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lit. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt. water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lit. water against downy mildew diseases of cucurbits. YVM Control- Carbofuran 3G @ 3 or Phorate 10 G @ 1 g/m² followed by any fungicide

Crop maturity stage- Stop spraying 1 week before harvesting

Post harvest- Harvest and sell produce in the market



French bean-

Vegetative stage- Rust disease Control- Mancozeb 2g/ lt water. Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lt. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lt. water against downy mildew diseases of cucurbits.

Flowering stage- Take care of pod borer and aphid attack. Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lt. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lt. water against downy mildew diseases of cucurbits.

Crop maturity stage- Stop spraying 1 week before harvesting

Post harvest- Harvest and sell produce in the market

B. Extreme Weather Events

Suggested Contingency measures

Hail storm

Seedling / nursery stage- Vegetable nursery should be raised in poly house or make proper arrangement of low height Polly tunnels in open area or cover with plastic sheet or thatching should be done

Vegetative stage- In vegetables-Remove damaged parts immediately and apply insecticide followed by fungicide as prophylactic measures. Follow fertilization through foliar as well as broadcasting

Reproductive stage- n vegetables- Remove damaged parts immediately and apply insecticide followed by fungicide as prophylactic measures. Follow fertilization through foliar as well as broadcasting for proper fruiting

At harvest- Safely sell in the market after grading for immediate returns

Heat Wave

Wheat Chickpea/pea

Seedling / nursery stage- For protection from heat and cold wave there is intervention to sow the rabi crops in between 2nd week of October to 2nd week of November to protect theirs vegetative phase from ground/radiation frost results from cold wave/wind chill injury and reproductive phase from terminal heat stress on Mustard, Chickpea, Wheat, Lentil, Linseed and pea crops. Life saving irrigation

Vegetative stage- Timely sown crop never face heat stress while very late sown(January) crop face heat stress hence only one option is to provide life saving irrigation and water spray during evening time frequently at 2-3 days intervals. Take care of termite attack by spraying Chlorpyriphos @ 1 ml/lt. water and drenching @ 3-5 ml/lt water

In Chickpea because of high soil and ambient temperature (> 35 °C) favours the dry root rot disease starts during flowering/reproductive stage (spraying Captan or thiram or carbendazim or ridomil MZ or Saaf @ 1,5-2 g/lt water)

Reproductive stage- To minimize the terminal heat stress during the month of March and April the only and only way is to provide frequent protective irrigation irrespective of theirs stages (Life saving irrigation). Take care of termite attack by spraying Chlorpyriphos @ 1 ml/lt and drenching @ 3-5 ml/lt water. In Chickpea because of high soil and ambient temperature (> 35 °C) favours the dry root rot disease starts during flowering/reproductive stage (spraying Captan or thiram or carbendazim or ridomil MZ or Saaf @ 1,5-2 g/lt water)

At harvest- Frequent irrigation should be provided to meet the evaporative losses.

Tomato/Brinjal/ Lady's finger/Cucurbits

Seedling / nursery stage- Due to heat stress wilting and mortality is more hence frequent irrigation and cover the nursery with mulch(Straw/leaves)

Vegetative stage- Due to heat stress wilting and mortality is more hence frequent irrigation and cover the nursery with mulch(Straw/leaves)

Reproductive stage- Drying of flower- Spray PCOA. Follow mulching after irrigation

At harvest- Immediate harvest after irrigation and shift it to safer place

Cold wave

Wheat

Seedling / nursery stage- Cold environment during tillering or branching stage favours more number of tillers in wheat and more branching in mustard, chickpea, lentil and linseed crops which prospects for high yield but it is detrimental for potato, tomato, brinjal, pea, creeper vegetables and fruits. Irrigation. Balanced fertilizer application.



Foliar spray of nutrients

Vegetative stage- Light irrigation. Mulching with crop residue \ weeds. Fertilizer application

Reproductive stage- Irrigation, fertilizer application

At harvest- N/A

Pigeonpea/Mustard/Linseed/Chickpea/pea

Seedling / nursery stage- In Mustard because of cool weather aphid insects attack is more prominent (spraying Rogor (Dimethoate) @ 2 ml or Monocrotophos 36 EC @ 1 ml /lt water during evening time is advised).

In linseed Alternaria blight (For blight spray Double dose (Iprodione 25 % WP + Carbendazim 25 % WP) @ 2 g per lt. water) and powdery mildew (prophylactic spraying of Sulfex @ 3 g or Kairathen 1 ml per lt water twice at weekly interval during evening time) disease are more common. For powdery mildew in pea (spraying Calixin (Tridemorph 80 % EC @ 5 ml per 10 lt water twice are highly recommended).

In Chickpea-Cold and wet environment (High humidity) during seedling stage cause collar rot, black root rot, wet rot, Pythium root and seed rot in Chickpea, while in potato, pea and tomato favours late blight (spraying of Krilaksil or Ridomil MZ chemical@ 1.5 g per liter water), powdery mildew (spraying newly emerged fungicide Double dose (Iprodione 25 % WP + Carbendazim 25 % WP) 2 g per lt water twice at weekly interval) and bacterial wilt, leaf spot and canker (spraying carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP) diseases in respective vegetable crops. Anthracnose in cucurbitaceous species. Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves. In Mustard because of cool weather aphid insects attack is more prominent (spraying Rogor (Dimethoate) @ 2 ml or Monocrotophos 36 EC @ 1 ml /lt water during evening time is advised)

Reproductive stage- Pigeonpea- During flowering and pod formation stage attack of Pod borer/sucking bug, mites, blister beetle insects as well as sterility disease may occur more (spraying Profenophos 50 EC, methomyl 40 SP or monocrotophos 36 SL kill the larvae but as the webs protect them from contact insecticides hence along with contact insecticides, mixing of fumigant insecticide such as DDVP @ 0.5 ml/lt. water is required to make the larvae come out from the web. For Mites and Aphids, Dimethoate 30 EC @ 2ml/lt. water and acaricides such as Dicofol 18.5 EC @ 2.5 ml/lt. water , for Blister beetle synthetic pyrethroids such as Cypermethrin 10 EC @ 1.0 ml/lt. or Lamda cyhalothrin 5 EC @ 1.0 ml/lt. water; for sterility mosaic Dicofol 18.5 EC 2.5 ml or Oxydemeton methyl 25 EC or Dimethoate 30 EC 2.0 ml/lt. water on alternate row twice at an interval of 10 days are recommended).

Vegetables

Seedling / nursery stage- Raising seedling in Poly house, re sowing if damage is more. Provide shelter belt (Wind break) at appropriate spacing with Sisham, Ghamhar. Provide irrigation and mulching with straw and leaves

Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves. Disease and pest control, care for chilling injury or replanting

Reproductive stage- Drying of flower- Spray PCOA. Follow mulching after irrigation

At harvest- Grading and safely dispose produce in the marketing

Frost

Wheat

Seedling / nursery stage- N/A

Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves

Pigeonpea

Seedling / nursery stage- Exposure of crop to smoke by burning waste material during night time

Vegetative stage- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

Reproductive stage- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

At harvest- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

Tomato & Potato and Horticultural crops (fruit)

Seedling / nursery stage- Create smoke around the field by using waste materials or set afire with used mobile oil in north-west or west-north direction towards incoming cold waves. Use polythene or bamboo hoogli in small horticultural /nursery/cash vegetable crops during morning hour and remove it during daytime. In Perennial or Horticulture crop (Fruit) also frequent irrigation followed by mulching, thatching , creating smoke screen s and lighting of fire should be practiced in availability of irrigation facility

Vegetative stage- Earthing up, Irrigation and create smoke around the field by using waste materials or set a fire with used mobile oil in north-west or west-north direction towards incoming cold waves. Use polythene or bamboo hoogli in small horticultural /nursery/cash vegetable crops during morning hour and remove it during daytime. In Perennial or Horticulture crop (Fruit) also frequent irrigation followed by mulching, thatching , creating smoke screen s and lighting of fire should be practiced

Reproductive stage- Immediate harvesting and disposal

At harvest- Harvest in dry weather

Cyclone- Not applicable



CONTINGENCY PLAN FOR RABI

1. Sowing window information

Land type	Cropping system	Crop name	Optimum sowing window (Please mention along with week)
1. Upland	Maize based (Early)	Toria, Linseed, Safflower Fodder crop- Oat, Lathyrus	Toria- 3 rd week of September- 4 th week of September Linseed- 2 nd week of October - 4 th week of October Safflower- 3 rd week of October - 4 th week of October Fodder- 2 nd week of October - 4 th week of October
2. Mid Land	Rice Based (Mid early)	Irrigated- Barley, Wheat (Zero tillage) Potato, Vegetables Rainfed (Zero tillage)- Barley, Mustard, Chickpea, Lentil, Linseed (Normal) Fodder Crop- Oat, maize	Barley/Wheat - 3 rd week of October - 2 nd week of November Potato- 4 th week of October - 2 nd Week of November Linseed- 2 nd week of October - 4 th week of October Chickpea - 2 nd week of October - 1 st week of November Lentil- 3 rd week of October- 2 nd week of November Vegetables- 1 st week of October - 4 th week of November Mustard- 1 st week of October - 4 th week of October Fodder - 2 nd week of October - 1 st week of November
3. Low Land	Rice based (Mid early)	Chickpea (Zero tillage) Linseed(Utera/paira cropping) Wheat (Surface seeding in marshy land), Vegetables near stream line/rivulet (Onion, Garlic, Tomato, Chili, Brinjal, Capsicum, Cucurbits) Fodder crop- Oat, Maize	Chickpea - 1 st week of November - 3 rd week of November Linseed- 4 th week of October - 2 nd week of November Barley/Wheat- Timely- 1 st week of November- 3 rd week of December Late Sown Wheat- 1 st week of December- 4 th week of December Vegetables- 1 st week of November - 4 th week of December Cucurbits- 1 st week of January - 1 st week of February Fodder- 1 st week of November - 4 th week of November

2. Contingency measures for Field crops grown with residual moisture under rainfed condition

2 (A) Optimal residual moisture	
2 A1.Land type- UPLAND	
a) Cropping system- Maize- Toria, Maize-vegetables	
b) Crop name- Zero Tillage-Toria, Linseed , Vegetables (Pea, French bean, Cabbage, Cauliflower, Broccoli with harvested water facility), Fodder- Berseem, Oat, Lucern, Maize, Sudan grass, Rizka	
c) Sowing Window- Toria- 3 rd week of September– 4 th week of September, Linseed- 2 nd week of October - 4th week of October, Vegetables- 1 st week of October - 4 th week of October	
d) Variety- Toria- PT 203, Panchali; Linseed- Dibya, Priyam, Sharda	
e) Agronomic management practices	
<ul style="list-style-type: none"> • Rain water harvesting and recycling. • Deeping of water storing structure(Shallow and deep) in April and May month • Deep summer ploughing in April and May month. • Strengthing and raising of field bunds in April and May months • Sowing in defined window for better establishment • Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population) • Application of Lime or Dolomite (3-5 q/ha) in soil • Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables. • Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oil seed and pulses • Follow seed priming (warm water for 4-6 hrs.) before sowing • Follow seed treatment with fungicide-insecticide-rhizobium • Follow deep summer ploughing • Irrigate only at critical stages • Pre and post emergence weedicide application • Follow hoeing after manual weeding • Follow RDF, INM and IPM • For Water use efficiency use antitranspirant, reflectant and mulches • Regular monitoring of field for disease and insect attack • Use pheromone trap and attractant • Promote protected vegetable cultivation under naturally ventilated polyhouse and net house. 	



Toria - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2A2. Land type- MEDIUM LAND

- a) Cropping system- Rice-Wheat, Rice-potato, Rice- Pulses, Rice- Oilseeds, Rice-vegetables
- b) Crop name- (Zero tillage) Potato, Vegetables (Tomato, Chili, Brinjal, Capsicum, Pea, French bean, Cabbage, Cauliflower, Broccoli with harvested water facility), Rainfed -(Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal)
- c) Sowing Window- Wheat - 3rd week of October - 2nd week of December, Potato- 4th week of October -2nd Week of November, Chickpea - 2nd week of October - 1st week of November, Lentil- 3rd week opf October- 2nd week of November, Mustard- 1st week of October - 4th week of October, Vegetables- 1st week of October - 4th week of November
- d) Variety- Wheat- HUW 468, K 9107, Birsa Genhu 3; Potato- Kufri Surya, Kufri Arun, Kufri Sutlej, Kufri Laukar, Kufri Lalima; Chickpea- JAKI 9218, Pusa 372, KWR 108, KPJ 59, Lentil- HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25, NRCHB101, NRCHYs 05-02

e) Agronomic management practices

- Follow deep summer ploughing
- Seed treatment with Azotobacter and Azospirillum and also soil application in wheat
- Follow seed treatment with fungicide-insecticide-rhizobium in pulses
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Irrigate only at critical stages
- Pre emergence weedicide application
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow RDF, INM and IPM
- Follow hoeing after hand weeding
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

Potato- Seed treatment. Proper spacing. Frequent irrigation. Take care for leaf curling, Early, late blight and grub infestation. Irrigate during cold day and night to get relief from frost attack. Produce smoke during cooler day and nigh

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)



Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

2A.3 Land type- LOW LAND

- a) Cropping system- Rice –Chickpea, Rice-Lentil, Rice-Wheat
- b) Crop name- Chickpea (Zero tillage), Linseed (Utera/pair cropping), Wheat (Surface seeding in marshy land, Vegetables near streamline/rivulet (Onion, Garlic, Tomato, Chili, Brinjal, Capsicum, Cucurbits)
- c) Sowing Window- Chickpea - 1st week of November - 3rd week of November, Linseed- 4th week of October - 2nd week of November, Wheat- 2nd week of November- 2nd week of December, Late Sown Wheat- 1st week of December- 4th week of December, Vegetables- 1st week of November - 4th week of December, Cucurbits- 1st week of January - 1st week of February
- d) Variety- Chickpea- JAKI 9218, Pusa 372, KWR 108, KPJ 59; Linseed- Dibya, Priyam, Sharda; Wheat- K 9107, K 8027, HD 2643 (Ganga), HDR 77; Late sown wheat- PBW 373, DBW 14

e) Agronomic management practices

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at Critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Be cautious for pod borer, bud fly insect and powdery mildew disease management.

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

2 (B) Less than optimum moisture i.e., 25% less than normal, which can happen due to insufficient rainfall during September/October months. Deficit of 20-40% rainfall

2B1. Land type- UP LAND

- a) Cropping system- Maize- Toria, Maize- Linseed
- b) Crop name- Zero Tillage-Toria, Linseed
- c) Sowing Window- Toria- 3rd week of September- 4th week of September, Linseed- 2nd week of October - 4th week of October
- d) Variety- Toria- PT 203, Panchali ; Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

- Rain water harvesting and recycling.
- Deepening of water storing structure(Shallow and deep) in April and May month
- Deep summer ploughing in April and May month.
- Strengthening and raising of field bunds in April and May months
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Application of Lime or Dolomite (3-5 q/ha) in soil
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow seed priming (warm water for 4-6 hrs.) before sowing
- Follow seed treatment with fungicide-insecticide-rhizobium
- Follow deep summer ploughing



- Irrigate only at critical stages
- Pre and post emergence weedicide application
- Follow hoeing after hand weeding
- Follow RDF, INM and IPM
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant
- Promote protected vegetable cultivation under naturally ventilated polyhouse and net house.

Toria— Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2B.2. Land type- MEDIUM LAND

- a) Cropping system- Rice- Pulses, Rice- Oilseeds, Rice-Linseed, Rice-vegetables (Tomato, Pea)
- b) Crop name- Rainfed (Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal), Vegetables (Tomato, Pea with harvested water facility)
- c) Sowing Window- Chickpea - 2nd week of October - 1st week of November, Lentil- 3rd week opf October- 2nd week of November, Mustard- 1st week of October - 4th week of October, Linseed- 2nd week of October - 4th week of October, Vegetables- 1st week of October - 4th week of November
- d) Variety- Chickpea- JAKI 9218, Pusa 372, Pusa 256, KWR 108, KPJ 59; Lentil- HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25, NRCHB 101, NRCHYS 05-02; Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)

Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud fly insect and powdery mildew disease management.



2B.3. Land type- LOW LAND

- a) Cropping system- Rice-Wheat, Rice- Potato Rice-vegetables, Rice- Pulses, Rice- Oilseeds, (Utera/Paira cropping)
- b) Crop name- Irrigated-Wheat (Zero tillage) Potato, Vegetables (Tomato, Chili, Brinjal, capsicum, Pea, French bean, Cabbage, Cauliflower, Broccoli, Cucurbits with harvested water facility), Rainfed (Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal)
- c) Sowing Window- Wheat Timely sown- 1st week of November– 4th week of November, Late sown- 1st week of December– 3rd week of December, Potato- 1st week of November– 4th week of November, Vegetables- 1st week of November– 4th week of December, Cucurbits- 1st week of January - 2nd week of February, Chickpea - 1st week of November– 3rd week of November, Lentil- 1st week of November– 2nd week of November, Mustard- 1st week of November– 4th week of November
- d) Variety- Irrigated Wheat-Timely sown (120-125)- HD2967, WH 1105, K307, HD2733; Late sown (105-110)- HD 3059, DBW 14, HI 1563 (seed rate 25 % more than timely sown); Potato-Kufri Surya, Kufri Arun, Kufri Sutlej, Kufri Laukar, Kufri Lalima; Chickpea- JAKI 9218, Pusa 372, Pusa 256, KWR 108, KPJ 59; Lentil-HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25, NRCHB 101, NRCHYs 05-02; Linseed- T 397, Priyam

e) Agronomic management practices

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

Potato- Seed treatment. Proper spacing. Frequent irrigation. Take care for leaf folder, early, late blight and grub infestation. Irrigate during cold day and night to get relief from frost attack. Produce smoke during cooler day and night

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)

Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.



CONTINGENT STRATEGIES FOR LIVESTOCK, POULTRY & FISHERIES

1 Livestock

Suggested contingency measures under DROUGHT event

a) Before the event

Feed and fodder availability

Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage supply of molasses to cattle feed plants

- Preservation of surplus fodder

Green grass is a good source of vitamin A which is present in the form of Carotene. One kg of green grass provides 50mg of vitamin A and 15 to 20g protein to the animal. Cowpea, beans, subabul leaves etc. give 30 to 40g of protein. From grass fodder herbivorous animals get the carbohydrates (energy source), proteins ("building material" of the body) and vitamins (especially carotene), which are the main drives of sustainable operation of the body.

Two methods are available for preserving or conserving the seasonal excess of green fodder, viz. hay making and silage making. Each method has its own limitations and advantageous. Ensiling is preferred on the basis of fodder quality.

Hay making

Hay -refers to cereals, grasses or legumes that are harvested at appropriate stage, dried and stored

Ensilage / Silage making

Silage may be defined as the green succulent roughage preserved under controlled anaerobic fermentation in the absence of oxygen by compacting green chops in air and watertight receptacles.

