



भारतीय कृषि अनुसंधान परिषद

ICAR

INDIAN COUNCIL OF
AGRICULTURAL RESEARCH

DISTRICT WISE CONTINGENCY PLAN

TO DEAL WITH

EL NIÑO

PREPAREDNESS | RESPONSE | RESILIENCE



**BUILDING A
DROUGHT RESILIENT
JHARKHAND**



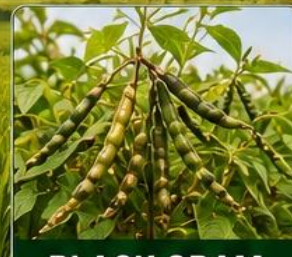
PADDY



MAIZE



RED GRAM



BLACK GRAM



EARLY WARNING
& MONITORING



WATER
MANAGEMENT



SUSTAINABLE
AGRICULTURE



COMMUNITY
PARTICIPATION

TOGETHER, LET'S BUILD A RESILIENT JHARKHAND

PREPARE TODAY • PROTECT TOMORROW • PROSPER TOGETHER

Jharkhand

Agriculture is the backbone of Jharkhand's economy and plays a vital role in the livelihood of the majority of its population. Although the state is rich in mineral resources and forests, agriculture remains the primary occupation in rural areas, providing employment and income to a large section of the people. Most farmers in Jharkhand are small and marginal landholders who practice traditional farming methods. Agriculture in the state is predominantly rain-fed, with a large part of the cultivated area depending on the southwest monsoon due to limited irrigation facilities. As a result, agricultural production is often influenced by the amount and distribution of rainfall.

Jharkhand has diverse agro-climatic conditions, fertile river valleys, and plateau regions that support the cultivation of a wide range of crops. Paddy (rice) is the principal crop and occupies the largest share of cultivated land during the kharif season. Other important crops include maize, wheat, pulses, oilseeds, millets, and vegetables. In addition to food grains, the state has excellent potential for horticulture. Fruits such as mango, litchi, guava, jackfruit, and papaya are widely grown, while vegetables like tomato, potato, cauliflower, cabbage, and brinjal are cultivated in many districts. The favorable climate also supports floriculture, medicinal plants, and spice cultivation.

Despite its agricultural potential, the sector faces several challenges, including low irrigation coverage, fragmented landholdings, soil erosion, declining soil fertility, inadequate storage facilities, limited access to modern technology, and poor marketing infrastructure. These constraints often result in low productivity and unstable farm incomes.

Historical impact of El Nino in Jharkhand

Historically, several El Niño years, such as 1982–83, 1987, 1997–98, 2002, 2009, 2015–16, and 2023–24, were associated with deficient or irregular rainfall across Jharkhand. During these years, the state experienced delayed monsoon onset, prolonged dry spells, and uneven rainfall distribution. Paddy, the principal kharif crop of Jharkhand, was the most affected because it requires adequate water during its early growth stages. Reduced rainfall often led to delayed sowing, poor germination, lower crop yields, and in severe cases, crop failure. The impact of El Niño has extended beyond crop production. Reduced rainfall has lowered reservoir levels, groundwater recharge, and river flows, resulting in water shortages for irrigation and drinking purposes. Livestock production has also suffered due to reduced fodder availability and scarcity of water. Farmers, particularly small and marginal landholders, have faced significant economic losses, increased debt, and reduced incomes during drought years. In many drought-affected districts, seasonal

migration to urban areas for employment has increased as rural livelihood opportunities declined. The 2002 and 2009 El Niño events were among the most severe, causing widespread drought conditions in Jharkhand and substantial reductions in agricultural output. Similarly, the strong 2015–16 El Niño affected monsoon rainfall, impacting crop production and water availability.

Effect on major crops

Paddy (Rice): The most affected crop due to its high water requirement. Delayed monsoon and moisture stress reduce transplanting, grain filling, and overall yield.

Maize: Insufficient rainfall during germination and flowering leads to poor plant growth, reduced cob formation, and lower production.

Pulses: Crops such as pigeon pea, black gram, and green gram experience reduced flowering, pod formation, and seed yield because of moisture stress.

Oilseeds: Mustard, sesame, and groundnut suffer from poor germination and reduced seed development, resulting in lower oil content and yield.