- Complete Feed Blocks

Supply enriched complete feed blocks containing dry roughage, concentrates/ unconventional supplements 50:50 ratio. Complete feed blocks may be sourced from different commercial sources.

Feeding practices for livestock in India at present separate feeding of roughage and concentrate

- ❖ Chopped roughage and soaked concentrate mixed together
- ❖ Chopped roughage mechanically mixed with concentrate as mash
- ❖ Chopped roughage and concentrate ingredients mixed and densified as Complete Feed Block

Concept of densified complete feeds with fibrous crop residues is a noble way to increase the intake and improve the nutrients utilization. A complete feed block has been defined as a system of feeding all ingredients including roughages, processed and mixed uniformly, to be made available ad lib to the animals.

- Urea molasses mineral block licks

Urea-molasses mineral block lick can sustain the animals by providing protein, energy and essential minerals. It is cost effective, easy to handle and transport and available commercially through milk cooperatives. Therefore, it is required that urea molasses blocks stocks (UMBS) are made available in the rain-deficient areas.

- Methods used for improving nutritive quality of straws and other crop residues like urea treatment

Spray dry roughages such as paddy and wheat straw with about 10% molasses and 2% urea for maintenance of animals in fodder deficit areas.

Preparation of 100 kg roughage-based enriched feed containing 88.8 kg wheat straw or any other straw/stover, 10 kg molasses, 1 kg urea and 0.5 kg mineral mixture will cost about Rs. 375-450 per quintal.

- Utilization of forest byproducts for feeding of livestock

Use of dry and fallen tree leafs like Pipal, Neem, Mango and Kathal etc.

- Making Leaf meal

- Use of conventional and non conventional feeds

- Rice Mills

The main by-products of rice are rice straw, rice husk or hull, and rice bran. Rice straw is produced when harvesting paddy. Rice husks generated during the first stage of rice milling, when rough rice or paddy rice is husked.

- Aquatic plants

- ❖ One kg DM/100 kg BW
- ❖ Water hyacinth, aquatic spinach, Stalks & leaves of lotus plant, Hydrilla, Pistia etc.

- Encourage supply of molasses to cattle feed plants

Molasses and Bagasse are the byproducts from sugarcane industry and are available in abundance. They can be used as cattle feed after supplementation with urea. Such a ration is a ready feed during drought and scarcity conditions when nothing else is available for feeding to animals.

- Crop Residue Enrichment & Densification

Crop residues can be fortified with feed ingredients like cakes, barns, grains, molasses, hay, minerals and then densified into blocks or pellets to save on storage and transport costs. Also balanced ration in the form of complete diet or total mixed ration as per need of animals can be supplied for improved productivity.

- Demonstration of Re-vegetation of Common Grazing Land

The grazing lands play an important role in the lives of rural people who are getting fodder, fuel, drinking water from commons. However, such lands are being continuously degraded due to overgrazing and overexploitation by locals. Re-vegetation of such lands on scientific lines suiting to agro-climatic conditions is to be demonstrated through strengthening institutional arrangement at village level. Fodder production from such lands can be enhanced substantially by introducing high yielding cultivated fodder crops, grasses and pasture legumes. An integrated approach of growing cultivated crops, grasses, trees and shrubs under silvi-pastoral/ horti - silvipasture system will improve overall productivity of such land.

Drinking water

Repairs of tube wells, clear off the sludge in the canals and local water catchments and clean the water tanks, large ponds and lakes

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - Vaccinate the cattle against tick-borne diseases
- Tick-borne diseases- Vaccination is best done in calves under 6 months of age and one dose is sufficient
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over long distances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1 packet mixed with 12.5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal)
- Sarcoptic Mange in pigs- Not applicable before event

Diseases caused by biting insects

- Trypanosomiasis- Fly control is important for prevention of the disease.
- Three-day stiff sickness- Prevention is by vaccination
- Lumpy-skin disease- Prevention is by vaccination

Diet related Disease problems

- Eating plastic bags and wire(Pica)- Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are grazing. Mineral mixture supplement should be given to the animal
- Poisonous plants- Not applicable before event
- Botulism- Prevention involves vaccination and good nutrition. Burn or bury all carcasses, bones or decaying material

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Not applicable before event
- Calcium, Phosphorous & Vit. D- Not applicable before event
- Vitamin A- Not applicable before event

Infectious Diseases

- Foot and Mouth Disease (FMD)- Vaccination at the age 4 months and above. Booster should be given 1 month after first dose then every six monthly
- Haemorrhagic Septicaemia (HS)- Vaccination at the age 6 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June.
- Black Quarter (BQ)- Vaccination at the age 6 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June
- Anthrax- Vaccination at the age 4 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June.
- Rabies (Post bite therapy only)- Not applicable
- Enterotoxaemia (pulpy kidney)- Vaccinate the animal at the age of 3-4 months, repeat after 15 days and then annually.
- Pneumonia- Not applicable

Non-Infectious Diseases

- Ruminal tympany (Bloat)- Not applicable
- Rumen acidosis- Not applicable
- Intussusception- Deforming should be given
- Pregnancy toxemia (Ketosis)- Fed the pregnant animal with balanced ration.



Poisoning

- Organochlorine compounds- Not applicable
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Not applicable

b) During the event

Feed and fodder availability

- Lactating and pregnant animals need to be provided enriched feed to meet the requirements and rest of animals be provided the maintenance diet. In case of acute shortage, lactating animals be provided feed meeting 50% of the requirements to maintain minimum level of production.
- Drought tolerant fodder crops (like sorghum PC 6 and MP chari, cowpea - BL 1 and 2) and fodder grasses (like stylo, *cenchrus ciliaris*, *athropogon*, etc.) should be cultivated. Under the mini kit programme, the developmental department need to provide fodder crop seeds in the drought-affected areas.
- Provide salt dose daily through feed (40-50 g of salt per adult animal and 10-20 g for small ruminants and calves).

Issue

- Large scale migration -Creating additional resources in drought prone area
- Grazing of poisonous plants/toxicity problems -Inventory of anti nutritional/toxic factors. Creating awareness in farmer for avoiding nitrate/nitrite HCN poisoning.
- Transport of fodder from normal DPA-Establishing feed and fodder banks. Effective mechanism for distribution of fodder/feed to productive animals. Densification/baling/briquette technologies

Drinking water

Harnessing water through the existing reservoirs and exploitation of groundwater.

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - If disease occurs Treat the cattle against tick-borne diseases. Consult Veterinarian.
- Tick-borne diseases- Prevention is by tick control, treatment of diseased animal and vaccination. Consult Veterinarian.
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over long distances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1 packet mixed with 12,5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal). Consult Veterinarian.
- Sarcoptic Mange in pigs- Itching; dermatitis; rubbing; scratching; reduced growth rate. Miticidal sprays; pour-ones injection and in-feed premix. Consult Veterinarian.

Diseases caused by biting insects

- Trypanosomiasis- Treated with SURAMIN through intramuscular injection or intravenous infusion if sufficient observation is possible. Consult Veterinarian.
- Three-day stiff sickness- It is important that the animal is given food and water if it is unable to stand
- Animal should be treated by Veterinarian
- Lumpy-skin disease- If your cattle get this disease, you should speak to your state veterinarian

Diet related Disease problems

- Eating plastic bags and wire (Pica) - Mostly occurring in those animals which are having shortage of feeds and fodder and deficiency of Phosphorus. Prevention involves the following: - Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are Grazing. Mineral mixture supplement should be given to the animal. Once the cow has eaten plastic bags or wire, the only effective treatment is an operation. Consult Veterinarian.
- Poisonous plants- Due to scarcity of feed s and fodder animals used to consume poisonous plans and are more likely to get toxicity. Poisoning can also happen when owner or animal handler move cattle to new paddocks where toxic plants occur. Consult Veterinarian.
- Botulism- Botulism can occur when cattle eat carcass and bone material when there is a lack of feed during drought or if they have a phosphorus deficiency
- Treatment is only possible in the early stages and requires an antitoxin. Consult Veterinarian.

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Characterized by anorexia and wasting. Deficiency affects growth and fertility of the cattle. Anemia, diarrhoea and unthriftiness occur in extreme cases. Copper or cobalt sulphate in the form of mineral mixture supplement causes rapid disappearance of the symptoms



- Calcium, Phosphorous & Vit. D- Deficiency may result in rickets in calves and osteomalacia in adults. Mineral supplementation in diet is essential to prevent this deficiency.
- Vitamin A- Vit. A deficiency occurs in cattle on dry countryside during periods of drought. Symptoms include night blindness, corneal keratinization, ptyriasis, hoof defects, loss of weight and infertility. Animals should have access to green pasture and should be supplied with Vit. A in feed to prevent deficiency.

Infectious Diseases

- Foot and Mouth Disease (FMD)- If outbreak occurs then the animal should be treated. Foot lesion should be washed with soap / detergent and apply Povidon iodine lotion while in mouth lesion boroglyserine should be applied. Consult Veterinarian.
- Haemorrhagic Septicaemia (HS)- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Black Quarter (BQ)- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Anthrax- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Rabies (Post bite therapy only)- Vaccinate the animal immediately after suspected bite. Booster should be given on 3, 7, 14, 28 and 90 (optional) days after first dose.
- Enterotoxaemia (pulpy kidney)- Not applicable
- Pneumonia- Not applicable

Non-Infectious Diseases

- Ruminant tympany (Bloat)- Not applicable
- Rumen acidosis- Ingestion of large amounts of highly fermentable carbohydrate feeds causes an acute illness due to excess production of lactic acid in the rumen. Clinically, the disease is manifested by dehydration, blindness, recumbency, complete rumen stasis and a high mortality rate. Normal saline, sodium bicarbonate and antihistaminic are advised.
- Intussusceptions- It occurs commonly due to nodular worms, change in feed and local intestinal problems. The animal is dull, off-feed, kicking at the belly with no rise of temperature, frequent straining with no defecation, colic symptoms, and at later stages, recumbency. Emergency surgery is the only rational treatment.
- Pregnancy toxæmia (Ketosis)- It is a highly fatal disease caused due to a decline in the plane of nutrition and short periods of starvation (40 hrs) during the last two months of pregnancy. Treatment comprises intravenous administration of 50% glucose. Supply of molasses in the ration and concentrate in the last two months of pregnancy helps in preventing the condition.

Poisoning

- Organochlorine compounds- Not applicable
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Usually bitten on the scrotum or udder. The presence of hair may obscure the typical fang marks. Prolonged pain, muscular weakness, impaired vision, nausea and paralysis are generally exhibited along with symptoms of shock. If anti-venin is not available and the bite is located in an area where a tourniquet cannot be applied, excision of an area of skin and sub-cutaneous tissue can be life-saving

c) After the event

Feed and fodder availability

Promotion of fodder seed production, cultivation and storage, establishment of fodder block making machines in fodder surplus areas

Post flood feeding management

- Animal should not be allowed to graze in water logged area
- Feeds to be protected from fungal contamination & wet feeds to be dried & fed
- Provides clean drinking water to animals
- Provide ready to eat feed blocks particularly the pregnant and lactating animals
- Requirement of energy may be met providing crude molasses
- Top feeds/ tree leaves available in the area to be provided to meet the DM requirement

Specific contingencies can be adopted for livestock feeding depending upon availability as under in different regions during drought situation

Neem seed kernel cake (NSKC), Saw dust, Paper waste, Agave (Ketki), Cactus, Tree leaves and vegetable leaves, Cher leaves and fruits, Straw and gotars, Sugarcane bagasse as animal feed and Use of damaged grains as feed



Drinking water

To strengthen reservoirs by promoting recharging of water and rain water harvesting during rainy season.

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - Treat the cattle against tick-borne diseases. Consult Veterinarian.
- Tick-borne diseases- Prevention is by tick control, treatment of diseased animal and vaccination. Consult Veterinarian.
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over longdistances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1packet mixed with 12.5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal). Consult Veterinarian.
- Sarcoptic Mange in pigs- Not applicable after event

Diseases caused by biting insects

- Trypanosomiasis- Treated with SURAMIN through intramuscular injection or intravenous infusion if sufficient observation is possible. Consult Veterinarian
- Three-day stiff sickness- It is important that the animal is given food and water if it is unable to stand.
- Animal should be treated by Veterinarian
- Lumpy-skin disease- If your cattle get this disease, you should speak to your state veterinarian

Diet related Disease problems

- Eating plastic bags and wire (Pica)- Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are grazing. Mineral mixture supplement should be given to the animal
- Poisonous plants- Not applicable
- Botulism- Prevention involves vaccination and good nutrition. Burn or bury all carcasses, bones or decaying material

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Not applicable
- Calcium, Phosphorous & Vit. D- Not applicable
- Vitamin A- Not applicable

Infectious Diseases

- Foot and Mouth Disease (FMD)- If outbreak occurs then the animal should be treated. Foot lesion should be washed with soap / detergent the apply Povidon iodine lotion while in mouth lesion boroglyserine should be applied. Consult Veterinarian.
- Haemorrhagic Septicaemia (HS)- Not applicable
- Black Quarter (BQ)- Not applicable
- Anthrax- Not applicable
- Rabies (Post bite therapy only)- Not applicable
- Enterotoxaemia (pulpy kidney) - It affects the animals in a high state of nutrition on a lush feed, grass or grain. Morbidity rates seldom exceed 10% but mortality rate approximates 100%. Under certain conditions, the organism proliferated rapidly in the intestines and produces lethal quantity of toxin. Suphadimidine with other supportive medicine may be effective for treatment
- Pneumonia- It is one of the most common and important pathological conditions. It is characterized clinically by increased respiration, coughing and abdominal breathing. Treatment with broad spectrum antibiotic, nebulization and other supportive drugs is effective.

Non-Infectious Diseases

- Ruminal tympany (Bloat)- It is the over-distension of the left flank either due to free gas or froth. This is generally encountered in “greedy feeders” when lush green pasture is available. Oral administration of sweet oil with turpentine oil or at times with formalin is advised.
- Rumen acidosis- Not applicable
- Intussusceptions- Not applicable
- Pregnancy toxæmia (Ketosis)- Not applicable

Poisoning

- Organochlorine compounds- This group includes DDT, BHC, lindane, aldrin, dieldrin, chlordane, toxaphane, methocyclor etc. which are used as pesticides on crops. Toxicity symptoms include increased excitability and irritability followed by muscle tremors, weakness, paralysis etc. Treatment consists of administering antidote, usually short-acting barbiturates.
- Organophosphorous compounds- This group consists of malathion, darathion, chlorathion, carbophenothon, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.



- Snake bite- Usually bitten on the scrotum or udder. The presence of hair may obscure the typical fang marks. Prolonged pain, muscular weakness, impaired vision, nausea and paralysis are generally exhibited along with symptoms of shock. If anti-venin is not available and the bite is located in an area where a tourniquet cannot be applied, excision of an area of skin and sub-cutaneous tissue can be life-saving

2 Poultry

Suggested contingency measures under DROUGHT event

a) Before the event

Shelter management

Optimum space should be provided. Orientation of shed (Long axis) should be in North - South. Plantation of tree around shed to provide cool environment. Provision of ad lib. Fresh water

Shortage of feed ingredients

Storage of feed

Drinking water

Manage clean drinking water. Storage facility should be made. Water quality should be checked before drinking to animal

Health and disease management

- Newcastle Disease- regular vaccination - Broiler birds should be with RD vaccine (Lasota 'F' strain) at the age of 4-7 days through Intra-nasal or Intra-ocular route. Layer birds should be vaccinated with NDV vaccine at the age of 9-14 day, 4 weeks, 13-14 weeks in drinking water/eye drop. Then at the age of 17 week with NDV vaccine through Intra-muscular (IM) route
- Marek's disease Marek's disease- Birds should be vaccinated with Herpes virus turkey vaccine at the age of 1 day through Subcutaneous route.
- Fowl pox- Chick embryo adopted fowl pox vaccine at the age 6-8 weeks. It important for the layer and broiler birds.
- Drop in Egg Production or Quality- Not applicable
- Nervous Signs and Lameness- Not applicable
- Diarrhoea- Not applicable
- Upper Respiratory Diseases- Vaccination against the some of the viral diseases like Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis which are also responsible for the respiratory symptoms can prevent this syndrome. Antifungal and antiparasitic drugs should be given.

Heat Wave

Plantation of tree around shed to provide cooler environment. Proper ventilation should be provided. Optimum space should be provided. Orientation of shed (Long axis) should be in East- West. Plantation of tree around shed to provide cool environment. Provision of ad lib. Fresh water. Manage green fodder and silage preparation. Height of roof should be minimum 220 - 240 cm. Roof of shed should be painted with white.

Cold Wave

Provide ad lib fresh water. Proper ventilation should be provided. Optimum space should be provided. Orientation of shed (Long axis) should be in North - South. Plantation of tree around shed to provide break cold wave. Provision of ad lib. Fresh water. Manage green fodder and silage preparation. Height of roof should be minimum 220 - 240 cm Roof of shed should be painted with Black Floor of shed should be Dry

b) During the event

Shelter management

Optimum space should be provided, there must not be overcrowded. Protect the animal from direct sun light. Try to provide them cool water. Proper ventilation should be maintained. Allow for grazing during night/early morning. Provision of ad lib. Fresh water

Shortage of feed ingredients

Provide non conventional feed, supplement anti oxidant and anti stress

Drinking water

Provide clean fresh and cold drinking water all the time. Water availability may increase by 20-50% depending upon feed quality and environmental temperature. Soft drinking water should be preferred. Add vit-C and other anti stress ingredients with water

Health and disease management

- Newcastle Disease- Vaccination and treatment of diseased one. Newcastle disease is the most important disease for poultry farmers around the world. This disease causes a large number of deaths in chickens and huge losses to farmers and the industry. Diseased birds should be slaughtered immediately. Consult Veterinarian.
- Marek's disease Marek's disease- It is one of the important diseases of poultry caused by virus. Mortality is very high and causes economic losses to the farmer and poultry industry.