Vegetables: Crops like tomato, potato, cabbage, cauliflower, and brinjal require regular irrigation. Water scarcity reduces their growth, quality, and productivity.

Horticultural Crops: Mango, litchi, guava, and papaya are affected by flower and fruit drop, smaller fruits, and reduced yields due to prolonged dry conditions.

Contingency plans for major crops in Jharkhand

Crop	Problems During El Niño	Contingency Plan
Paddy (Rice)	Delayed monsoon, moisture stress, poor transplanting, low yield	Use short-duration and drought-tolerant varieties, adopt direct seeding or delayed transplanting, practice SRI, provide life-saving irrigation, harvest rainwater.
Maize	Poor germination, stunted growth, reduced cob formation	Sow early-maturing drought-tolerant varieties, adopt ridge and furrow planting, apply mulch, ensure timely weed and nutrient management.

Pulses	Reduced flowering, pod formation, and seed yield	Grow drought-tolerant varieties, timely sowing, adopt intercropping with cereals, conserve soil moisture.
Oilseeds	Poor germination, low seed development, reduced oil content	Cultivate drought-tolerant crops (sesame, mustard), timely sowing, mulching, balanced fertilizer application, moisture conservation.
Vegetables	Water stress, poor growth, lower quality and yield	Use drip/sprinkler irrigation, grow short-duration varieties, apply mulching, adopt integrated pest management (IPM).
Horticultural Crops	Flower and fruit drop, poor fruit development	Install drip irrigation, harvest rainwater, mulch around trees, prune damaged branches, provide protective irrigation.

Agriculture is the foundation of Jharkhand's rural economy and supports the livelihoods of a large proportion of the state's population. However, its heavy dependence on the southwest monsoon makes it highly vulnerable to climate variability, particularly El Niño events. Historical El Niño years have resulted in deficient rainfall, drought, reduced crop productivity, water scarcity, and economic losses for farmers. Major crops such as paddy, maize, pulses, oilseeds, vegetables, and horticultural crops are all adversely affected, with paddy being the most vulnerable due to its high water requirement.

To minimize these impacts, effective contingency measures such as the use of drought-tolerant and short-duration crop varieties, improved irrigation systems, rainwater harvesting, soil moisture conservation, crop diversification, and timely weather-based advisories are essential. Strengthening climate-resilient agricultural practices, expanding irrigation infrastructure, and improving access to modern technologies will help reduce the risks associated with El Niño. A coordinated approach involving farmers, researchers, and government agencies is necessary to ensure sustainable agricultural development, enhance food security, and improve the resilience and livelihoods of farming communities in Jharkhand.

Area under major crops

Crop	Area (Lakh ha)
Paddy	14.69
Maize	2.89
Red gram	2.17
Black gram	1.26

Districts vulnerable to El Nino

Highly	Medium	Low
Jamtara, Bokaro Bokaro	Hazaribag, Kodarma, Dhanbad, Latehar, Devghar, Palamu, Ramgarh	Lohardaga, Giridih, Garhwa

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	BOKARO
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	912.1	More than 19%	Less than 738.801
June	166.6		
July	273		
August	247.5		
September	225		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	2679	Gross irrigated area:	2830
Net Rainfed area	16083	Gross rainfed area	20703

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	858	889
Tanks	813	836
Other sources	1008	1105

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	16990	0	
2	Jowar	-	-	
3	Maize	946		946
4	Bajra	-		
5	Ragi	3		3

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	-		
2	Groundnut	-		
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

A. Crop Plan- Beginning of the season

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

A1. Major Farming Situation/Land Situation: Upland Sandy lateritic soils	
Normal Crop/cropping system	Upland rice, Groundnut, Maize, Pigeon pea, Pigeonpea+ maize Vegetables: Brinjal, Tomato, Spongegourd Blackgram/ Greengram
a) Change in crop/cropping system	
Discard Rice	
<u>Sole Crop</u> Pigeonpea, Black gram , Green gram, Maize, Finger millet Gundli, Sorghum, Rainy Potato, Sweet Potato	
<u>Intercrop</u> Pigeonpea/Maize + lady's Finger (1:1), Pigeonpea + Maize (1:1), Maize + Beans (1: 2), Maize + Lobia (1: 2) Pigeonpea + Guarfalli (1:1), Pigeonpea+ Black gram/Green gram (1: 2), Pigeonpea + vegetable (1:2) Maize + vegetable (1: 2)	
<u>Horticulture Crop</u> <i>Vegetables</i> : Brinjal/ Tomato/ Cucurbits,/Cowpea,/Beans/Lady's finger/ Chili Variety – Pigeonpea- Birsa Arhar (200-220), Asha (200-220), ICPH 2671 (200) Black gram- Birsa urd 1 (75-80), Uttara (75-80 small grain)	