- Fowl pox- It is a viral infection of chickens and turkeys characterized by proliferative lesions in the skin (Cutaneous form), it also affect the GI tract and respiratory tract (Diphtheritic form)
- Drop in Egg Production or Quality- There are many different types of organisms that can cause a drop in egg production or quality. These include: Bacteria (E. coli, Salmonella), Mycoplasma, Viruses (Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis, avian encephalomyelitis, egg drop syndrome). The Parasites, lack of Nutrition and Stress factor also support the onset of this condition. Adding vitamins and minerals to the water or feed may help. Consult Veterinarian
- Nervous Signs and Lameness- Chickens lie down because they cannot stand up. They also walk with a limp or are reluctant to move. Nervous signs may include staring into the sky, pulling the head and neck over their backs, paralysis. Sores on the breast muscles from lying down
- Diarrhoea- The stool or droppings of the chickens are not firm but very loose, watery, not of the normal colour and may contain blood. This may cause the feathers of the vent to be soiled and caked together, Depression, reluctance to eat, drink and move about, poor growth and death. Use an antibiotic or coccidiostatic drug in the water that was recommended by the animal health technician or veterinarian in the water for 3 to 5 days. Stress preparations that contain electrolytes, vitamins and minerals can be added to the water
- Upper Respiratory Diseases- Not applicable

Heat Wave

Water sprinkling to animal. Prevent the animal from direct sunlight. Optimum space should be provided, there must not be overcrowded. Fan should be provided to make the body cool. Try to provide them cool drinking water all time Proper ventilation should be maintained. Allow for grazing during night/early morning. Try to provide green fodder and silage. Stocking density should be less. Roof should be covered with tiles, paddy, dry leaves to protect from direct sun light

Cold Wave

Luke worm water should be provided at least 4-6 times a day. Prevent the animal from direct cold wave by closing the windows and doors. Optimum space should be provided, there must not be overcrowded. Proper ventilation should be maintained. Allow for grazing during sunny day time. Try to provide green fodder and silage. During extreme cold condition electric heater of wood fire heat should be provided. Try to make the environment inside and outside the shed dry. Gunny bags or blanket may be used to cover the body. Bedding material like paddy straw, Gunny Bag, Bhusa should be provided specially to young one shed.

c) After the event

Shelter management

Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

Shortage of feed ingredients

Not applicable

Drinking water

Provide adlib. Drinking water

Health and disease management

- Newcastle Disease- Disposal of dead birds
- Marek's disease Marek's disease- Disposal of dead birds
- Fowl pox- Disposal of dead birds
- Drop in Egg Production or Quality-Not applicable
- Nervous Signs and Lameness- A complete hygiene and disinfection programme should be planned together with the animal health technician or veterinarian. Antibiotics will only be effective against bacteria and can be used as recommended. If it is a viral disease, such as Newcastle disease, urgent steps have to be taken to prevent possible spread because it causes serious production losses
- Diarrhoea- Disposal of dead birds
- Upper Respiratory Diseases- There is many different types of organisms that can cause disease in the upper respiratory tract. These include: Mycoplasma Bacteria (E. coli, Pasteurella, Haemophilus), Viruses (Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis), Parasites (mites and worms) And Fungi (Aspergillus). Cold stress is also one of the predisposing factors for the occurrence of respiratory problems. Use an antibiotic drug that was recommended by your animal health technician or veterinarian in the water for 3 to 5 days
- Stress preparations that contain electrolytes, vitamins and minerals can be added to the water



Heat Wave

Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

Cold Wave

Provide ad lib. Normal drinking water. Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

3 Fisheries

Suggested contingency measures under DROUGHT event

a) Before the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Increase depth of pond, Repair dyke, outlet and inlet of pond; Prepare duck/pig house & stock pig @ 50-60, duck @ 450-500 no/ha if farmer involve in Integrated fish farming, Allow manure and urine directly in pond, Remove unwanted, predatory & old fishes and for this apply Mahua oil cake @ 2500kg/ha. Fixed net in outlet & inlet to prevent escaping of fish, Plough the pond and apply lime @ 250 kg/ha, Check the natural feed (plankton)@ 1.0 1.5 ml/50 lt. water; otherwise apply organic manure, Stock yearling (stunted grow fish) @ 6,000-8,000 no/ha
- Impact of salt load build up in ponds / change in water quality- Prevent entry of polluted water or apply lime at inlet.

Heat wave and cold wave

- Changes in pond environment (water quality) - Increase depth of pond. Reduce application of organic manure and supplementary feeds
- Health and Pest and disease management- Apply lime @ 50 kg/ha

b) During the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Reduce the stocking density from 25000 fry (1inches size) to 10000-15000/ha, fingerling 6,000-8,000 no/ha. Check the availability of natural food, if it is not sufficient provide supplementary feed at fixed place, time, amount and ratio & if it is more greenish stop supplementary feed & manure, store manure in separate place for agricultural purpose. Check the growth & health status by regular netting, Apply lime @ 50kg/ha.
- Impact of salt load build up in ponds / change in water quality- Apply lime @ 50 kg/ha on every 15-30 days. Aerate the water as per need

Heat wave and cold wave

- Changes in pond environment (water quality) - Stop or reduce supplementary feed and manure, Remove bigger size fishes. Reduce/stop application of feed and fertilizer.
- Health and Pest and disease management- Apply lime/salt as per need

c) After the event

Aquaculture

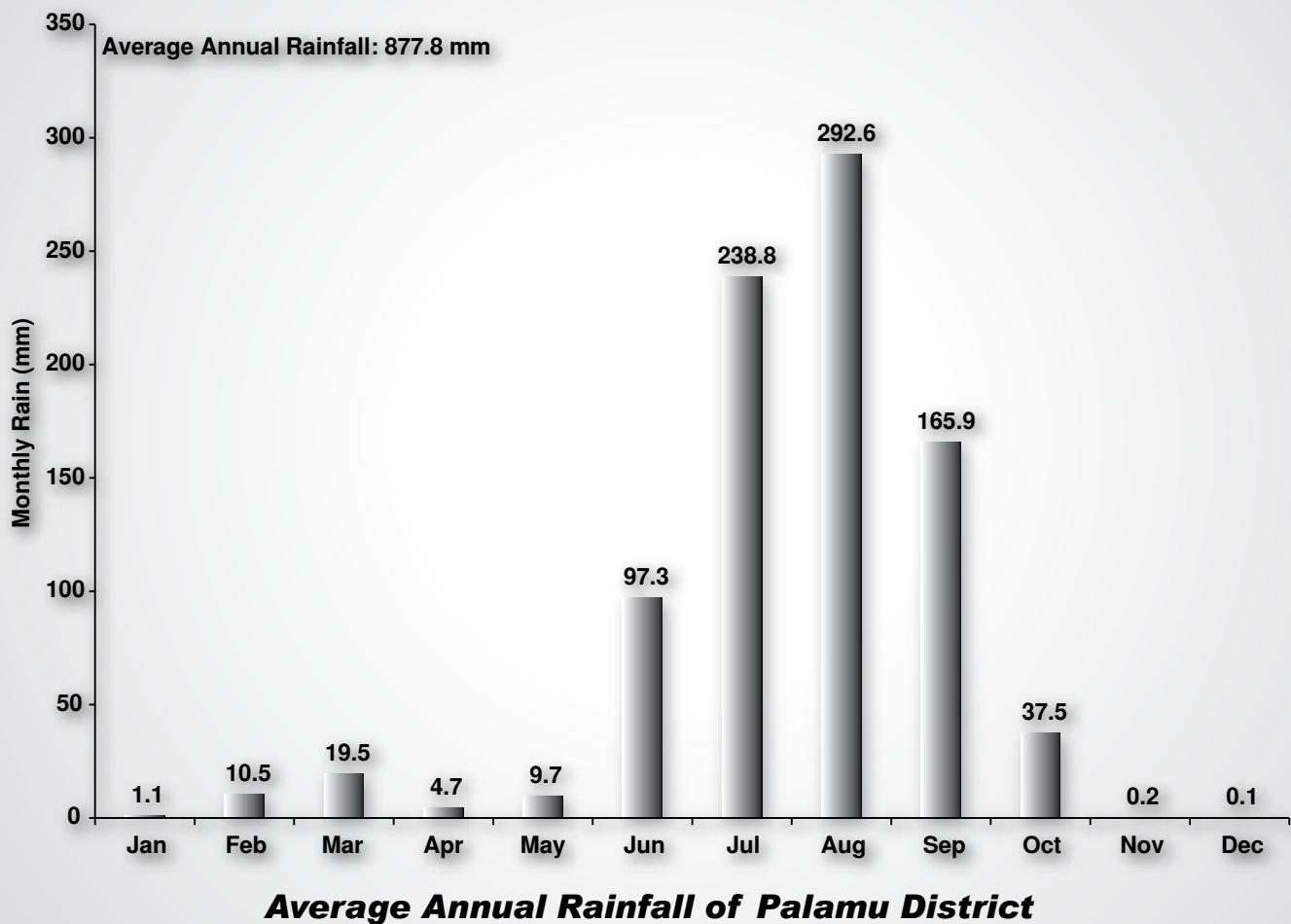
- Shallow water in ponds due to insufficient rains/inflow- Remove the bigger size fishes (0.5kg). In winter season fish reduces feed consumption so reduce supplementary feed, duck start egg laying so they should not allow before 9 O'clock otherwise loss of egg is possible, pig may attain 50 - 60 kg so that can be sell out and again stock same no of piglets. Apply bleaching powder @ 10kg/ha at place of litter deposition.
- Impact of salt load build up in ponds / change in water quality- Apply lime as per need @ 50 kg/ha

Heat wave and cold wave

- Changes in pond environment (water quality) - Stop or reduce supplementary feed and manure, Remove bigger size fishes. Harvest the bigger fishes, Reduce/stop application of supplementary feed, Apply lime @ 50 kg/ha and potassium per magnet in perforated plastic ball- 5-10g in each ball
- Health and Pest and disease management- Apply lime/salt as per need

PALAMU DISTRICT

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	c) After the event	





District Agriculture Plan

Agro-Climatic Zone	AZ - 58						
Agro Ecological Sub Region (ICAR)	Moderately To Gently Sloping ChattisgarhMahanadi Basin, Hot Moist/Dry Subhumid Transitional ESR (11.0)						
Agro-Climatic Zone (Planning Commission)	Weastern plateau and hills region (VII)						
Agro Climatic Zone (NARP)	Western Plateau Sub Zone - V						
List all the districts falling under the NARP Zone (>50% area falling in the zone)	Garhwa, Gumla, Latehar, Lohardaga, Palamau, Ranchi (1/3 rd), Simdega						
Meteorological Subdivision	8 th						
Geographic coordinates of district headquarters	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Latitude</td> <td style="width: 33%;">Longitude</td> <td style="width: 33%;">Altitude</td> </tr> <tr> <td>23°47'40" N- 24°38'34" N</td> <td>83°48' 58" E- 84°35' 29" E</td> <td>208 m</td> </tr> </table>	Latitude	Longitude	Altitude	23°47'40" N- 24°38'34" N	83°48' 58" E- 84°35' 29" E	208 m
Latitude	Longitude	Altitude					
23°47'40" N- 24°38'34" N	83°48' 58" E- 84°35' 29" E	208 m					
Name and address of the concerned ZRS/ZARS/ RARS/ RRS/ RRTTS	Zonal Research Station (Z.R.S.), Chianki, Medinigar, Palamau, Pin - 822133 (Birsa Agricultural University, Ranchi) Pin - 834006.						
Mention the KVK located in the district with address	Krishi Vigyan Kendra, Palamau, Pin - 822133						
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Department of Agrometeorology and Environmental Science, Birsa Agricultural University, Ranchi						

Land use pattern of the district (area: '000 ha)

Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
460.431	173.254	169.819	31.819	2.577	5.719	3.21	26.611	81.617	47.422



CONTINGENCY PLAN FOR KHARIF

PART-I

A Monsoon/Weather Situation: 2 Weeks Delay (Onset: 4th Week of June) - Early Season Drought

A1. Major Farming Situation/Land Situation: Upland sandy loam soils

Normal Crop/cropping system	Maize, Pigeonpea, Birsa Arhar - 1, Bahar, BR-65, local , Pigeonpea + Maize , Rice - BVD - 109, 110, Vandana, Sweet Potato-local, Blackgram- Birsa Urd-1, T9, Pant U-19, Soybean- Birsa Soybean-1
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice Crop	
Sole crop	
Maize, Pigeonpea, Sesame (Til), Blackgram, Soybean	
<u>Intercrop :</u>	
Pigeonpea + Lady's finger (1:2), Pigeonpea + Blackgram (1:2), Pigeonpea + Maize (1:1), Pigeonpea + Sorghum (1:1)	
<u>Horticulture</u>	
<u>Vegetable-</u> Brinjal/French bean/ Dolichos bean/Radish, Cucurbits/Cowpea	
<u>Variety</u>	
Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Pusa HM 9(AQH 9), KDMH, P3544, Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)	
Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 (240-250), Asha (200-220), Sesame- Kanke safed (95-100), Krishna (95-100)	
Blackgram- Birsa urd 1 (75-80), WBU 109 (70-75), Uttara (75-80)	
Soybean- Birsa soybean 1 black(120-125), JS 335	
Birsa safed soybean 2 (105-110), RKS 18, RAUS 5	
<u>Vegetable crops</u>	
Brinjal- Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6	
French bean- Komal, Stringless, Kentucky wonder, Birsa priya,	
Dolichos bean-Swarna utkrist, Swarna rituwar	
Cowpea- Birsa sweta(80-90), Swarn sweta(80-90)	
Radish- Kashi hansi, Jaunpur/ Pusa himani, Japanese white, Cowpea- Arka garima, Pusa barsati, Swarna sweta, Swarn harit	
b) Agronomic measures	
<ul style="list-style-type: none"> • Summer deep ploughing with Mouldboard or disc • Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations. • RD Spacing • Zero tillage practices • Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing • RDF and in case of Intercropping reduce 1/3rd dose for intercrop • Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin@ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables • Bund construction for unbundled upland • Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables • Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables • Inter-cropping to meet the consequences of occasional Drought. • Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed. • In case of phosphogypsum for soil application apply @ 120 kg/ha • Lime or dolomite application for pulses and oilseed @ 3-5 q/ha in furrow at the time of sowing. • In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha • Follow recommended seed rate • Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha • Foliar application of Urea 2% solution + lime in lady's finger • Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure 	

c) Remarks on Implementation

- Linkage with RKVY, ATMAs, and NFSM
 - Vermicomposting through KVKs ATMAs and NHM
 - Goatry and poultry rearing through KVKs, ATMAs and Veterinary Dept of. Govt. and BAU for livelihood support.
 - Awareness about balanced use of fertilizers to increase their fertility, productivity and sustainability
 - A special programme is needed to be launched in such areas to motivate the farmers to adopt improved technology.
 - Awareness for more and more use of organic manures, bio-pesticides for organic cultivation with IFS (eight components linkages)
 - Upland- 15-20 % upland area should be covered with orchard
1. Mango based orchard-
Variety- Amrapali (30 June-5 July), Mallika (15-20 June regular bearer), Sunder langra(15-20 May)
Spacing- 5 m X 5m
 - i) Recommended package of Practices- Intercrops
 - a) Mango + Papaya (Filler crop for two years) + Blackgram (rainy)/ Chickpea
 - b) Mango + Custard apple (for 10 years and renovate or remove after 10 years) + Blackgram/Chickpea
 - Variety- Langra (15 June)/Bombay green(15 May)/ Himsagar (20-25 May irregular bearer),
Spacing- 10 m X 10m
 - ii) Recommended package of practices
 - a) Mango + Guava(Upto 10 years as filler) + Papaya (Less than 3 years) + Blackgram-Chickpea/Lentil
 - b) Mango + Lemon + Papaya + Rabi pulses/vegetables
 - c) Mango + Custard apple + Papaya + Blackgram - Pea/Chickpea/Lentil/ Vegetables
 2. Guava base orchard-
Variety- Arka Mridula, Pant Prabhat, Allahabad safeda, L 49
Spacing- 5m X 5m
 - Recommended package of practices- Intercrops
 - a) Guava + Papaya (For 3 years) + Blackgram-Chickpea
 - b) Guava + Custard apple + Blackgram/Soybean- Pea/Vegetables
 3. Ber Based Orchard -
Variety- Banarsi, Karakka, Gola, Apple ber
Spacing- 5m X 5m
 - Recommended package of practices Intercrops
 - Ber + Custard apple + Sesame/Blackgram- Toria/Linseed/Safflower
 4. Beal Based orchard-
Variety- NB 2, 1, 5, 7, and 9 (NB- Narendra Beal) Kagezi beal
Spacing- 8m X 8m
 - Recommended package of practices Intercrops
 - Beal + Custard apple + Blackgram/ Sesame- Linseed/ Safflower
 5. Citrus based orchard-
Crops- Lemon, Lime, Mosambi, Kinnow, Orange/Mandarine
Variety-Lemon- Kagazi Kalan, Banarsi; Lime- Limepatti; Sweet orange- Mosambi, Malta; Orange- Kinnow, Curg Mandarine, nagpur mandarine
Grape fruit- Duncan, Saharanpur, Marsh (seed less)
Spacing- 5 m X 5 m
 - Recommended package of practices Intercrops
 - a) Citrus + Papaya + Blackgram/ Soybean/ Sesame-Chickpea/Lentil/toria/Linseed
 - b) Citrus + Papaya + Blackgram- Vegetable (Pea/French bean-bush type/ Tomato/Brinjal/ Chili/ Capsicum
- N.B.-
- Cucurbits, beans or any creeper or climber vegetable should be avoided
 - Field crops having height more than one meter should be avoided such as Pigenpea, Maize, Sorghum
 - After 3-5 years when shading effects started shade loving crops like ginger, Turmeric, Oel or leafy vegetables should be grown
 - In citrus leaf minor and aphid susceptible crops should be avoided
 - Aphid should be managed of mustard /toria taken in citrus orchard
 - 6. Cassava should be grown for the requirement as feed for pig animals
 - 7. Moringa should also be grown as fodder or vegetable purpose on upland main field bunds as shelter belt/ wind break. Every year pruning and thinning should be followed for bushy look.



A2. Major Farming Situation/Land Situation: Midland deep sandy loam soils

Normal Crop/cropping system	Rice - IR -36, IR - 64, Lalat , Birsa Dhan-202
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u>	
DSR (Improved rice varieties) Var.- IR 64 Drt 1, BVD 203, Shabhagi Dhan, Abhishek also Green manuring/ Brown manuring	
Transplanting(Hybrid rice varieties)Var.-PAC 801, 807, 25P25, 27P31, Arize Tej (Gold)	
<u>Don 3</u>	
Raised bed or ridge and Furrow method :Replace Rice with Pigeonpea/Soybean/ Cowpea/Maize/ Lady's finger/ Radish Variety	
Pigeonpea- Birsa Arhar (200-220), ICPH 2671 (200)	
Soybean- R 518 (110), JS 9752 (100), Birsa safed soybean 2 (105-110), RKS 18	
Cowpea- Birsa sweta(80-90), Swarn sweta(80-90)	
Maize- Birsa makka (Vikash) 2 (75-80), LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Vivek hybrid 9 (80)	
Lady's finger- Pusa A 4, Hybrid- Sonal	
Radish- Jaunpur/ Pusa himani, Japanese white, Pusa roshni	
b) Agronomic Measures	
<ul style="list-style-type: none"> • Staggered Nursery raising by MAT/DAPOG method • Follow community based nursery raising • Follow RDF, INP • Use early to mid early duration of rice variety. • Nursery management- 1 kg N + 1kg P_2O_5 + 1 kg K_2O for 100 m² • Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice • Topdressing above mentioned dose 10-15 days after sowing • In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling • Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm • Fertilizer dose- 80:40:20 kg/ha N : P_2O_5 : K_2O (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P_2O_5 + 40 K_2O/ha (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K_2O 	
c) Remarks on Implementation	
<ul style="list-style-type: none"> • A campaign trough RKVY , ATMAs, NFSM, KVVs, NHM and other State Govt. line departments are needed to be launched trough different district, block, panchayat and village level programme. • Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme • Supply of Plastic drum seeder through line departments • Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept. • Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon. • Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates • Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation. 	

A3. Major Farming Situation/Land Situation: Lowland deep clay soil

Normal Crop/cropping system	Rice: Birsamati, Rajendra munsuri - 1,MTU - 7029
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Long duration variety (Swarna , BPT 5204 and Rajshree) with Medium duration rice variety of Don 2 in Don 1	
DSR (Improved variety) Var.- Shabhagi Dhan, MTU 1001, MTU 1010, Abhishek	
Transplanting (Hybrid rice varieties) Var- Arize 6444 (Gold), PHB 71 PAC 807, 25P25, US 312 , Uday 111, 27P31	
b) Agronomic Measures	
<ul style="list-style-type: none"> • Staggered Nursery raising by MAT/ DAPOG method • Follow community based nursery raising • Follow RDF,INPM • Use Post emergence weedicide • Use early to mid early duration of rice variety. 	



- Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre, Gall midge- Monocrotophos @ 1ml/lit. water Gundhi bug, leaf folder and BPH -Quinolphos 25 EC (Ekalux) dust @ 25 kg/ha. Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water

c) Remarks on Implementation

- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation.

B. Monsoon/Weather Situation: 4 Weeks Delay (Onset: 2nd Week of July) - Early Season Drought

B1. Major Farming Situation/Land Situation: Upland sandy loam soils

Normal Crop/cropping system	Cropping system -Maize , Pigeonpea + Maize, Pigeonpea , Birsa Arhar –1, Bahar, BR-65, local, Rice- Vandana, Birsa Vikash Dhan-109 , Blackgram
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Suggested Contingency measures

a) Change in crop/cropping system

Discard Rice crop

Sole Crop

Finger millet, Gundli, Sorghum, Sesame, Blackgram, Rainy potato

Intercrop

Pigeonpea/ Maize + lady's finger (1:2), Pigeonpea + Maize (1:1), Maize + Beans (1:2), Maize + Lobia (1:2)

Pigeonpea + Guarfalli (1:2), Pigeonpea+ Blackgram (1:2)/Greengram (1:2)

Horticulture

Vegetables: Brinjal(Aghanua)/ Tomato/ Cucurbits,/Cowpea,/Beans/ Lady's Finger/ Chili/ Dolichos bean

Variety

Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)

Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), KDMH,

P3544, LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Kanchan(K 25)

100-110 , Vivek hybrid 9 (80)

Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149

Gundli- Birsa gundli 1

Sorghum- CSV 20-110-20, MP cheri, CSV 1616

Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)

Blackgram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), WBU 109 (70-75), Uttara (75-80 small grain)

Rainy potato- Utimus, Kufri ashoka, Kufri pukhraj

Vegetable crops

Brinjal- Swarn pratibha, Swarn mani, hybrid-Swarn shakti , Vijay, Swarna sampada 6

Tomato- Hybrid- Swarn sampada, Swarn samridh, Pusa hybrid 1 Suraksha

Cowpea- Pusa barsati ,Birsa sweta, Swarna sweta

French bean- Pant anupma, Arka Komal, Kentucky wonder, Birsa priya

Lady's finger- Hybrid- Sonal, Sarika

Chili- Andhra jyoti, Jwala, California wonder, Yellow wonder, Bharat

Dolichos bean-Swarna utkrist, Swarna rituwar

Cucurbits-

Bitter gourd- Arka harit, Pusa domausami
Bottle gourd- CoimbtOr long green, local
Sponge gourd- Rajendra nema, Long green, Long white
Ridge gourd- Swarn manjari, Pusa nasdar, Satputia,
Red Pumpkin- CO 1, CO 2, Arka suryamukhi

b) Agronomic Measures

- Summer deep ploughing with Mouldboard or disc
- Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.
- RD Spacing
- Zero tillage practices
- Seed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacing
- RDF and in case of Intercropping reduce 1/3rd dose for intercrop
- Weed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetables
- Bund construction for unbundled upland
- Broadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetables
- Ridge and furrow method for moisture Conservation in cereals, pulses and vegetables
- Inter-cropping to meet the consequences of occasional Drought.
- Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.
- In case of phosphogypsum for soil application apply @ 120 kg/ha
- Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.
- In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/ha
- Follow recommended seed rate
- Treat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid @ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /ha
- Foliar application of Urea 2% solution + lime in lady's finger
- Application of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measure
- Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility. Apply Borax @ 10 kg/ha
- For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges and furrows
- Cultivate vegetables like Brinjal Tomato, Cucurbits, Lady's finger, Chili, Coriander leaf, Amaranthus leaf, Oel, Arvi, Dolichos bean, Cole crop, French bean Cowpea etc.
- Gap filling and resowing should be done If mortality is more than 50 per cent and even if necessary replace the crops with short duration high yielding low water requiring crops like: Greengram, Blackgram, Horsegram, Niger, Cowpea Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour.
- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/ltr. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 ltr. water; vegetables- Nursery management- Application of carbofuran 3G @ 3 gm/m² before 10 days of transplanting followed by application of Tricoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/ltr. water

c) Remarks on Implementation

- Linkage with RKVY, ATMAS and NFSM
- Vermicomposting awareness through KVKS, ATMAS and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKS, ATMAS and Veterinary Dept of. Govt. and BAU for livelihood support.
- A special programme is needed to be launched in such areas on priority basis to motivate the farmers to adopt improved technology for stress management through ATMAS, KVKS, Govt. Dept., NGOs
- Campaign for awareness of crop-weather insurance to meet the losses due to drought/cyclone like weather vagaries.



B2. Major Farming Situation/Land Situation: Midland medium deep sandy loam soils

Normal Crop/cropping system	Rice - IR -36, IR - 64, Lalat
Suggested Contingency measures	
a) Change in crop/cropping system	
Don2 DSR (Improved rice varieties) Var- IR- 64 Drt 1, Shabhagi Dhan, Abhishek, BVD 203 <u>Transplanting : Hybrid rice varieties</u> Var.-ArizeTez (Gold), PAC 801, 807, 27P31, 25P25	
Don 3 <u>Replace rice with Pulses/vegetable/ Fodder crop</u> Pigeonpea/Sorghum Pulses-Blackgram/ Soybean/Cowpea /Pigeonpea+ Fodder (1:2)/ Pigeonpea + Blackgram/Maize/Lady's Finger Finger Millet <u>Vegetables-</u> Ladys's Finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ <u>Fodder Crop</u> Ginnea grass /Rice bean (Moth bean)/ Maize/Cowpea <u>Variety</u> Lady's finger- Hybrid- Sonal, Sarik Coriander leaf- Pusa haritima, rajendra swati Dolichos bean-Swarna utkrist, Swarna rituwar <u>Fodder crop</u> Maize- African tall, Cowpea-EC-4216, UPC-287	
b) Agronomic Measures	
<ul style="list-style-type: none">Summer deep ploughing with Mouldboard or discDobha construction for In-situ rain water conservation Line sowing in upland rice areas through suitable seeding devices is required to be made popularized for desired plant population. This will facilitate to control weeds and also to carry out intercultural operations.RD SpacingZero tillage practicesSeed rate - Sole- full quantity and in case of Intercropping reduce seed rate by 30-40 % according to spacingRDF and in case of Intercropping reduce 1/3rd dose for intercropWeed control (Maize- Atrazine as pre-emergence, Pulses- pre-emergence Imizathyper or Pendimithilin @ 1 kg a.i./ha, Soybean- Flucloralin or Basalin and also for vegetablesBund construction for unbunded uplandBroadcast Well rotten FYM along with 1/4th N + Full basal application of P, K of recommended dose for all crops and for vigorous seedling growth of vegetablesRidge and furrow method for moisture Conservation in cereals, pulses and vegetablesInter-cropping to meet the consequences of occasional Drought.Follow RDF for all upland crops and add Sulphur @ 20kg/ha soil application for pulses and oilseed.In case of phosphogypsum for soil application apply @ 120 kg/haLime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.In vegetable nursery apply carbofuran @ 3gm/m² or phorate 10 G @ 1gm/ m² or neem cake @ 50 kg/haFollow recommended seed rateTreat the leguminous seed in the sequence of FIR (Bavistin @ 2gm/kg, Imidacloprid@ 3 ml or Chlorpyriphos @ 5ml/kg, Rhizobium 500 gm/ha , PSB @ 500 gm/ha and for non leguminous treat seed with Fungicide + Insecticide + soil application Azotobacter @ 2kg /haFoliar application of Urea 2% solution + lime in lady's fingerApplication of required fungicide and insecticide in case of population count more than the ETL or as prophylactic measureLeguminous/pulse crops may be included in the cropping system in order to improve the soil fertility.Apply Borax @ 10 kg/haFor in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges and furrowsCultivate vegetables like Brinjal Tomato, Cucurbits, Lady's finger, Chili, Coriander leaf, Amaranthus leaf, Oel, Arvi, Dolichos bean, Cole crop, French bean Cowpea etc.Gap filling and resowing should be done If mortality is more than 50 per cent and even if necessary replace the crops with short duration high yielding low water requiring crops like : Greengram, Blackgram, Horsegram, Niger, Cowpea Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour.	



- Weed control by applying pre-emergence 5-6 DAS (Pendimithilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/lit. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/lit. water, Mosaic- Methyl Demeton @ 1.5 ml/lit. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water; Finger millet- Leaf/neck and collar blast- Tricyclazole @ 6 gm/10 lt, water; vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/lit. water.
- Rice pest and disease management -Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha. Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lt water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign through RKVY, ATMAs, NFSM, KVVs, NHM programme and other State Govt. line departments are needed to be awarded through different district, block, panchayat and village level programme.
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.

B3. Major Farming Situation/Land Situation: Lowland deep clay soils

Normal Crop/cropping system	Rice - Birsamati, Rajendra munsuri - 1, MTU - 7029
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Suggested Contingency measures

a) Change in crop/cropping system

Discard Long duration variety (Swarna , BPT 5204 and Rajshree) Replace Late duration with Medium duration rice variety of Don 2 in Don 1

DSR (Improved rice varieties) Var.- IR- 64 Drt 1, Shabhagi Dhan, BVD203, Abhishek

Transplanting (Hybrid rice varieties) Var.- PAC 807, Arize 6444 (Gold), 25P25, 27P31, 27P36, Uday 111, MTU1010, MTU 1001

b) Agronomic Measures

- Staggered Nursery raising by MAT/ DAPOG method
- Follow community based nursery raising
- Follow RDF,INPM
- Use Post emergence weedicide
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit. water, Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha, Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %, Blast- Beam or Tricyclazole @ 0.6 gm /lt water

c) Remarks on Implementation

- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme



- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds through Lamps one month prior to the arrival of monsoon.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation

C. Monsoon/Weather Situation: 6 Weeks Delay (Onset: 6th Week of July) - Early Season Drought

C1. Major Farming Situation/Land Situation: Upland sandy loam soils

Normal Crop/cropping system	Maize , Pigeonpea/ Pigeonpea + Maize, Pigeonpea , Birsa Arhar - 1, Bahar, local, BR-65, Rice - Vandana, BVD - 109, 110.
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice Crop	
<u>Sole crop</u>	
Niger, Horsegram, Pigeonpea,Sorghum, Sweet potato, Blackgram, Gundli, Kodo, Guarfalli, Hybrid Maize	
<u>Intercrop</u>	
Pigeonpea + Maize (1:1), Pigeonpea + lady's finger (1:2)	
<u>Horticulture</u>	
Vegetable -French bean/ Lady's finger/Tomato/ Brinjal/ Chili/ Cowpea/Radish	
<u>Fodder Crop:</u>	
Sorghum/ Lobia/ Maize/Deenanath grass / Stylo Hemata/ Rice bean/ Hybrid Napier	
<u>Variety</u>	
Niger- Birsa niger 1, 2 and 3 (95-105)	
Horsegram- Birsa kulthi1 (90-95)	
Pigeonpea- Birsa Arhar (200-220), Narendra Arhar 1 and 2 (240-250)	
Sorghum- CSV 20-110-20, MP cheri, CSV 1616	
Sweet potato-Shribhadra (80-90), Kalinga, Birsa sakarkand 1, Gauri	
Blackgram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), Gundli- Birsa gundli 1	
Maize- HQPM 1 (90-100), Pusa HM 9(AQH 9), VMH 4106 (Sweet corn hybrid), Vivek hybrid 9 (80)	
<u>Vegetable crops</u>	
French bean- Pant anupma, Birsa priya, Swarna lata	
Lady's finger-Hybrid- Sonal, Sarika	
Tomato- BT 12, Hybrid- Swarn sampada, Swarn samridh	
Brinjal- Pusa purple round, Mukta keshi, Swarn pratibha, Swarn shayamali, hybrid-Swarn shakti , Chili-Pusasadabahar, NP 46, Chinese giant, Yellow wonder, Bharat	
Cowpea- CP 4, Pusa komal, Birsa sweta, Swarna sweta,	
Radish- Kashi hansi, Jaunpur/ Pusa himani, Japanese white	
<u>Fodder crops</u>	
Sorghum- Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid	
Lobia-EC-4216, GFC-2 and GFC-4.	
Maize- African tall, JS-1006 and Vijaya composite	
b) Agronomic Measures	
<ul style="list-style-type: none">• Top dressing of urea and DAP after receipt of the rain for all crops• Lime or dolomite (3-5 q/ha) sulphur and phosphogypsum (30 Kg/ha) with compost application few days before sowing.• Leguminous/pulse crops may be included in the cropping system in order to improve the soil fertility. Apply Borax @ 10-15 kg/ha• Replace the crops with short duration high yielding low water requiring crops like : Greengram, Blackgram, Soybean, Sesame, Horsegram , Niger, Cowpea, Fodder maize, Fodder cowpea, Fodder sorghum, Fodder pearl millet, Sweet potato, Gundli, Guarfalli after receiving the downpour• Follow mulch after cultural operations to control the weeds in vegetables.• For in-situ moisture conservation in vegetables, 15-20 DAS follow intercultural operations by making ridges• Foliar application of 2 % DAP or 0.5 to 1 % potassium chloride (KCl) +0.3 % Boric acid or 2% urea at pre-flowering and flowering stage in pulses and vegetables• 2 % DAP spray for pulses.	



- Use antitranspirants : Stomatal closure (Growth hormones like ABA, Ethrel, TIBA, succinic acid, ascorbic acid and Cycocel (CCC), Reflectant (Calcium bicarbonate, Lime water) Thin film (Hexadecanol (Higher alcohols) Cetyl alcohol, Methanol
- Acidic soils should be reclaimed by application of soil ameliorants.
- Follow integrated pest management.
- Weed control by applying pre-emergence 5-6 DAS (Pendimethalin) or Post-emergence 18-28 DAS (Bispyribac)
- Pest and disease management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/lit. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/lit. water, Mosaic- Methyl Demeton @ 1.5 ml/lit. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt. water; vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/lit. water

c) Remarks on Implementation

- A special programme is needed to be launched in such areas to motivate the farmers to adopt improved technology for stress management through ATMAS, KVKS, Govt. Dept., NGOs and others. Soybean and fodder crops may be promoted.
- Promote Knowingness about climate resilient agriculture at district, block, panchayat and village level through involvement of KVKS, ATMAS, DAO, NGOs and other State Agril. Govt. line departments.
- Awareness of mechanization and Supply of Mouldboard and disc chisel/harrow through govt. scheme on subsidized way.
- Promote for double their income by curtailing cost of cultivation by introduction of early duration crops variety.
- Campaign for Awareness programme about crop-weather insurance

C2. Major Farming Situation/Land Situation: Midland deep sandy loam soils

Normal Crop/cropping system	Rice - IR -36, IR - 64, Lalat
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Suggested Contingency measures

a) Change in crop/cropping system

Don 2

DSR (Medium duration rice varieties) Var.- Shabhagi Dhan, BVD 110, 111, IR 64 Drt 1, Abhishek, Transplanting(Hybrid rice varieties)Var.- PAC 801, 807, 25P25, 27P31

Don 3

Raised bed or ridge and furrow method :Replace rice with Pulses and cereals/ vegetables/ Fodder crop : Pulses and cereals - Pigeonpea/ Maize/ Horsegram/ Niger/Cowpea/Gundli

Vegetables-

Lady's finger/Tomato,/ Brinjal/ cucurbits/Chili/ /Amaranthus leaf/Dolichos bean/Radish

Fodder Crop

Sorghum/ Maize/ Rice bean(Moth bean)/ Thin Napier (Un shadow condition)/ Late August-September- Berseem (MC)/ Oat (MC) Variety

Pigeonpea- Birsa Arhar (200-220), Malvia 13 (240-250), Asha (200-220), ICPH 2671 (200)

Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80)

Horsegram- Birsa kulthi1 (90-95)

Niger- Birsa niger 1, 2 and 3 (95-105), Puja 1 (90), VLG 19

Cowpea- Birsa sweta(80-90), Swarn harit (80-90)

Gundli- Birsa gundli 1

Lady's finger- Pusa A 4, Arka anamika, Hybrid- Sonal, Sarika

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Pusa hybrid 1 Suraksha

Brinjal- Pusa purple cluster, Mukta keshi, hybrid-Swarn shakti , Vijay, Swarna sampada 6

Cucurbits-

Bitter gourd- Arka harit, Pusa domausami,

Bottle gourd- Arka bahar, Pusa samar, Pusa Naveen, PusaMeghdoot, Coimbtur long green, local, Arka harit

Sponge gourd- Pusa chikni, Pusa supriya, Rajendra nema, Long green,Long white

Ridge gourd- Swarn manjari, Swarn uphar, Swarn baha, Pusa nasdar, Satputia,

Red Pumpkin- CO 1, CO 2, Arka chandan, Arka suryamukhi,

Chili- NP 46, California wonder, Chinese giant, Bharat

Dolichos bean-Swarna utkrist, Swarna rituwar

Radish- Kashi hansi, , Pusa roshni



Fodder crop

Sorghum- HC-136, HC-171, PSC-1, Sorghum Sudan hybrid.

Maize- African tall, JS-1006 and Vijaya composite.