Green gram- IPM-02-03-60-65, SML 668

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

Finger millet- A 404, BM 2, BM 3 (BBM

10) Gundli- Birsa gundli 1

Sorghum- CSV 20-110-20, MP chari, CSV

1616 Sweet potato- Kalinga, Birsa

sakarkand 1 Groundnut- Girnar 3

Vegetable crops-

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

Pusa hybrid 1, BT 12, Hybrid- Swarn sampada, Swarn samridih, Suraksha

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

Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless Lady's finger- Pusa A 4, Hybrid- Sonal, Sarika

Chili- Spices- Andhrajyoti, Pusasadabahar, NP 46, Jwala, Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati

Cucurbits

Bitter gourd- Arka hait, Pusa domasami,

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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.
 - Recommended 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 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, Imaidacloprid@ 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, Chilli, 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, Cow pea 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
- Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder-Methyl demeton @ 1.5 ml/lit. water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit. water., Mosaic- Methyl Demoton @ 1.5 ml/lit. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water, Groundnut- Tikka and leaf minor-

Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy caterpillar –Quinolphos 1.5ml /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 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/lit. water.
c) Remarks on Implementation • Linkage with RKVY , ATMA and NFSM • Vermicomposting awareness through KVKs, ATMA and NHM • Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, KVKs, Govt. Dept., NGOs Campaign for awareness of crop-weather insurance to meet the losses due to drought/cyclone like weather vagaries.

A2. Major Farming Situation/Land Situation: Midland sandy loam soils	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> <u>DSR (Improved rice varieties) Var.-IR- 64 Drt 1, Shabhagi Dhan, Abhishek, MTU 1001 Transplanting (Hybrid ric varieties) Var-ArizeTez (Gold), PAC 801, 807</u> <u>Don 3</u> <u>DSR (Upland rice variety dry and wet method) BVD 109, 110, Anjali, Virendra Replace rice with Pulses/vegetable/ Fodder crop (raised bed or ridge and furrow method)</u> Pigeonpea/Sorghum/ Pulses-Black gram/ Soybean/ Cowpea / Pigeonpea+ Fodder (2:1)/ Pigeonpea + Black gram/ Maize/ Lady's Finger/ Finger Millet <u>Vegetables-</u> Lady's Finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ <u>Fodder Crop -</u> Brachiaria grass/ Rice bean (Moth bean)/ Maize/Cowpea Variety- Black gram- Birsu 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), Birsu soybean 1 black(120-125), JS 335 Birsu safed soybean 2 (105-110), RKS 18, RAUS 5 Cowpea-rainy – Birsu sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) Pigeonpea- Birsu Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200) Maize- Birsu 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) Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149 <u>Vegetable crops-</u> Coriander- Pant haritima, Rajendra swati Dolichos bean-Swarna utkrist, Swarna rituwar <u>Fodder crop-</u> Maize- Malvia makka 2, Kanchan (K 25) Cowpea – bushy- Swarn sweta(80-90), Swarn harit (80-90)	
b) Agronomic Measures	
• Summer deep ploughing with Mould Board or discs • 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 • Recommended 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 phospho gypsum 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, Cow pea 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 Disease management- Maize- Stem borer Monocrotophos @ 1ml/ltr water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/ltr water or Cartap hydrochloride @ 2 gm/ltr water, hairy caterpillar – Quinolphos 1.5ml /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 disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /ltr water. Termite- Methyl parathion dust @ 25 kg/ha	
c) Remarks on Implementation • A campaign through RKVY , ATMA, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be aware 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 Birs 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 sandy loam soils	
Normal Crop/cropping system	Rice-Nursery raising of MTU- 7029
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 <u>DSR (Improved rice)</u> Var.- IR- 64 drt 1, Shabhagi, Abhishek <u>Transplanting (Hybrid rice Varieties)</u>Var- PAC 801, 807, Arize 6444 (Gold), 25P25, 27P31, 27P36, PHB 71, 27P52 DRRH 2,Akshayadhan	
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 mentiond 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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest 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. Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, 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 Chlorpyrifos @ 2ml/ltr 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 Quinalphos @ 1 ml/ltr 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/ltr 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/ ltr or Imidacloprid 4 ml/10 ltr 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/ltr. 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/ltr 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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 loose 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
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 $ZNSO_4$ @ 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