Berseem (MC)-Vardan

b) Agronomic Measures

- Staggered Nursery raising by MAT/DAPOG method
- Follow community based nursery raising
- Follow RDF,INPM
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P_2O_5 + 1 kg K_2O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing above mentioned dose 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P_2O_5 : K_2O (Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P_2O_5 + 40 K_2O /ha ((Basal 1/2 N + full dose P_2O_5 + 2/3rd K_2O ; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K_2O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- INPM
- Use of post weedicide
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr. water; Gundhi bug,leaf folder and BPH -Quinolophos 25 EC(Ekalux) dust @ 25 kg/ha; Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %; Blast- Beam or Tricyclazole @ 0.6 gm /ltr water; Termite- Methyl parathion dust @ 25 kg/ha
- Pest and disease management- Pigeonpea-leaf folder- Methyl Demeton @ 1.5 ml/ltr. water; Blackgram and Greengram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr. water; S vegetables- Nursery management- Application of carbofuron 3G @ 3 gm/m² before 10 days of transplanting followed by application of Trichoderma along with half rotten cow dung @ 1 kg Trichoderma in 100 kg cow dung (20 days staying period required for cow dung treated with Trichoderma), rainy potato-Ridomyl MZ @ 1-2 gm/ltr. water

c) Remarks on Implementation

- Campaign for awareness improved technology trough RKVY, ATMAs, NFSM, KVKS, NHM programme and other State Govt. line departments are needed to be at different district, block, panchayat and village level
- Awareness of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds of contingency crops through Lamps within one months.
- Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone situation.

C3. Major Farming Situation/Land Situation: Lowland sandy clay loam soils

Normal Crop/cropping system	Rice - Birsamati, Rajendra mahsuri - 1
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Suggested Contingency measures

a) Change in crop/cropping system

Discard Long duration variety (Swarna , BPT 5204 and Rajshree)

Replace Late duration with Medium duration rice variety of Don 2 in Don 1

DSR-(Improved rice varieties) Var.- Shabhagi, IR 64-Drt 1, Abhishek, BVD 110, BVD 111, BVS 1

Transplanting(Hybrid rice varieties)Var.-PAC 801, 807, 25P25, Arize Tej (Gold), Arize 6444 (Gold), Uday 111, MTU 1010, 1001

Fodder crop : In case of fallow (Late heavy rainfall) Para Grass / Dallis grass



b) Agronomic Measures

- Staggered Nursery raising by MAT/ DAPOG method
- Follow community based nursery raising
- Follow RDF,INPM
- Use Post emergence weedicide
- Use early to mid early duration of rice variety.
- Nursery management- 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m²
- Seed rate 80-100 kg/ha for improved rice variety and 15 kg/ha for hybrid rice
- Topdressing 1 kg N + 1kg P₂O₅ + 1 kg K₂O for 100 m² at 10-15 days after sowing
- In nursery- Carbofuron 3G @300 gm/100 m² 10 days before uprooting of seedling
- Spacing DSR- 20 cm row for PDS and for transplanting 20-25 X 15-25 cm
- Fertilizer dose- 80:40:20 kg/ha N : P₂O₅ : K₂O (Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O and rest before flowering and for hybrid 120-150 kg N + 60 Kg P₂O₅ + 40 K₂O/ha ((Basal 1/2 N + full dose P₂O₅ + 2/3rd K₂O; 1/4th N at 20-25 DAS; 1/4th N at 45 DAS ; 1/3rd K₂O at the time of flowering.
- DSR-Use plastic drum seeder rice tools
- Rice pest and disease management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr. water; Gundhi bug,leaf folder and BPH -Quinolphos 25 EC(Ekalux) dust @ 25 kg/ha; Falsesmut- 1st spraying at time of flowering and 2nd 10 days after 1st spraying of Propiconazole @ 0.1 % or Nativo @ 0.04 %; Blast- Beam or Tricyclazole @ 0.6 gm /ltr water

c) Remarks on Implementation

- Awareness programme of MAT/DAPOG method of raising nursery and nursery management through different district, block, panchayat and village level programme
- Supply of Plastic drum seeder through line departments in case of DSR
- Awareness about climate smart agriculture through Birsa Agricultural University and state Govt. Ag. Dept.
- Supply of improved and hybrid seeds of contingency mid early rice varieties through Lamps within one month Linkages of farmers through different line departments and BAU for providing alertness, warning and weather vagaries updates
- Campaign for more and more crop-weather insurance to meet losses in case of drought/cyclone upside-down situation
- Contingency technology awareness programme through KVKS, ATMAs, NGOs and DAOs
- Achieve maximum fallow area in case of late drought and suggest to go for cultivation of early duration rabi and fodder crops.

PART-II

Monsoon/Weather Situation: Normal onset followed by 15-20 days dry spell after sowing
(Early Season Drought-Normal onset)

A1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management	
Cultivate drought tolerant promising non paddy crops like pigeonpea, blackgram, greengram, rice bean, finger millet, guar, sesame, soyabean, sorghum, pearl millet, sweet potato, castor and vegetables like radish, tomato,, brinjal, creeper bean, chili, lady's finger wherever possible in place of upland rice	
<ul style="list-style-type: none"> • Maximum use of organic manures for early seedling vigour along with RDF (N:P₂O₅:K₂O) • Recommend to resow with subsequent rains for better plant stand. • When damage is Less than 30 per cent then go for Gap filling in all upland crops • When damage is More than 50 per cent then go resowing in all upland crops • Removing excess plants where are overcrowded, reduce crop stand to conserve soil moisture • Water spraying during evening and early morning 	
b) Soil nutrient & moisture conservation measures	
<ul style="list-style-type: none"> • Avoid top dressing of Urea during dry spell and wait till downpour • Go for in-situ moisture conservation • One hand weeding followed by hoeing and simultaneous eartingup after 20 DAS is highly recommended in all upland crops. 	
c) Remarks on Implementation	
Awareness for Construction of rain water harvesting structures for recycling of water during dry spell like DOVAS through SHG or on subsidized basis through State Govt. schemes.	
A2. Major Farming Situation/Land Situation: MID LAND Sandy loam solis	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change management	
<u>Don 2</u> <ul style="list-style-type: none"> • If possible, go for staggered raising of nursery in rice crop • If possible, raise community nursery of rice at a reliable water source to save time for further delay. • In case, if rice population is less than 40-50 percent, gap filled by retransplanting the rice crop and for more than 50 per cent mortality use fresh seeding for fresh transplanting. • Follow gap filling by removing seedlings from profuse tillers to have a uniform distribution of same aged plants • For termite and disease management in nursery spray Indofil M 45 and Chlorpyriphos @ 0.2 per cent • life saving irrigation • DSR on receipt of rain by using Paddy drum seeder or • High yielding varieties- follow transplanting while, Improved varieties - follow DSR • In case of DSR- Use sprouted seeds in plastic drum seeder with increased seed rate by 20-25 per cent for good crop stand • Late transplanted rice during early season drought results in the occurrence of sheath rot and grain discoloration diseases. • Follow pre emergence and post emergence weedicide to disturb/check the crop-weed competition for nutrient • Provide life saving and protective irrigation to over aged seedling in nursery through dovas (harvested rain water). Also, take care of blast disease in nursery and avoid using urea in nursery. • Strengthen the bunds to check the drainage holes and seepage loss in transplanted and direct sown medium land rice regularly 	
<u>Don3</u> <ul style="list-style-type: none"> • Follow raised bed broad furrow or Ridge and furrow method for Maize/ Pigeonpea/ Lady's finger/ Blackgram/ Soybean • Adopt surface mulching with crop residue or tree lopping of <i>Glyricidia</i> wherever possible. If farm waste is not available, use blade to form a thin layer of soil mulch to avoid cracks • Life saving irrigation • In case of transplanting of over aged seedling (35-45 days), increase number of seedling per hill (5-6 seedling/hill) 	



b) Soil nutrient & moisture conservation measures

- Dry seeding of rice with application of pre and post emergence weedicide in over aged seedlings (>25 DOS)
- Split application of Urea fertilizer
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells

c) Remarks on Implementation

Awareness for Construction of rain water harvesting structures for recycling of water during dry spell like DOVAS through SHG or on subsidized basis through State Govt. schemes.

A3. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change management	

- If possible, go for staggered nursery raising in rice crop
- If possible, raise community nursery of rice at a reliable water source to save time for further delay.
- In case, if rice population is less than 40-50 percent, gap filled by retransplanting the rice crop and for more than 50 per cent mortality use fresh seeding for fresh transplanting.
- Follow gap filling by removing seedlings from profuse tillers to have a uniform distribution of same aged plants
- Prefer mid early rice variety instead of late variety
- Use pre and post emergence weedicide
- Over aged seedling should be top cut and treat the seedlings root by Dursban/Chlorpyriphos @ 5 ml per lt water and transplant immediately after treated seedlings with 2 per cent Urea solution
- In case of transplanting over aged seedling (35-45 days), increase number of seedling per hill (5-6 seedling/hill)
- In fallow land go for cultivation of mid early duration rice variety through DSR @ 70-80 Kg/ha

b) Soil nutrient & moisture conservation measures

- Split application of Urea fertilizer
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells

c) Remarks on Implementation

Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidized basis through State Govt. schemes.

B. Monsoon/Weather Situation: Mid season drought (long dry spell, consecutive 2 weeks rainless (<2.5 mm) period

B1. At vegetative phase

B1.1 Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	

a) Change management

- Use organic mulches such as tree leaves, straw and other available crop residue to conserve soil moisture
- Avoid top dressing of fertilizers till sufficient moisture is available in soil
- Use reflectant or antitranspirant like Kaolin @ 3-5 kg/100 lt or
- In pulses, at weekly interval foliar spray of KCl @ 0.5- 1 % + 100 ppm Boric acid followed by foliar spraying of 2 percent urea during evening time
- Spray wax emulser
- Manual weeding followed by hoeing for germinating weeds.
- For termite and leaf folder control spraying or drenching of Chlorpyriphos @ 2ml/lt water and for all pulses and cereals.
- For leaf folder control in Maize (Stem borer) and Pigeonpea apply Carbofuran 3 G @ 12 Kg/acre or Phorate 10 G @ 4 kg/acre or Quinolphos @ 1 ml/lt water in Maize for leaf folder
- Also, spray @ 20/40/60 ppm CaCl₂ in pulses
- Vegetables- Foliar spray of water with 2 per cent KCl + 100 ppm Boron
- Tomato- Foliar spray of CaCl₂ @ 20/40/60 ppm
- Gap filling may be done with pigeonpea to maintain adequate plant stand.
- For termites in pigeonpea, maize and other standing cereal crops which can be controlled by soil drenching with chlorpyriphos 20 EC @ 2 ml/lt water or by adding Chlorpyriphos 1.5% dust @ 8– 10 kg/ha or Carbofuran 3G @ 12 kg or Phorate 10 G @ 4 kg.acre before final land preparation and also contol Gallmidge
- In green and blackgram, cowpea, bean and lady's finger the spread of YMV by insect vector may increase. Hence, to control insect vectors spray Dimethoate @ 1ml/ lt. water or Imidacloprid 4 ml/10 lt. water twice at 10 days interval



- In groundnut crop termites and white grub incidence is expected to be more. Methods suggested in rice may be followed to reduce the pest infestation.
- Incidence of leaf miner in groundnut may increase which can be managed by spraying Monocrotophos 36 SL or Triazophos 40 EC @ 1 ml/lit. water twice at fortnight intervals.
- Under dry condition incidence of mites is expected to be more in vegetable crops which can be brought down by spraying of dicofol @ 2 ml/lit water.
- Early and mid season drought favours disease like brown spot of rice, bacterial wilt of brinjal and other vegetables

b) Soil nutrient & moisture conservation measures

- Foliar spraying of DAP @ 2 per cent along with Boric acid @ 0.3 per cent. Also, spray Urea @ 1 per cent
- Provide micro- irrigation with drip for wide spaced crops such as chilies and vegetables and Sprinklers for groundnut, maize and vegetables wherever ground/ surface water is available.
- Go for life saving and protective irrigation from constructed dovas.

c) Remarks on Implementation

Promote construction of Rain water harvesting structure watershed programme and MNREGA

B2. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

B2.1 Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
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Suggested Contingency measures

a) Change management

Maize- Harvest it for fodder use

Pulses- and vegetables- At 2-3 days interval spraying of water followed by 2 per cent KCl + 100 ppm Boron during evening time is recommended.

In case of groundnut maturing in the month of September which can be harvested after providing light irrigation through dovas to lose the soil.

b) Soil nutrient & moisture conservation measures

Go for life saving and protective irrigation from constructed DOVAS.

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA

B3. At vegetative phase

B3.1. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Crop management

Don 2

- Manual weeding followed by hoeing for germinating weeds
- Take care of mealy bug and termite attack which are more prevalent in dry weather.
- Top dressing should be followed only after receipt of rain.
- No urea should be top dressed until receipt of rainfall in rice crop.
- For BPH, dusting field bunds and around with Carbaryl (Savin)4% or malathion 5% @ 10 - 12 kg/acre

Don 3

- One manual weeding for germinating weeds
- Apply 4 Kg N/acre in sorghum and oilseed crops soon after receipt of rains.
- In pigeonpea, if the drought affected plants to recoup with the revival of the rains, spray 2 to 3% urea after the foliage is wetted with the rains.
- Foliar application of Sulphur @ 1ppm to mitigate the stress condition in oilseed is necessary after receipt of rainfall
- Apply post emergence weedicide for controlling weeds in oilseed (Groundnut) to undisturb the pegging process.
- During 40-45 DAS, if there is a severe moisture stress, thinning may be done in kharif sorghum and pearl millet.

b) Soil nutrient & moisture conservation measures

- Foliar spray of KCl or ZNSO₄ @ 2 per cent
- Foliar spray of 2% KNO₃ or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells
- Life saving irrigation through dovas,well, ponds, check dams and bora bandh

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA



B4. At flowering/ fruiting stage

B4.1. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Crop management

Don 2 and Don 3

- Life saving irrigation with harvested water
- Spray of urea @ 1-2 percent
- Drought condition during the month of August-September onwards shall result in severe incidence of foliar blast and brown spot diseases in rice. It is advised to spray Tricyclazole (Tilt) @ 6 g/ 10 lt. water or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period.

b) Soil nutrient & moisture conservation measures

- Foliar spray of KCl or $ZNSO_4$ @ 2 per cent
- Foliar spray of 2% KNO_3 or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells
- Life saving irrigation through dovas,wells, ponds, check dams and bora bandh

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA

B5. At vegetative phase

B5.1. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Crop management

- Foliar spray of 2 per cent KCL followed by 1-2 per cent Urea.
- Weeding should be done
- Drought makes the crop vulnerable to sheath rot and sheath blight diseases. Maintenance of field sanitation followed by twice spraying at 10 days interval with validamycin 2-3 ml/lt water or Tricyclazole @ 6g/10 lt. water or carbendazim @ 2 g/lt water are advised.
- Life saving irrigation

b) Soil nutrient & moisture conservation measures

- Foliar spray of Foliar spray of urea @ 2 per cent
- Foliar spray of 2% KNO_3 or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells
- Life saving irrigation through dovas, wells, ponds, check dams and bora bandh

c) Remarks on Implementation

Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidized basis through State Govt. schemes.

B6. At flowering/ fruiting stage

B6.1 Major Farming Situation/Land Situation: LOW LAND Sandy clayloam soils

Normal Crop/cropping system	Rice
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Suggested Contingency measures

a) Crop management

- Drought condition during flowering and fruiting and onwards shall result in severe incidence of foliar blast and brown spot diseases in rice. It is advised to spray Tricyclazole (Tilt) @ 6 g/ 10 lt. water or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period.
- Life saving irrigation
- During drought, attack of gundhi bug shall be more. Apply Quinolphos or Monocrotophos @ 1-2 ml per lt. water.

b) Soil nutrient & moisture conservation measures

- Weeding and foliar spray of urea @ 2 per cent
- Foliar spray of 2% KNO_3 or 2% urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition during dry spells
- Life saving irrigation through dovas, wells, ponds, check dams and bora bandh

c) Remarks on Implementation

Promote for the construction of Rain water harvesting structure watershed programme and MNREGA



C. Monsoon/Weather Situation: Terminal drought (Early withdrawal of monsoon)

C1. At fruiting/pre physiological maturity stage

C1.1. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils

Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cowpea, Pigeonpea + Groundnut, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management	
<ul style="list-style-type: none"> • Life saving irrigation to vegetables through stored moisture from constructed DOVA • If not possible to make survival harvest it for fodder use 	
b) Rabi Crop planning	
<ul style="list-style-type: none"> • Cultivation of Niger, Horsegram, Toria, linseed as relay/paira cropping • In case of availability of irrigation, go for cultivation of early Potato and pea (early Arkel group) • Prepare kachha check dam or Bora Bandh for Water conservation • Mid early variety of radish cultivation is recommended 	
c) Remarks on Implementation	
Promote for the construction of Farm ponds through watershed management programme and MNREGA	

C1.2. Major Farming Situation/Land Situation: MID LAND Sandy loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u> <ul style="list-style-type: none"> • At milking , soft and dough stage spray KCL @ 2 per cent • In case of gundhi bug attack found more than ETL(>2 gundhibug /m²), spray Chlorpyriphos dust or Monocrotophos @ 1 ml/lit. water • If possible go for life saving irrigation • Late season drought generally results in outbreak of foliar, node, collar or neck blast of rice depending on the stage of crop. 	
<u>Don 3</u> <p>Instead of grain purpose crops like sorghum, pearl millet, maize, cowpea, black and greengram that can be harvested for fodder use</p>	
b) Rabi crop planning	
<ul style="list-style-type: none"> • Ensure for all inputs required for rabi season in advance. • In case of failure of kharif crops prefer sowing of pre rabi catch crops like, Toria, Niger, Horsegram, blackgram, sesame linseed in uplands to medium lands 	
c) Remarks on Implementation	
Promote construction of Rain water harvesting structure watershed programme and MNREGA	

C1.3. Major Farming Situation/Land Situation: LOW LAND Sandy loam soils

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Crop management	
Life saving irrigation. <ul style="list-style-type: none"> • The land should be tilled properly in case <i>kharif</i> crop fails sow <i>rabi</i> crops like safflower, pigeonpea in sept-Oct (Short duration) • Spray KCL @ 2 per cent followed by Uear @ 2 per cent • Mid early rice crop may be harvested at Physiological maturity • Cultivate vegetables like Tomato, Brinjal, Capsicum, Shimla mirch, Broccoli, Cabbage and Cauliflower, green pea and potato as per suitability near and around tributaries 	
b) Rabi crop planning	
Prefer early sowing of wheat, Mustard, Chickpea, linseed and lentil as sole or intercrop Wheat + Chickpea (4:2) Wheat+ Mustard (4:3)	
c) Remarks on Implementation	
Promote construction of Rain water harvesting structure watershed programme and MNREGA	

PART-III

Unusual rains: Continuous high rainfall in a short span leading to water logging

Suggested Contingency measures
a) Crop management
Pigeonpea /sorghum/Pearl millet
Vegetative stage- Prefer ridge and furrow method of sowing. Ensure for proper drainage through channel. Collect runoff water in Dovas for further use.
Flowering stage- Ensure for proper drainage through channel. Collect runoff water in Dovas for further use.
Crop maturity stage- No such situation at the time of maturity
Post harvest- After Sun drying follow grading and storing
Blackgram and other pulses/Oilseeds
Vegetative stage- Follow Ridge and furrow sowing
Ensure for proper drainage through channel
Collect runoff water in Dovas for further use
Avoid application of fertilizer
Flowering stage- Ensure for proper drainage through channel
Collect runoff water in Dovas for further use
Avoid application of fertilizer
Prophylactic measure for jassid and YMV
Crop maturity stage-
Post harvest-
Rice
Vegetative stage- Safe disposal of excess water from rice field. Bund repairing and strengthen. Application of insecticides in the afternoon hours is preferred seeing the weather condition or after spraying weather should remain rain free for at least 4-5 hrs. Retransplant to maintain plant population in case of mortality more than 50 % In partially damaged crop, allow to withstand upright. Flood occurs due to heavy storm in mid and lowland which when recedes probability of occurrence of swarming caterpillar on field bunds and around of rice crop is more. So, when it crosses the Economic Threshold Limit (ETL) i.e., one larva / hill then spray the crop with Chlorpyriphos/ Triazophos/ Profenophos @ 2 ml/lt water or dust the crop with Quinalphos @ 1.5% D @ 10kg/ acre. To prevent migration of larvae from one field to other, bunds should be heavily dusted with the dust formulation mentioned above. In partially ponded field, rice caseworm and in general leaf folder attack is expected. If 1-2 cases or folded leaves/hill is seen spray the crop with Monocrotophos / Chlorpyriphos @ 1 ml/lt water or with Cartap Hydrochloride 50 SP / Fipronil 5 SP @ 200 g/acre. Rain storms during <i>kharif</i> may result in severe occurrence of bacterial leaf streak and bacterial blight in rice. It is advised to spray the crop immediately after every rainspell with streptocycline @ 1g/10 lt water or plantomycin @ 1g/lt water or bacterinol @ 2g/lt. water. Control snail occurrence by Acaricide
Flowering stage- Safe disposal of excess water from rice field. Bund repairing and strengthen. Avoid application of fertilizer. Flood occurs due to heavy storm in mid and lowland which when recedes probability of occurrence of swarming caterpillar, BPH and cut worm on field bunds and around of rice crop is more. So, when it crosses the Economic Threshold Limit (ETL) i.e., one larva / hill then spray Chlorpyriphos/ Triazophos/ Profenophos @ 2 ml/lt water or dust the crop with Quinalphos @ 1.5% D @ 10kg/ acre. To prevent migration of larvae from one field to other, bunds should be heavily dusted with the dust formulation mentioned above. In partially ponded field, rice caseworm and in general leaf folder attack is expected. If 1-2 cases or folded leaves/hill is seen spray the crop with Monocrotophos / Chlorpyriphos @ 1 ml/lt water or with Cartap Hydrochloride 50 SP / Fipronil 5 SP @ 200 g/acre. Unusual and heavy rain during <i>kharif</i> may result in severe occurrence of bacterial leaf streak and bacterial blight in rice. It is advised to spray the crop immediately after every rain spell with streptocycline @ 1g/10 lt water or plantomycin @ 1g/lt water or bacterinol @ 2g/lt. water. Control snail occurrence by Acaricide.
Crop maturity stage- Provide drainage for fast removal of water from the field to favour harvesting
Post harvest- Protect the grain from rain and store it after sun drying for 2-3 days
Maize
Vegetative stage- Prefer ridge and furrow method of sowing. Ensure for proper drainage through channel. Earthingup after downpour. At Knee stage apply thimate 10 G @ 4-6 grains in whirl
Flowering stage- Ensure for proper drainage through channel. At flowering and silking stage for ant attack apply dust on silks @ 0.5 g / cob
Crop maturity stage- Provide drainage for fast removal of water from the field to favour harvesting
Post harvest- Protect grains from rain and store it after sun drying for 2-3 days



Horticulture

Vegetative stage- Prefer ridge and furrow method for sowing and proper drainage. Ensure for proper drainage through water ways. Collect runoff water in Dovas for further use. Soil drenching Carbofuran 3G @ 3 g/lt water against insects. In case of web formation with leaves apply (Nuvan)DDVP @ 1 ml/lt water as a fumigant

Flowering stage- Apply hormone to prevent flower drop. Ensure for proper drainage. Take precaution against wilting and fruit rot. In Tomato and Brinjal - drenching Bavistin @ 2 ml/lit. water + Streptocycline @ 1-2 g/lit water. In Cauliflower -In case of Incidence of collar rot -Spraying of Saaf (Metalaxyl + Mancozeb) @ 2 g/lit water solution. Drainage of excess water. In Lady's finger- YVMV- Spray insecticide followed by fungicide. Soil drenching Carbofuran 3G @ 3 g/lt water against insects. In case of web formation with leaves apply (Nuvan) DDVP @ 1 ml/lt water as a fumigant

Crop maturity stage- Take precaution against wilting and fruit rot. For wilting– Soil drenching with Bavistin @ 2 ml/lit. water + Streptocycline @ 1-2 g/lit water. In YMVM- Insecticide followed by fungicide

Post harvest- Immediate harvest and safe disposal of produce

Vegetables- (Cucurbits,/ Tomato/ Brinjal/ Cauliflower/ Cabbage/ Lady's finger/Dolichos bean/Amaranthus leaf/ Coriander leaf/Radish)

Vegetative stage- Sowing on ridge and drainage through furrow. Prophylactic measures against pest and diseases. Damaged twigs and leaves may be removed and follow fungicide spraying and stacking

Flowering stage- Apply hormone to prevent flower drop. Ensure for proper drainage. Take precaution againsts wilting and fruit rot. In Tomato and Brinjal- drenching Bavistin @ 2 ml/lit. water + Streptocycline @ 1-2 g/lit water. In Cauliflower -In case of Incidence of collar rot -Spraying of Saaf (Metalaxyl + Mancozeb) @ 2 g/lit water solution. Drainage of excess water. In Lady's finger- YVMV- Spray insecticide followed by fungicide. Provide support through stacking

Crop maturity stage- Take precaution against wilting and fruit rot. In Wilting– Soil drenching with Bavistin @ 2 ml/lit + Streptocycline @ 1-2 g/lit water. In YMVM- Insecticide followed by fungicide

Provide support through stacking.

Post harvest- Immediate harvest and sell produce safely in the market

b) Pest and disease management

Rice

Vegetative stage- Sheath blight- Hexaconazole @ 1ml/lit water. Blast- Tricyclazole @ 6 g/10 lt water

Flowering stage- Sheath blight- Hexaconazole @ 1ml/lit water. Blast- Tricyclazole @ 6 g/10 lt water. Falsesmut- Nativo @ 4g/10 lt water

Crop maturity stage- False Smut - Control- Nativo @ 4g/10 lt water or Propiconazole + Tricyclazole 52.5 SE @ 1ml/lit water. In case of grain discolourness (Grain blast). Spray Tricyclazole @ 6 ml / 10 liter water

Post harvest- Store grains after proper sun drying to minimize the incidence of stored grain pest

Maize

Vegetative stage- Stem borer Control- Carbofuran 3 G @ 12 Kg/acre or Phorate 10G@ 4 kg/acre

Flowering stage- Sheath blight Control- Hexaconazole1-2 ml/lit water

Vegetables- (Cucurbits,/ Tomato/ Brinjal/ Cauliflower/ Cabbage/ Lady's finger/Dolichos bean/Amaranthus leaf/ Coriander leaf/Radish)

Vegetative stage- Before sowing apply in soil, Carbofuran 3 G @2-3 g/m². Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lit. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lit water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lit. water against downy mildew diseases of cucurbits.

Flowering stage- Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lit . water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lit water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lit. water against downy mildew diseases of cucurbits. YVM Control- Carbofuran 3G @ 3 or Phorate 10 G @ 1 g/m² followed by any fungicide

Crop maturity stage- Stop spraying 1 week before harvesting

Post harvest- Harvest and sell produce in the market



French bean-

Vegetative stage- Rust disease Control- Mancozeb 2g/ lt water. Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt. water streptocycline or 2-3 g/lt. water plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lt. water against downy mildew diseases of cucurbits.

Flowering stage- Take care of pod borer and aphid attack. Post heavy rainfall affected areas where vegetable is grown are likely to be affected by bacterial wilt, leaf spot and canker disease. Therefore, total package of practices starting from planting need to be followed as given below. Seedling root dip for 30 minutes in 1g/10 lt streptocycline or 2-3 g/lt plantomycin. Perform soil drenching to the base of the plants with a solution of carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP coinciding with intercultural operations. Spray Ridomil MZ @ 1.5 ml/lt. water against downy mildew diseases of cucurbits.

Crop maturity stage- Stop spraying 1 week before harvesting

Post harvest- Harvest and sell produce in the market

B. Extreme Weather Events

Suggested Contingency measures

Hail storm

Seedling / nursery stage- Vegetable nursery should be raised in poly house or make proper arrangement of low height Polly tunnels in open area or cover with plastic sheet or thatching should be done

Vegetative stage- In vegetables-Remove damages parts immediately and apply insecticide followed by fungicide as prophylactic measures. Follow fertilization through foliar as well as broadcasting

Reproductive stage- n vegetables- Remove damaged parts immediately and apply insecticide followed by fungicide as prophylactic measures. Follow fertilization through foliar as well as broadcasting for proper fruiting

At harvest- Safely sell in the market after grading for immediate returns

Heat Wave

Wheat Chickpea/pea

Seedling / nursery stage- For protection from heat and cold wave there is intervention to sow the rabi crops in between 2nd week of October to 2nd week of November to protect theirs vegetative phase from ground/radiation frost results from cold wave/wind chill injury and reproductive phase from terminal heat stress on Mustard, Chickpea, Wheat, Lentil, Linseed and pea crops. Life saving irrigation

Vegetative stage- Timely sown crop never face heat stress while very late sown(January) crop face heat stress hence only one option is to provide life saving irrigation and water spray during evening time frequently at 2-3 days intervals. Take care of termite attack by spraying Chlorpyriphos @ 1 ml/lt and drenching @ 3-5 ml/lt water

In Chickpea because of high soil and ambient temperature (> 35 °C) favours the dry root rot disease starts during flowering/reproductive stage (spraying Captan or thiram or carbendazim or ridomil MZ or Saaf @ 1,5-2 g/lt water)

Reproductive stage- To minimize the terminal heat stress during the month of March and April the only and only way is to provide frequent protective irrigation irrespective of theirs stages (Life saving irrigation). Take care of termite attack by spraying Chlorpyriphos @ 1 ml/lt and drenching @ 3-5 ml/lt water. In Chickpea because of high soil and ambient temperature (> 35 °C) favours the dry root rot disease starts during flowering/reproductive stage (spraying Captan or thiram or carbendazim or ridomil MZ or Saaf @ 1,5-2 g/lt water)

At harvest- Frequent irrigation should be provided to meet the evaporative losses.

Tomato/Brinjal/ lady's finger/Cucurbits

Seedling / nursery stage- Due to heat stress wilting and mortality is more hence frequent irrigation and cover the nursery with mulch(Straw/leaves)

Vegetative stage- Due to heat stress wilting and mortality is more hence frequent irrigation and cover the nursery with mulch(Straw/leaves)

Reproductive stage- Drying of flower- Spray PCOA. Follow mulching after irrigation

At harvest- Immediate harvest after irrigation and shift it to safer place

Cold wave

Wheat

Seedling / nursery stage- Cold environment during tillering or branching stage favours more number of tillers in wheat and more branching in mustard, chickpea, lentil and linseed crops which prospects for high yield but it is detrimental for potato, tomato, brinjal, pea, creeper vegetables and fruits. Irrigation. Balanced fertilizer application.

Foliar spray of nutrients

Vegetative stage- Light irrigation. Mulching with crop residue \ weeds. Fertilizer application



Reproductive stage- Irrigation, fertilizer application

At harvest- N/A

Pigeonpea/Mustard/Linseed/Chickpea/pea

Seedling / nursery stage- In Mustard because of cool weather aphid insects attack is more prominent (spraying Rogor (Dimethoate) @ 2 ml or Monocrotophos 36 EC @ 1 ml /lt water during evening time is advised).

In linseed Alternaria blight (For blight spray Double dose (Iprodione 25 % WP + Carbendazim 25 % WP) @ 2 g per lt. water) and powdery mildew (prophylactic spraying of Sulfex @ 3 g or Kairathen 1 ml per lt water twice at weekly interval during evening time) disease are more common. For powdery mildew in pea (spraying Calixin (Tridemorph 80 % EC @ 5 ml per 10 lt water twice are highly recommended).

In Chickpea-Cold and wet environment (High humidity) during seedling stage cause collar rot, black root rot, wet rot, Pythium root and seed rot in Chickpea, while in potato, pea and tomato favours late blight (spraying of Krilaksil or Ridomil MZ chemical@ 1.5 g per liter water), powdery mildew (spraying newly emerged fungicide Double dose (Iprodione 25 % WP + Carbendazim 25 % WP) 2 g per lt water twice at weekly interval) and bacterial wilt, leaf spot and canker (spraying carbendazim @ 2g/lt water and streptocycline @ 1g/10 lt. water at 10 DAP, 25 DAP and 40 DAP) diseases in respective vegetable crops. Anthracnose in cucurbitaceous species. Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves. In Mustard because of cool weather aphid insects attack is more prominent (spraying Rogor (Dimethoate) @ 2 ml or Monocrotophos 36 EC @ 1 ml /lt water during evening time is advised)

Reproductive stage- Pigeonpea- During flowering and pod formation stage attack of Pod borer/sucking bug, mites, blister beetle insects as well as sterility disease may occur more (spraying Profenophos 50 EC, methomyl 40 SP or monocrotophos 36 SL kill the larvae but as the webs protect them from contact insecticides hence along with contact insecticides, mixing of fumigant insecticide such as DDVP @ 0.5 ml/lt. water is required to make the larvae come out from the web. For Mites and Aphids, Dimethoate 30 EC @ 2ml/lt. water and acaricides such as Dicofol 18.5 EC @ 2.5 ml/l water , for Blister beetle synthetic pyrethroids such as Cypermethrin 10 EC @ 1.0 ml/l or Lamda cyhalothrin 5 EC @ 1.0 ml/l water; for sterility mosaic Dicofol 18.5 EC 2.5 ml or Oxydemeton methyl 25 EC or Dimethoate 30 EC 2.0 ml or ml/l water on alternate row twice at an interval of 10 days are recommended).

Vegetables

Seedling / nursery stage- Raising seedling in Poly house, re sowing if damage is more. Provide shelter belt (Wind break) at appropriate spacing with Sisham, Ghamhar. Provide irrigation and mulching with straw and leaves

Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves. Disease and pest control, care for chilling injury or replanting

Reproductive stage- Drying of flower- Spray PCOA. Follow mulching after irrigation

At harvest- Grading and safely dispose produce in the marketing

Frost

Wheat

Seedling / nursery stage- N/A

Vegetative stage- Provide light irrigation. Follow mulching with crop residue \ weeds\straw\leaves

Pigeonpea

Seedling / nursery stage- Exposure of crop to smoke by burning waste material during night time

Vegetative stage- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

Reproductive stage- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

At harvest- Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation

Tomato & Potato and Horticultural crops (fruit)

Seedling / nursery stage- Create smoke around the field by using waste materials or set afire with used mobile oil in north-west or west-north direction towards incoming cold waves. Use polythene or bamboo hoogli in small horticultural /nursery/cash vegetable crops during morning hour and remove it during daytime. In Perennial or Horticulture crop (Fruit) also frequent irrigation followed by mulching, thatching , creating smoke screen s and lighting of fire should be practiced in availability of irrigation facility

Vegetative stage- Earthing up, Irrigation and create smoke around the field by using waste materials or set a fire with used mobile oil in north-west or west-north direction towards incoming cold waves. Use polythene or bamboo hoogli in small horticultural /nursery/cash vegetable crops during morning hour and remove it during daytime. In Perennial or Horticulture crop (Fruit) also frequent irrigation followed by mulching, thatching , creating smoke screen s and lighting of fire should be practiced

Reproductive stage- Immediate harvesting and disposal

At harvest- Harvest in dry weather

Cyclone- Not applicable



CONTINGENCY PLAN FOR RABI

1. Sowing window information

Land type	Cropping system	Crop name	Optimum sowing window (Please mention along with week)
1. Upland	Maize based (Early)	Toria, Linseed, Safflower Fodder crop- Oat, Lathyrus	Toria- 3 rd week of September- 4 th week of September Linseed- 2 nd week of October - 4 th week of October Safflower- 3 rd week of October - 4 th week of October Fodder- 2 nd week of October - 4 th week of October
2 .Mid Land	Rice Based (Mid early)	Irrigated- Barley, Wheat (Zero tillage) Potato, Vegetables Rainfed (Zero tillage)- Barley, Mustard, Chickpea, Lentil, Linseed (Normal) Fodder Crop- Oat, maize	Barley/Wheat - 3 rd week of October - 2 nd week of November Potato- 4 th week of October - 2 nd Week of November Linseed- 2 nd week of October - 4 th week of October Chickpea - 2 nd week of October - 1 st week of November Lentil- 3 rd week of October- 2 nd week of November Vegetables- 1 st week of October - 4 th week of November Mustard- 1 st week of October - 4 th week of October Fodder - 2 nd week of October - 1 st week of November
3. Low Land	Rice based (Mid early)	Chickpea (Zero tillage) Linseed(Utera/paira cropping) Wheat (Surface seeding in marshy land, Vegetables near stream line/rivulet (Onion, Garlic, Tomato, Chili, Brinjal, Capsicum, Cucurbits) Fodder crop- Oat, Maize	Chickpea - 1 st week of November - 3 rd week of November Linseed- 4 th week of October - 2 nd week of November Barley/Wheat- Timely- 1 st week of November- 3 rd week of December Late Sown Wheat- 1 st week of December- 4 th week of December Vegetables- 1 st week of November - 4 th week of December Cucurbits- 1 st week of January - 1 st week of February Fodder- 1 st week of November - 4 th week of November

2 (A) Optimal residual moisture

2A1. Land type- UPLAND

b) Cropping system- Maize- Toria, Maize-Vegetables

c) Crop name- Zero Tillage-Toria, Linseed, Vegetables (Pea, French bean, Cabbage, Cauliflower, Broccoli with harvested water facility), Fodder- Berseem, Oat, Lucern, Maize, Sudan

d) Sowing Window- Toria- 3rd week of September– 4th week of September, Linseed- 2nd week of October - 4th week of October, Vegetables- 1st week of October - 4th week of October

e) Variety- Toria- PT 203, Panchali, Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

- Rain water harvesting and recycling.
- Deeping of water storing structure(Shallow and deep) in April and May month
- Deep summer ploughing in April and May month.
- Strengthing and raising of field bunds in April and May months
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Application of Lime or Dolomite (3-5 q/ha) in soil
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow seed priming (warm water for 4-6 hrs.) before sowing
- Follow seed treatment with fungicide-insecticide-rhizobium
- Follow deep summer ploughing
- Irrigate only at critical stages
- Pre and post emergence weedicide application
- Follow hoeing after manual weeding
- Follow RDF, INM and IPM
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant
- Promote protected vegetable cultivation under naturally ventilated polyhouse and net house.