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

- 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 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

- 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/lit water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/lit water are advised. - Life saving irrigation
b) Soil nutrient & moisture conservation measures - 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 clay loam soils	
Normal Crop/cropping system	Rice
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 or Casugamycin @ or Kasu B @ 2 ml/lit. 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% 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	

C. Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management - 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 - 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> - 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/lt - 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, pearmillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
- 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. • 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, Capsimum, Shimla mirch, Broccoli, Cabbage and Cauliflower, green pea and potato as per suitability near and around turbutries	
b) Rabi crop planning	
Prefere 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	

Resource management technologies

- Green manuring for In-situ moisture conservation
- Zero tillage: Alleviating heat and moisture stress in rabi crops

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	DEVGHAR
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	999.2	More than 19%	Less than 809.352
June	185.8		
July	297.4		
August	243.1		
September	272.9		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	9419	Gross irrigated area:	10310
Net Rainfed area	15487	Gross rainfed area	42370

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	3674	4134
Tanks	4213	4284
Other sources	1532	1892

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	38164	0	
2	Jowar	-	-	
3	Maize	1748		1748
4	Bajra	-		
5	Ragi	-		

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	-		
2	Groundnut	-		
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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

B1. Major Farming Situation/Land Situation: Upland rainfed sandy soil	
Normal Crop/cropping system	Direct sown rice (Vandana, Birsa Vikas dhan-109), Pigeon pea (Birsa Arhar-1, ICPH-2671) , Maize (Kanchan, Birsa Makai-1) Maize+ Lady finger, Pigeon pea (Birsa Arhar-1) + Black gram (T-9/Pant U-19/Birsa urd-1), Black gram (T-9/Pant U-19/Birsa urd-1) + Green gram (Pusa Vishal), Groundnut (Birsa mungfali-2), Cucurbits/Ladyfinger/Cow pea, /Dolichos Bean
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice crop <u>Sole Crop</u> Pigeon pea, Maize, Finger millet, Soybean, Cowpea, Black gram <u>Intercrop</u> Pigeon pea + Black gram (1:2), Pigeon pea + lady's finger (1:2), Maize+ Pigeon pea (1:1) <u>Horticulture crop</u> <u>Vegetable</u> – Tomato/ Brinjal/ Chili/Cucurbits/Lady's finger/ Cow pea / Dolichos Bean <u>Variety</u>	

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

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

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

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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- Andhrajyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat

Cucurbits-

Bitter gourd- Arka hait, Pusa domasami,

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

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

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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- Fluclofuralin 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, Cow pea 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

Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/ltr. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr. water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/ltr. water., Mosaic-Methyl Demeton @ 1.5 ml/ltr. water;

Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water, Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy caterpillar –Quinolphos 1.5ml /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

- Linkage with RKVY , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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** rainfed loamy soils.

Normal Crop/cropping system

Paddy (IR-36, IR-64, Lalat, Birsamati, Naveen, Arise-6444, Sahbhagi)

Suggested Contingency measures

a) Change in crop/cropping system

Don2

DSR (Improved rice varieties) Var- Sahbhagi Dhan, Abhishek, IR 64-Drt 1, IR 64 Sukha, BVD 111, Rice + Dhaincha/Sunhemp (Green manuring/ Brown manuring) in DSR

Transplanting (Hybrid Rice varieties)Var.-Arize Tej (Gold), PAC 801, PAC 807, 27P31, CR Dhan 40 Don 3

Ridge and Furrow method or raise bed broad furrow along the slope: Replace rice with Cereal/Pulses/ vegetable/ Fodder crop
Cereal – Maize/Sorghum

Pulses- Pigeonpea+ Lady's finger (1:1)/Black gram (1:2)/Soybean (1:2)/ /Maize (1:1)/Cowpea (1:2)