Toria - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2A2 Land type- MEDIUM LAND

- a) Cropping system- Rice-Wheat, Rice-potato, Rice- Pulses, Rice- Oilseeds, Rice-vegetables
- b) Crop name- (Zero tillage) Potato, Vegetables (Tomato, Chili, Brinjal, capsicum, Pea, French bean, Cabbage, Cauliflower, Broccoli with harvested water facility), Rainfed -(Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal)
- c) Sowing Window- Wheat - 3rd week of October - 2nd week of December, Potato- 4th week of October -2nd Week of November, Chickpea - 2nd week of October - 1st week of November, Lentil- 3rd week of October- 2nd week of November, Mustard- 1st week of October - 4th week of October, Vegetables- 1st week of October - 4th week of November
- d) Variety- Wheat- HUW 468, K 9107, Birsa Genhu 3, Potato- Kufri Surya, Kufri Arun, Kufri Sutlej, Kufri Laukar, Kufri Lalima, Chickpea- JAKI 9218, Pusa 372, KWR 108, KPJ 59, Lentil- HUL 57, WBL 77, KLS 218, Mustard- Pusa Mahak, Pusa Mustard 25, NRCHB101, NRCHYs 05-02

e) Agronomic management practices

- Follow deep summer ploughing
- Seed treatment with Azotobacter and Azospirillum and also soil application in wheat
- Follow seed treatment with fungicide-insecticide-rhizobium in pulses
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Irrigate only at critical stages
- Pre emergence weedicide application
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow RDF, INM and IPM
- Follow hoeing after hand weeding
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

Potato- Seed treatment. Proper spacing. Frequent irrigation. Take care for leaf curling, Early, late blight and grub infestation. Irrigate during cold day and night to get relief from frost attack. Produce smoke during cooler day and night

Chickpea - Seed treatment with Rhizobium culture and Phosphate solubilizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)



Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

2A3 Land type- LOW LAND

- a) Cropping system- Rice –Chickpea, Rice-Lentil, Rice-Wheat
- b) Crop name- Chickpea (Zero tillage), Linseed (Utera/pair cropping), Wheat (Surface seeding in marshy land, Vegetables near stream line/rivulet (Onion, Garlic, Tomato, Chili, Brinjal, Capsicum, Cucurbits)
- c) Sowing Window- Chickpea - 1st week of November - 3rd week of November, Linseed- 4th week of October - 2nd week of November, Wheat-2nd week of November- 2nd week of December, Late Sown Wheat- 1st week of December- 4th week of December, Vegetables- 1st week of November - 4th week of December, Cucurbits- 1st week of January - 1st week of February
- d) Variety- Chickpea- JAKI 9218, Pusa 372, KWR 108, KPJ 59, Linseed- Dibya, Priyam, Sharda, Wheat- K 9107, K 8027, HD 2643 (Ganga), HDR 77, Late sown wheat- PBW 373, DBW 14

e) Agronomic management practices

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Be cautious for pod borer, bud fly insect and powdery mildew disease management.

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

2 B Less than optimum moisture i.e., 25% less than normal, which can happen due to insufficient rainfall during September/October months. Deficit of 20-40% rainfall

2B1 Land type- UP LAND

- a) Cropping system- Maize- Toria, Maize- Linseed
- b) Crop name- Zero Tillage-Toria, Linseed
- c) Sowing Window- Toria- 3rd week of September– 4th week of September, Linseed- 2nd week of October - 4th week of October
- d) Variety- Toria- PT 203, Panchali, Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

- Rain water harvesting and recycling.
- Deepening of water storing structure(Shallow and deep) in April and May month.
- Deep summer ploughing in April and May month.
- Strengthening and raising of field bunds in April and May months
- Sowing in defined window for better establishment
- Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better crop stand (Plant population)
- Application of Lime or Dolomite (3-5 q/ha) in soil
- Soil application of Sulphur (20 kg/ha) and boron (1kg/ha) in oilseed, pulses and vegetables.
- Foliar spray of Urea (2 %) at flower initiation and pod formation stage in oilseed and pulses
- Follow seed priming (warm water for 4-6 hrs.) before sowing
- Follow seed treatment with fungicide-insecticide-rhizobium
- Follow deep summer ploughing
- Irrigate only at critical stages
- Pre and post emergence weedicide application
- Follow hoeing after hand weeding



- Follow RDF, INM and IPM
- For Water use efficiency use antitranspirant, reflectant and mulches
- Regular monitoring of field for disease and insect attack
- Use pheromone trap and attractant
- Promote protected vegetable cultivation under naturally ventilated polyhouse and net house.

Toria— Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud fly insect and powdery mildew disease management.

2B3 Land type- MEDIUM LAND

- a) Cropping system- Rice- Pulses, Rice- Oilseeds, Rice-Linseed, Rice-vegetables (Tomato, Pea)
- b) Crop name- Rainfed (Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal), Vegetables (Tomato, Pea with harvested water facility)
- c) Sowing Window- Chickpea - 2nd week of October - 1st week of November, Lentil- 3rd week opf October- 2nd week of November, Mustard- 1st week of October - 4th week of October, Linseed- 2nd week of October - 4th week of October, Vegetables- 1st week of October - 4th week of November
- d) Variety- Chickpea- JAKI 9218, Pusa 372, Pusa 256, KWR 108, KPJ 59; Lentil- HUL 57,WBL 77, KLS 218; Mustard- Pusa Mahak, Pusa Mustard 25,NRCHB 101, NRCHYS 05-02; Linseed- Dibya, Priyam, Sharda

e) Agronomic management practices

Chickpea - Seed treatment with Rhizobium culture and Phosphate solublizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)

Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.

2B31 Land type- LOW LAND

- a) Cropping system-Rice-Wheat, Rice- Potato Rice-vegetables, Rice- Pulses, Rice- Oilseeds, (Utera/Paira cropping)
- b) Crop name- Irrigated-Wheat (Zero tillage) Potato, Vegetables (Tomato, Chili, Brinjal, capsicum, Pea, French bean, Cabbage, Cauliflower, Broccoli, Cucurbits with harvested water facility), Rainfed (Zero tillage)- Chickpea, Lentil, Mustard, Linseed (Normal)



c) Sowing Window- Wheat Timely sown– 1st week of November– 4th week of November, Late sown- 1st week of December– 3rd week of December, Potato- 1st week of November– 4th week of November, Vegetables- 1st week of November– 4th week of December, Cucurbits- 1st week of January - 2nd week of February, Chickpea - 1st week of November– 3rd week of November, Lentil- 1st week of November– 2nd week of November, Mustard- 1st week of November– 4th week of November

d) Variety- Irrigated Wheat-Timely sown (120-125)- HD2967, WH 1105, K307, HD2733; Late sown (105-110)- HD 3059, DBW 14, HI 1563 (seed rate 25 % more than timely sown); Potato-Kufri Surya, Kufri Arun, Kufri Sutlej, Kufri Laukar, Kufri Lalima; Chickpea- JAKI 9218, Pusa 372, Pusa 256, KWR 108, KPJ 59; Lentil-HUL 57,WBL 77, KLS 218; Mustard- Pusa mahak, Pusa mustard 25, NRCHB 101, NRCHYs 05-02; Linseed- T 397, Priyam

e) Agronomic management practices

Wheat - For surface seeding increase seed rate and Nitrogenous fertilizer by 25 per cent. Remove excess water by making deep furrow around their fields. Planking should be done after seed placement for better germination and crop stands. Follow RDF, INM and IPM. Pre emergence weedicide application

Potato- Seed treatment. Proper spacing. Frequent irrigation. Take care for leaf folder, early, late blight and grub infestation. Irrigate during cold day and night to get relief from frost attack. Produce smoke during cooler day and night

Chickpea - Seed treatment with Rhizobium culture and Phosphate solubilizing bacteria (PSB) and Trichoderma. Management for Collar rot during temperature fall and dry root rot during temperature increment in. Pre emergence weedicide application. Irrigate at critical stages. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray

Lentil - Foliar spray of Sulphur and Boron is necessary Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Follow deep summer ploughing. Proper water management. Follow seed treatment with Rhizobium culture and PSB. Irrigate only at critical stages. Pre emergence weedicide application. Follow RDF, INM and IPM also drench FYM treated with Trichoderma and Foliar spray. Management for wilt disease. One hand weeding followed by two hoeing for management of weeds (HW-20-25 DAS and Hoeing 30-32 and 40-42 DAS)

Mustard - Seed treatment and proper seed rate for optimum crop stand. Thinning, weeding at 30-35 DAS followed by irrigation. Follow RDF, INM and IPM. Irrigate at three critical stages 30-35 DAS, before flowering and capsule/pod formation. Apply second dose of Urea before flowering. Management for painted bug, aphid and Powdery mildew.

Linseed - Follow seed treatment. Irrigate only at critical stages. Seed placement at proper depth for better germination and optimum seed rate with right crop geometry for better establishment (Plant population). Soil as well as seed treatment for the management of disease and termite attack. Pre and post emergence weedicide application. One hand weeding followed by one hoeing for management of weeds between 20 and 45 DAS. Irrigate at critical stages (before flowering and at pod formation). For dual purpose (seed and flax) increase N fertilizer dose by 25 percent. Follow RDF, INM and IPM. Follow deep summer ploughing. Proper water management. Pre emergence weedicide application. Follow RDF, INM and IPM. Precaution for pod borer, bud flies insect and powdery mildew disease management.



CONTINGENT STRATEGIES FOR LIVESTOCK, POULTRY & FISHERIES

1 Livestock

Suggested contingency measures under DROUGHT event

a) Before the event

Feed and fodder availability

Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage supply of molasses to cattle feed plants

- Preservation of surplus fodder

Green grass is a good source of vitamin A which is present in the form of Carotene. One kg of green grass provides 50mg of vitamin A and 15 to 20g protein to the animal. Cowpea, beans, subabul leaves etc. give 30 to 40g of protein. From grass fodder herbivorous animals get the carbohydrates (energy source), proteins ("building material" of the body) and vitamins (especially carotene), which are the main drives of sustainable operation of the body.

Two methods are available for preserving or conserving the seasonal excess of green fodder, viz. hay making and silage making. Each method has its own limitations and advantageous. Ensiling is preferred on the basis of fodder quality.

Hay making

Hay -refers to cereals, grasses or legumes that are harvested at appropriate stage, dried and stored

Ensilage / Silage making

Silage may be defined as the green succulent roughage preserved under controlled anaerobic fermentation in the absence of oxygen by compacting green chops in air and watertight receptacles.

- Complete Feed Blocks

Supply enriched complete feed blocks containing dry roughage, concentrates/ unconventional supplements 50:50 ratio. Complete feed blocks may be sourced from different commercial sources.

Feeding practices for livestock in India at present separate feeding of roughage and concentrate

- ❖ Chopped roughage and soaked concentrate mixed together
- ❖ Chopped roughage mechanically mixed with concentrate as mash
- ❖ Chopped roughage and concentrate ingredients mixed and densified as Complete Feed Block

Concept of densified complete feeds with fibrous crop residues is a noble way to increase the intake and improve the nutrients utilization. A complete feed block has been defined as a system of feeding all ingredients including roughages, processed and mixed uniformly, to be made available ad lib to the animals.

- Urea molasses mineral block licks

Urea-molasses mineral block lick can sustain the animals by providing protein, energy and essential minerals. It is cost effective, easy to handle and transport and available commercially through milk cooperatives. Therefore, it is required that urea molasses blocks stocks (UMBS) are made available in the rain-deficient areas.

- Methods used for improving nutritive quality of straws and other crop residues like urea treatment

Spray dry roughages such as paddy and wheat straw with about 10% molasses and 2% urea for maintenance of animals in fodder deficit areas.

Preparation of 100 kg roughage-based enriched feed containing 88.8 kg wheat straw or any other straw/stover, 10 kg molasses, 1 kg urea and 0.5 kg mineral mixture will cost about Rs. 375-450 per quintal.

- Utilization of forest byproducts for feeding of livestock

Use of dry and fallen tree leafs like Pipal, Neem, Mango and Kathal etc.

- Making Leaf meal

- Use of conventional and non conventional feeds

- Rice Mills

The main by-products of rice are rice straw, rice husk or hull, and rice bran. Rice straw is produced when harvesting paddy. Rice husks generated during the first stage of rice milling, when rough rice or paddy rice is husked.

- Aquatic plants

- ❖ One kg DM/100 kg BW

- ❖ Water hyacinth, aquatic spinach, Stalks & leaves of lotus plant, Hydrilla, Pistia etc.

- Encourage supply of molasses to cattle feed plants

Molasses and Bagasse are the byproducts from sugarcane industry and are available in abundance. They can be used as cattle feed after supplementation with urea. Such a ration is a ready feed during drought and scarcity conditions when nothing else is available for feeding to animals.

- Crop Residue Enrichment & Densification

Crop residues can be fortified with feed ingredients like cakes, barns, grains, molasses, hay, minerals and then densified into blocks or pellets to save on storage and transport costs. Also balanced ration in the form of complete diet or total mixed ration as per need of animals can be supplied for improved productivity.

- Demonstration of Re-vegetation of Common Grazing Land

The grazing lands play an important role in the lives of rural people who are getting fodder, fuel, drinking water from commons. However, such lands are being continuously degraded due to overgrazing and overexploitation by locals. Re-vegetation of such lands on scientific lines suiting to agro-climatic conditions is to be demonstrated through strengthening institutional arrangement at village level. Fodder production from such lands can be enhanced substantially by introducing high yielding cultivated fodder crops, grasses and pasture legumes. An integrated approach of growing cultivated crops, grasses, trees and shrubs under silvi-pastural/ horti - silvipasture system will improve overall productivity of such land.

Drinking water

Repairs of tube wells, clear off the sludge in the canals and local water catchments and clean the water tanks, large ponds and lakes

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - Vaccinate the cattle against tick-borne diseases
- Tick-borne diseases- Vaccination is best done in calves under 6 months of age and one dose is sufficient
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over long distances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1 packet mixed with 12,5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal)
- Sarcoptic Mange in pigs- Not applicable before event

Diseases caused by biting insects

- Trypanosomiasis- Fly control is important for prevention of the disease.
- Three-day stiff sickness- Prevention is by vaccination
- Lumpy-skin disease- Prevention is by vaccination

Diet related Disease problems

- Eating plastic bags and wire(Pica)- Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are grazing. Mineral mixture supplement should be give to the animal
- Poisonous plants- Not applicable before event
- Botulism- Prevention involves vaccination and good nutrition. Burn or bury all carcasses, bones or decaying material

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Not applicable before event
- Calcium, Phosphorous & Vit. D- Not applicable before event
- Vitamin A- Not applicable before event

Infectious Diseases

- Foot and Mouth Disease (FMD)- Vaccination at the age 4 months and above. Booster should be given 1 month after first dose then every six monthly
- Haemorrhagic Septicaemia (HS)- Vaccination at the age 6 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June.
- Black Quarter (BQ)- Vaccination at the age 6 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June
- Anthrax- Vaccination at the age 4 months and above. Annually in endemic areas. Vaccinate the animal before onset of monsoon every year preferably in the month of May and June.
- Rabies (Post bite therapy only)- Not applicable
- Enterotoxaemia (pulpy kidney)- Vaccinate the animal at the age of 3-4 months, repeat after 15 days and then annually.
- Pneumonia- Not applicable

Non-Infectious Diseases

- Ruminant tympany (Bloat)- Not applicable
- Rumen acidosis- Not applicable
- Intussusception- Deforming should be give
- Pregnancy toxemia (Ketosis)- Fed the pregnant animal with balanced ration.



Poisoning

- Organochlorine compounds- Not applicable
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Not applicable

b) During the event

Feed and fodder availability

- Lactating and pregnant animals need to be provided enriched feed to meet the requirements and rest of animals be provided the maintenance diet. In case of acute shortage, lactating animals be provided feed meeting 50% of the requirements to maintain minimum level of production.
- Drought tolerant fodder crops (like sorghum PC 6 and MP chari, cowpea - BL 1 and 2) and fodder grasses (like stylo, *cenchrus ciliaris*, *athropagan*, etc.) should be cultivated. Under the mini kit programme, the developmental department need to provide fodder crop seeds in the drought-affected areas.
- Provide salt dose daily through feed (40-50 g of salt per adult animal and 10-20 g for small ruminants and calves).

Issue

- Large scale migration -Creating additional resources in drought prone area
- Grazing of poisonous plants/toxicity problems -Inventory of anti nutritional/toxic factors. Creating awareness in farmer for avoiding nitrate/nitrite HCN poisoning.
- Transport of fodder from normal DPA-Establishing feed and fodder banks. Effective mechanism for distribution of fodder/feed to productive animals. Densification/baling/briquette technologies

Drinking water

Harnessing water through the existing reservoirs and exploitation of groundwater.

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - If disease occurs Treat the cattle against tick-borne diseases. Consult Veterinarian.
- Tick-borne diseases- Prevention is by tick control, treatment of diseased animal and vaccination. Consult Veterinarian.
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over long distances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1 packet mixed with 12,5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal). Consult Veterinarian.
- Sarcoptic Mange in pigs- Itching; dermatitis; rubbing; scratching; reduced growth rate. Miticidal sprays; pour-ones injection and in-feed premix. Consult Veterinarian.

Diseases caused by biting insects

- Trypanosomiasis- Treated with SURAMIN through intramuscular injection or intravenous infusion if sufficient observation is possible. Consult Veterinarian.
- Three-day stiff sickness- It is important that the animal is given food and water if it is unable to stand
- Animal should be treated by Veterinarian
- Lumpy-skin disease- If your cattle get this disease, you should speak to your state veterinarian

Diet related Disease problems

- Eating plastic bags and wire (Pica) - Mostly occurring in those animals which are having shortage of feeds and fodder and deficiency of Phosphorus. Prevention involves the following: - Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are Grazing. Mineral mixture supplement should be given to the animal. Once the cow has eaten plastic bags or wire, the only effective treatment is an operation. Consult Veterinarian.
- Poisonous plants- Due to scarcity of feed s and fodder animals used to consume poisonous plans and are more likely to get toxicity. Poisoning can also happen when owner or animal handler move cattle to new paddocks where toxic plants occur. Consult Veterinarian.
- Botulism- Botulism can occur when cattle eat carcass and bone material when there is a lack of feed during drought or if they have a phosphorus deficiency
- Treatment is only possible in the early stages and requires an antitoxin. Consult Veterinarian.