Vegetables- Radish/Amaranthus leaf/ Spinach/ Colocasia/ Yam/ French Bean/ Dolichos Bean/ Tomato/

Brinjal/Cucurbits/ Cowpea/ Chilli/ lady's finger

Fodder Crop

Rice bean (Moth bean)/ Maize / Cowpea/ Sweet Sorghum/Sudan grass Variety

Maize- Birsamakka (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)

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

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

Black gram- Birsam 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), Birsam soybean 1 black(120-125), JS 335

Birsam safed soybean 2 (105-110), RKS 18, RAUS 5

Cowpea-rainy – Birsam sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) Vegetable crops

Radish- Pusa chetki , Pusa deshi, Kashi hansh, Jaunpur/ Pusa himani, Japanese white, Pusa roshni, Spinach-

Pusa jyoti, Allgreen, Deshi, Pusa madhawi

Oel-Gajendra, Vidhan, Kusum, Shri pada

Frenchbean- Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless, Creeper- Kentuky wonder, Birsam priya, Swarna lata

Dolichos bean-Swarna utkrist, Swarna rituwar

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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

Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati Creeper- Birsam sweta, Swarna sweta, Swarn harit Chili- Spices- Andhrayyoti, Pusasadabhar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat

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

Cucurbits-

Bitter gourd- Arka hait, Pusa domasami, 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 <u>Fodder crop</u> Maize- African tall, JS-1006 and Vijaya composite. Cowpea-EC-4216, UPC-287, UPC-5286, GFC-1, GFC-2 and GFC-4. Sorghum-PC-1, PC-6, PC-23, HC-136, HC-171, PSC-1, Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid
b) Agronomic Measures • Summer deep ploughing with Mould Board 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- Flucloalrin or Basalin and also for vegetables • Bund construction for unbunded upland • Broadcast Well rotten FYM along with 1/4th N + Full basal ppplication 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, Chilli, 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, Cow pea 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 Disease managemnt- Maize- Stem borer Monocrotophos @ 1ml/ltr water; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/ltr water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demoton @ 1.5 ml/ltr water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/ltr water or Cartap hydrochloride @ 2 gm/ltr water, hairy caterpillar – Quinolphos 1.5ml /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 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 disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /ltr water. Termite- Methyl parathion dust @ 25 kg/ha
c) Remarks on Implementation • A campaign trough RKVY , ATMA, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be aware 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 rainfed clay soils.

Normal Crop/cropping system

Paddy (MTU-7029, Arise-6444, Rajshree)

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 variety)- Shabhagi Dhan, IR 64-Drt 1, IR 64 Sukha, Abhishek (120 days), MTU-1001, MTU 1010, Rice + Dhaincha/Sunhemp as green/brown manuring in DSR

Transplanting (Hybrid rice varieties)Var.-Arize 6444 (Gold), IET 5656, PHB 71, 25P25, 27P31, 27P36, NK 15620

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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr, 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

Contingency measures- Mid season**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, Cow pea, Groundnut+ Pigeonpea, 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 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 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/lt. 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/lt 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
4 (a) Change management • Maize- Harvest it for fodder use • Pulses- and vetables- 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 dohas to loose 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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u> - 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	
<u>Don 3</u> - 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 <i>kharif</i>sorghum and pearl millet.	
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	

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	
<u>Don 2 and Don 3</u> - 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 or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period.	

4b) 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 - 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/ltr water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/ltr 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 - 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 or Casugamycin @ or Kasu B @ 2 ml/ltr. 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize	
Suggested Contingency measures		
a) Change management		
- Life saving irrigation to vegetables through stored moisture from constructed DOVA - If not possible to make survival harvest it for fodder use		
4b) Rabi Crop planning		
- 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>		
- 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 Chlorpyrifos dust or Monocrotophos @ 1 ml/lt - 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, pearmillet, maize, cowpea, black and green gram that can be harvested for fodder use		
b) Rabi crop planning		
- 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. • 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

Resource management technologies

- Zero tillage: Alleviating heat and moisture stress in rabi crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	DHANBAD
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	1082.7	More than 19%	Less than 876.987
June	210.3		
July	309.9		
August	271.5		
September	291		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	1212	Gross irrigated area:	1744
Net Rainfed area	2264	Gross rainfed area	4724

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	10	18
Tanks	515	943
Other sources	687	783