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Characterized by anorexia and wasting. Deficiency affects growth and fertility of the cattle. Anemia, diarrhoea and unthriftiness occur in extreme cases. Copper or cobalt sulphate in the form of mineral mixture supplement causes rapid disappearance of the symptoms
- Calcium, Phosphorous & Vit. D- Deficiency may result in rickets in calves and osteomalacia in adults. Mineral supplementation in diet is essential to prevent this deficiency.
- Vitamin A- Vit. A deficiency occurs in cattle on dry countryside during periods of drought. Symptoms include night blindness, corneal keratinization, ptyriasis, hoof defects, loss of weight and infertility. Animals should have access to green pasture and should be supplied with Vit. A in feed to prevent deficiency.

Infectious Diseases

- Foot and Mouth Disease (FMD)- If outbreak occurs then the animal should be treated. Foot lesion should be washed with soap / detergent the apply Povidon iodine lotion while in mouth lesion boroglyserine should be applied. Consult Veterinarian.
- Haemorrhagic Septicaemia (HS)- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Black Quarter (BQ)- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Anthrax- If disease occurs animal should be treated with Broad Spectrum Antibiotic like penicillin at higher dose and other supportive medicine as per the symptoms. Consult local Veterinarian.
- Rabies (Post bite therapy only)- Vaccinate the animal immediately after suspected bite. Booster should be given on 3, 7, 14, 28 and 90 (optional) days after first dose.
- Enterotoxaemia (pulpy kidney)- Not applicable
- Pneumonia- Not applicable

Non-Infectious Diseases

- Ruminal tympany (Bloat)- Not applicable
- Rumen acidosis- Ingestion of large amounts of highly fermentable carbohydrate feeds causes an acute illness due to excess production of lactic acid in the rumen. Clinically, the disease is manifested by dehydration, blindness, recumbency, complete rumen stasis and a high mortality rate. Normal saline, sodium bicarbonate and antihistaminic are advised.
- Intussusceptions- It occurs commonly due to nodular worms, change in feed and local intestinal problems. The animal is dull, off-feed, kicking at the belly with no rise of temperature, frequent straining with no defecation, colic symptoms, and at later stages, recumbency. Emergency surgery is the only rational treatment.
- Pregnancy toxæmia (Ketosis)- It is a highly fatal disease caused due to a decline in the plane of nutrition and short periods of starvation (40 hrs) during the last two months of pregnancy. Treatment comprises intravenous administration of 50% glucose. Supply of molasses in the ration and concentrate in the last two months of pregnancy helps in preventing the condition.

Poisoning

- Organochlorine compounds- Not applicable
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Usually bitten on the scrotum or udder. The presence of hair may obscure the typical fang marks. Prolonged pain, muscular weakness, impaired vision, nausea and paralysis are generally exhibited along with symptoms of shock. If anti-venin is not available and the bite is located in an area where a tourniquet cannot be applied, excision of an area of skin and sub-cutaneous tissue can be life-saving

c) After the event

Feed and fodder availability

Promotion of fodder seed production, cultivation and storage, establishment of fodder block making machines in fodder surplus areas

Post flood feeding management

- Animal should not be allowed to graze in water logged area
- Feeds to be protected from fungal contamination & wet feeds to be dried & fed
- Provides clean drinking water to animals
- Provide ready to eat feed blocks particularly the pregnant and lactating animals
- Requirement of energy may be met providing crude molasses
- Top feeds/ tree leaves available in the area to be provided to meet the DM requirement



Specific contingencies can be adopted for livestock feeding depending upon availability as under in different regions during drought situation, Neem seed kernel cake (NSKC), Saw dust, Paper waste, Agave (Ketki), Cactus, Tree leaves and vegetable leaves, Cher leaves and fruits, Straw and gotars, Sugarcane bagasse as animal feed and Use of damaged grains as feed

Drinking water

To strengthen reservoirs by promoting recharging of water and rain water harvesting during rainy season.

Health and Hygiene

Tick damage and tick-borne diseases

- Tick damage - Treat the cattle against tick-borne diseases. Consult Veterinarian.
- Tick-borne diseases- Prevention is by tick control, treatment of diseased animal and vaccination. Consult Veterinarian.
- Babesiosis (Red water)- Treatment involves keeping the cattle calm. They should not be driven over longdistances and should be injected with Berenil or Imizol. The dose for Berenil is 5 ml of made up solution (1packet mixed with 12.5 ml of sterile water) for each 100 kg (for example, 20 ml for a 400 kg animal). Consult Veterinarian.
- Sarcoptic Mange in pigs- Not applicable after event

Diseases caused by biting insects

- Trypanosomiasis- Treated with SURAMIN through intramuscular injection or intravenous infusion if sufficient observation is possible. Consult Veterinarian
- Three-day stiff sickness- It is important that the animal is given food and water if it is unable to stand.
- Animal should be treated by Veterinarian
- Lumpy-skin disease- If your cattle get this disease, you should speak to your state veterinarian

Diet related Disease problems

- Eating plastic bags and wire (Pica)- Feed cattle well, especially in winter. Clear wires and plastic bags from the grazing area. Watch cattle closely when they are grazing. Mineral mixture supplement should be given to the animal
- Poisonous plants- Not applicable
- Botulism- Prevention involves vaccination and good nutrition. Burn or bury all carcasses, bones or decaying material

Deficiency diseases

Cattle grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Copper and Cobalt- Not applicable
- Calcium, Phosphorous & Vit. D- Not applicable
- Vitamin A- Not applicable

Infectious Diseases

- Foot and Mouth Disease (FMD)- If outbreak occurs then the animal should be treated. Foot lesion should be washed with soap / detergent the apply Povidon iodine lotion while in mouth lesion boroglyserine should be applied. Consult Veterinarian.
- Haemorrhagic Septicaemia (HS)- Not applicable
- Black Quarter (BQ)- Not applicable
- Anthrax- Not applicable
- Rabies (Post bite therapy only)- Not applicable
- Enterotoxaemia (pulpy kidney) - It affects the animals in a high state of nutrition on a lush feed, grass or grain. Morbidity rates seldom exceed 10% but mortality rate approximates 100%. Under certain conditions, the organism proliferated rapidly in the intestines and produces lethal quantity of toxin. Suphadimidine with other supportive medicine may be effective for treatment
- Pneumonia- It is one of the most common and important pathological conditions. It is characterized clinically by increased respiration, coughing and abdominal breathing. Treatment with broad spectrum antibiotic, nabalization and other supportive drugs is effective.

Non-Infectious Diseases

- Ruminal tympany (Bloat)- It is the over-distension of the left flank either due to free gas or froth. This is generally encountered in "greedy feeders" when lush green pasture is available. Oral administration of sweet oil with turpentine oil or at times with formalin is advised.
- Rumen acidosis- Not applicable
- Intussusceptions- Not applicable
- Pregnancy toxæmia (Ketosis)- Not applicable

Poisoning

- Organochlorine compounds- This group includes DDT, BHC, lindane, aldrin, dieldrin, chlordane, toxaphane, methoxychlor etc. which are used as pesticides on crops. Toxicity symptoms include increased excitability and irritability followed by muscle tremors, weakness, paralysis etc. Treatment consists of administering antidote, usually short-acting barbiturates.
- Organophosphorus compounds- This group consists of malathion, darathion, chlorathion, carbophenothion, demeton, dasnon, dimethylparathion, trichlorphon, dioxalthion etc. Symptoms of toxicity are profuse salivation, muscle stiffness, dyspnoea with open mouth breathing, tremors. Treatment consists of administering antidote, usually atropine sulphate.
- Snake bite- Usually bitten on the scrotum or udder. The presence of hair may obscure the typical fang marks. Prolonged pain, muscular weakness, impaired vision, nausea and paralysis are generally exhibited along with symptoms of shock. If anti-venin is not available and the bite is located in an area where a tourniquet cannot be applied, excision of an area of skin and sub-cutaneous tissue can be life-saving

2 Poultry

Suggested contingency measures under DROUGHT event

a) Before the event

Shelter management

Optimum space should be provided. Orientation of shed (Long axis) should be in North - South. Plantation of tree around shed to provide cool environment. Provision of ad lib. Fresh water

Shortage of feed ingredients

Storage of feed

Drinking water

Manage clean drinking water. Storage facility should be made. Water quality should be checked before drinking to animal

Health and disease management

- Newcastle Disease- regular vaccination - Broiler birds should be with RD vaccine (Lasota 'F' strain) at the age of 4-7 days through Intra-nasal or Intra-ocular route. Layer birds should be vaccinated with NDV vaccine at the age of 9-14 day, 4 weeks, 13-14 weeks in drinking water/eye drop. Then at the age of 17 week with NDV vaccine through Intra-muscular (IM) route
- Marek's disease Marek's disease- Birds should be vaccinated with Herpes virus turkey vaccine at the age of 1 day through Subcutaneous route.
- Fowl pox- Chick embryo adopted fowl pox vaccine at the age 6-8 weeks. It important for the layer and broiler birds.
- Drop in Egg Production or Quality- Not applicable
- Nervous Signs and Lameness- Not applicable
- Diarrhoea- Not applicable
- Upper Respiratory Diseases- Vaccination against the some of the viral diseases like Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis which are also responsible for the respiratory symptoms can prevent this syndrome. Antifungal and antiparasitic drugs should be given.

Heat Wave

Plantation of tree around shed to provide cooler environment. Proper ventilation should be provided. Optimum space should be provided. Orientation of shed (Long axis) should be in East- West. Plantation of tree around shed to provide cool environment. Provision of ad lib. Fresh water. Manage green fodder and silage preparation. Height of roof should be minimum 220 - 240 cm. Roof of shed should be painted with white.

Cold Wave

Provide ad lib fresh water. Proper ventilation should be provided. Optimum space should be provided. Orientation of shed (Long axis) should be in North - South. Plantation of tree around shed to provide break cold wave. Provision of ad lib. Fresh water. Manage green fodder and silage preparation. Height of roof should be minimum 220 - 240 cm. Roof of shed should be painted with Black. Floor of shed should be Dry

b) During the event

Shelter management

Optimum space should be provided, there must not be overcrowded. Protect the animal from direct sun light. Try to provide them cool water. Proper ventilation should be maintained. Allow for grazing during night/early morning. Provision of ad lib. Fresh water

Shortage of feed ingredients

Provide non conventional feed, supplement anti oxidant and anti stress



Drinking water

Provide clean fresh and cold drinking water all the time. Water availability may increase by 20-50% depending upon feed quality and environmental temperature. Soft drinking water should be preferred. Add vit-C and other anti stress ingredients with water

Health and disease management

- Newcastle Disease- Vaccination and treatment of diseased one. Newcastle disease is the most important disease for poultry farmers around the world. This disease causes a large number of deaths in chickens and huge losses to farmers and the industry. Diseased birds should be slaughtered immediately. Consult Veterinarian.
- Marek's disease Marek's disease- It is one of the important diseases of poultry caused by virus. Mortality is very high and causes economic losses to the farmer and poultry industry.
- Fowl pox- It is a viral infection of chickens and turkeys characterized by proliferative lesions in the skin (Cutaneous form), it also affect the GI tract and respiratory tract (Diphtheritic form)
- Drop in Egg Production or Quality- There are many different types of organisms that can cause a drop in egg production or quality. These include: Bacteria (E. coli, Salmonella), Mycoplasma, Viruses (Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis, avian encephalomyelitis, egg drop syndrome). The Parasites, lack of Nutrition and Stress factor also support the onset of this condition. Adding vitamins and minerals to the water or feed may help. Consult Veterinarian
- Nervous Signs and Lameness- Chickens lie down because they cannot stand up. They also walk with a limp or are reluctant to move. Nervous signs may include staring into the sky, pulling the head and neck over their backs, paralysis. Sores on the breast muscles from lying down
- Diarrhoea- The stool or droppings of the chickens are not firm but very loose, watery, not of the normal colour and may contain blood. This may cause the feathers of the vent to be soiled and caked together, Depression, reluctance to eat, drink and move about, poor growth and death. Use an antibiotic or coccidiostatic drug in the water that was recommended by the animal health technician or veterinarian in the water for 3 to 5 days. Stress preparations that contain electrolytes, vitamins and minerals can be added to the water
- Upper Respiratory Diseases- Not applicable

Heat Wave

Water sprinkling to animal. Prevent the animal from direct sunlight. Optimum space should be provided, there must not be overcrowded. Fan should be provided to make the body cool. Try to provide them cool drinking water all time

Proper ventilation should be maintained. Allow for grazing during night/early morning. Try to provide green fodder and silage. Stocking density should be less. Roof should be covered with tiles, paddy, dry leaves to protect from direct sun light

Cold Wave

Luke worm water should be provided at least 4-6 times a day. Prevent the animal from direct cold wave by closing the windows and doors. Optimum space should be provided, there must not be overcrowded. Proper ventilation should be maintained. Allow for grazing during sunny day time. Try to provide green fodder and silage. During extreme cold condition electric heater of wood fire heat should be provided. Try to make the environment inside and outside the shed dry. Gunny bags or blanket may be used to cover the body. Bedding material like paddy straw, Gunny Bag, Bhusa should be provided specially to young one shed.

c) After the event

Shelter management

Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

Shortage of feed ingredients

Not applicable

Drinking water

Provide adlib. Drinking water

Health and disease management

- Newcastle Disease- Disposal of dead birds
- Marek's disease Marek's disease- Disposal of dead birds
- Fowl pox- Disposal of dead birds
- Drop in Egg Production or Quality-Not applicable
- Nervous Signs and Lameness- A complete hygiene and disinfection programme should be planned together with the animal health technician or veterinarian. Antibiotics will only be effective against bacteria and can be used as recommended. If it is a viral disease, such as Newcastle disease, urgent steps have to be taken to prevent possible spread because it causes serious production losses

- Diarrhoea- Disposal of dead birds
- Upper Respiratory Diseases- There is many different types of organisms that can cause disease in the upper respiratory tract. These include: Mycoplasma Bacteria (E. coli, Pasteurella, Haemophilus), Viruses (Newcastle disease, influenza, infectious bronchitis, infectious laryngotracheitis), Parasites (mites and worms) And Fungi (Aspergillus). Cold stress is also one of the predisposing factors for the occurrence of respiratory problems. Use an antibiotic drug that was recommended by your animal health technician or veterinarian in the water for 3 to 5 days
- Stress preparations that contain electrolytes, vitamins and minerals can be added to the water

Heat Wave

Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

Cold Wave

Provide ad lib. Normal drinking water. Optimum space should be provided. Take care and fulfill the requirement of water along with proper nutrients. Take care of proper feeding as per requirement. Provision of ad lib. Fresh water

3 Fisheries

Suggested contingency measures under DROUGHT event

a) Before the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Increase depth of pond, Repair dyke, outlet and inlet of pond; Prepare duck/pig house & stock pig @ 50-60,duck @ 450-500 no/ha if farmer involve in Integrated fish farming, Allow manure and urine directly in pond, Remove unwanted, predatory & old fishes and for this apply Mahua oil cake @ 2500kg/ha. Fixed net in outlet & inlet to prevent escaping of fish, Plough the pond and apply lime @ 250 kg/ha, Check the natural feed (plankton)@ 1.0 1.5 ml/50 lt. water; otherwise apply organic manure, Stock yearling (stunted grow fish) @ 6,000-8,000 no/ha
- Impact of salt load build up in ponds / change in water quality- Prevent entry of polluted water or apply lime at inlet.

Heat wave and cold wave

- Changes in pond environment (water quality) - Increase depth of pond. Reduce application of organic manure and supplementary feeds
- Health and Pest and disease management- Apply lime @ 50 kg/ha

b) During the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Reduce the stocking density from 25000 fry (1inches size) to 10000-15000/ha, fingerling 6,000-8,000 no/ha. Check the availability of natural food, if it is not sufficient provide supplementary feed at fixed place, time, amount and ratio & if it is more greenish stop supplementary feed & manure, store manure in separate place for agricultural purpose. Check the growth & health status by regular netting, Apply lime @ 50kg/ha.
- Impact of salt load build up in ponds / change in water quality- Apply lime @ 50 kg/ha on every 15-30 days. Aerate the water as per need

Heat wave and cold wave

- Changes in pond environment (water quality) - Stop or reduce supplementary feed and manure, Remove bigger size fishes. Reduce/stop application of feed and fertilizer.
- Health and Pest and disease management- Apply lime/salt as per need

c) After the event

Aquaculture

- Shallow water in ponds due to insufficient rains/inflow- Remove the bigger size fishes (0.5kg). In winter season fish reduces feed consumption so reduce supplementary feed, duck start egg laying so they should not allow before 9 O'clock otherwise loss of egg is possible, pig may attain 50 - 60 kg so that can be sell out and again stock same no of piglets. Apply bleaching powder @ 10kg/ha at place of litter deposition.
- Impact of salt load build up in ponds / change in water quality- Apply lime as per need @ 50 kg/ha
- Heat wave and cold wave
- Changes in pond environment (water quality) - Stop or reduce supplementary feed and manure, Remove bigger size fishes. Harvest the bigger fishes, Reduce/stop application of supplementary feed, Apply lime @ 50 kg/ha and potassium per magnet in perforated plastic ball- 5-10g in each ball
- Health and Pest and disease management- Apply lime/salt as per need

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• बिरसा कृषि विश्वविद्यालय, काँके रँची द्वारा

झारखण्ड के किसानों को दिये जा रहे अति उपयोगी सेवा

मौसम पूर्वानुमान आधारित मौसम-कृषि परामर्श सेवा



सप्ताह में दो दिन, प्रत्येक मंगलवार एवं शुक्वार को जिलावार परामर्श बुलेटिन जारी की जाती है।

1. अगामी 5 दिनों का जिलावार मौसम पूर्वानुमान
2. मौसम के संभावित स्थिति के अनुसार कृषि सलाह बुलेटिन
3. बुलेटिन में खेतों की तैयारी, फसल व किस्म का चयन, बोआई, रोपनी एवं हर प्रकार के प्रबन्धन की जानकारी दी जाती है जो उस समय आवश्यक हो।
4. प्रत्येक मंगलवार एवं शुक्वार के अलावा प्रत्येक दिन यदि आवश्यक हुआ तो मोबाइल मैसेज द्वारा तत्काल सलाह दी जाती है।
5. जिला स्तरीय सेवा के अलावा फिलहाल यह सेवा प्रखण्ड स्तर पर भी रँची (काँके, रातू, अनगढ़ा एवं ओरमांझी); पूर्वी सिंहभूम (बहरागोड़ा, घाटशिला, चाकुलिया एवं धालभूमगढ़) तथा दुमका (दुमका, काठिकुंड, जामा एवं जरमुंडी) जिलों के प्रखण्डों के लिये शुरू की गई है और व्हाट्सएप ग्रुप्स से भी कृषि सलाह दी जाती है।

संचार माध्यम

- समाचार पत्र
- रेडियो
- टेलीवीजन
- क्षेत्रीय अनुसंधान केन्द्र
- कृषि विज्ञान केन्द्र
- आतंका
- जनसंपर्क तथा विभिन्न वेबसाईट्स :

www.baujharkhand.org | www.bau-eagriculture.com | www.imdagrimet.gov.in | www.cropweatheroutlook.ernet.in | www.sameti.org

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