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	3797	0	
2	Jowar	-	-	
3	Maize	83		83
4	Bajra	-		
5	Ragi	-		

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	-		
2	Groundnut	-		
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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

B1. Major Farming Situation/Land Situation: Upland rainfed sandy soil	
Normal Crop/cropping system	Direct sown rice (Vandana, Birsa Vikas dhan-109), Pigeon pea (Birsa Arhar-1, ICPH-2671) , Maize (Kanchan, Birsa Makai-1) Maize+ Lady finger, Pigeon pea (Birsa Arhar-1) + Black gram (T-9/Pant U-19/Birsa urd-1), Black gram (T-9/Pant U-19/Birsa urd-1) + Green gram (Pusa Vishal), Groundnut (Birsa mungfali-2), Cucurbits/Ladyfinger/Cow pea, /Dolichos Bean
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice crop <u>Sole Crop</u> Pigeon pea, Maize, Finger millet, Soybean, Cowpea, Black gram <u>Intercrop</u> Pigeon pea + Black gram (1:2), Pigeonpea + lady's finger (1:2), Maize+ Pigeonpea (1:1) <u>Horticulture</u>	

crop

Vegetable – Tomato/ Brinjal/ Chili/Cucurbits/Lady's finger/ Cow pea / 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

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

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

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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- Andhrajyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat

Cucurbits-

Bitter gourd- Arka hait, 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

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

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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- Fluclofuralin 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, Imaidacloprid @ 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, Cow pea 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

Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/lit. water; Black gram and green gram- 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, Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy caterpillar –Quinolphos 1.5ml /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 , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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 rainfed loamy soils.	
Normal Crop/cropping system	Paddy (IR-36, IR-64, Lalat, Birsamati, Naveen, Arise-6444, Sahbhagi)
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> DSR (Improved rice varieties) Var- Sahbhagi Dhan, Abhishek, IR 64-Drt 1, IR 64 Sukha, BVD 111, Rice + Dhaincha/Sunhemp (Green manuring/ Brown manuring) in DSR Transplanting (Hybrid Rice varieties)Var.-Arize Tej (Gold), PAC 801, PAC 807, 27P31, CR Dhan 40 <u>Don 3</u> Ridge and Furrow method or raise bed broad furrow along the slope: Replace rice with Cereal/Pulses/ vegetable/ Fodder crop Cereal – Maize/Sorghum Pulses- Pigeonpea+ Lady's finger (1:1)/Black gram (1:2)/Soybean (1:2)/ Maize (1:1)/Cowpea (1:2) Vegetables- Radish/Amaranthus leaf/ Spinach/ Colocasia/ Yam/ French Bean/ Dolichos Bean/ Tomato/ Brinjal/Cucurbits/ Cowpea/ Chilli/ lady's finger <u>Fodder Crop</u> Rice bean (Moth bean)/ Maize / Cowpea/ Sweet Sorghum/Sudan grass <u>Variety</u> Maize- Birsamakka (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) Sorghum- CSV 20-110-20, MP chai, CSV 1616 Pigeonpea- Birsam Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200) Black gram- Birsam 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), Birsam soybean 1 black(120-125), JS 335 Birsam safed soybean 2 (105-110), RKS 18, RAUS 5 Cowpea-rainy – Birsam sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) <u>Vegetable crops</u> Radish- Pusa chetki , Pusa deshi, Kashi hansh, Jaunpur/ Pusa himani, Japanese white, Pusa roshni, Spinach- Pusa jyoti, Allgreen, Deshi, Pusa madhawi Oel-Gajendra, Vidhan, Kusum, Shri pada Frenchbean- Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless, Creeper- Kentuky wonder, Birsam priya, Swarna lata Dolichos bean-Swarna utkrist, Swarna rituwar Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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 Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati Creeper- Birsam sweta, Swarna sweta, Swarn harit Chili- Spices- Andhrajyoti, Pusasadabaha, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika Cucurbits- Bitter gourd- Arka hait, Pusa domasami, 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 <u>Fodder crop</u> Maize- African tall, JS-1006 and Vijaya composite. Cowpea-EC-4216, UPC-287, UPC-5286, GFC-1, GFC-2 and GFC-4. Sorghum-PC-1, PC-6, PC-23, HC-136, HC-171, PSC-1, Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid	
b) Agronomic Measures	
• Summer deep ploughing with Mould Board 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- Flucloalrin or Basalin and also for vegetables
 - Bund construction for unbunded upland
 - Broadcast Well rotten FYM along with 1/4th N + Full basal pplication 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, Imaidacloprid@ 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, Chilli, 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, Cow pea 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
- Disease managemnt- Maize- Stem borer Monocrotophos @ 1ml/lit water; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/lit water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit. water, Mosaic- Methyl Demoton @ 1.5 ml/lit water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit water or Cartap hydrochloride @ 2 gm/lit water, hairy caterpillar – Quinolphos 1.5ml /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. Rice disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign trough RKVY , ATMA, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be aware 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-weathet insurance to meet losses in case of drought/cyclone situation.

B3. Major Farming Situation/Land Situation: **Lowland** rainfed clay soils.

Normal Crop/cropping system

Paddy (MTU-7029, Arise-6444, Rajshree)

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 variety)- Shabhazi Dhan, IR 64-Drt 1, IR 64 Sukha, Abhishek (120 days), MTU-1001, MTU 1010, Rice + Dhaincha/Sunhemp as green/brown manuring in DSR

Transplanting (Hybrid rice varieties)Var.-Arize 6444 (Gold), IET 5656, PHB 71, 25P25, 27P31, 27P36, NK 15620

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- Carbofuran 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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuran 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr, Gundhi bug,leaf folder and BPH -Quinolpos 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 Birsra 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

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, 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 Chlorpyrifos @ 2ml/ltr 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 Quinolpos @ 1 ml/ltr 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/ltr 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 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/lt. 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/lt 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
4 (a) Change management • Maize- Harvest it for fodder use • Pulses- and vetables- 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 dobhas to loose 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
Suggested Contingency measures	
a) Crop management <u>Don 2</u> • 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 <u>Don 3</u> • 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 <i>kharif</i> sorghum and pearl millet.	

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	

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	
b) Crop management <u>Don 2 and Don 3</u> - 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 or Casugamycin @ or Kasu B @ 2 ml/lt. water twice at 10 days intervals during drought period.	
4b) 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 - 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	
- 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 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% 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
a) Change management	
- Life saving irrigation to vegetables through stored moisture from constructed DOVA - If not possible to make survival harvest it for fodder use	
4b) Rabi Crop planning	
- 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>	
- 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 Chlorpyrifos dust or Monocrotophos @ 1 ml/lt - 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, pearnillet, maize, cowpea, black and green gram that can be harvested for fodder use	

b) Rabi crop planning	
• 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. • 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	
Prefere 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	

Resource management technologies

- Zero tillage: Alleviating heat and moisture stress in rabi crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	GARHWA
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	911.5	More than 19%	Less than 738.315
June	132.4		
July	294.5		
August	265.2		
September	219.4		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	34075	Gross irrigated area:	39045
Net Rainfed area	5220	Gross rainfed area	20587

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	7524	7901
Tanks	9569	11871
Other sources	16982	19273

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	24294	19648	4646
2	Jowar	27	-	
3	Maize	2303	83	2220
4	Bajra	17		17
5	Ragi	91		91

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	2228		2228
2	Groundnut	287	18	269
3	Sesamum	1882	30	1852
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	106		106

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	25		25
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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

Pigeonpea, Maize, Sesame, Sorghum, Cowpea

Intercrop:

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

Cucurbits-

Bitter gourd- Arka hait, Pusa domasami,

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

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

Dolichos bean-Swarna utkrist, 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

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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- Fluclozalin 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, Imaidacloprid@ 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, Cow pea 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 • Disease management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor- Hexaconazole (Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet-Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt; 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 , ATMA and NFSM • Vermicomposting awareness through KVKs, ATMA and NHM • Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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 loom 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, Shabhazi 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-Black gram/ Soybean/Cowpea /Pigeonpea+ Fodder (2:1)/ Pigeonpea + Black gram (1:2)/Maize (1:1)/Lady's finger (1:1)/Finger Millet (1:2) <u>Vegetables</u>- Lady's Finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ <u>Fodder</u> <u>Crop</u> Brachiaria grass/ Guinea grass /Rice bean (Moth bean)/ Maize/ Cowpea/ Sorghum/Pearl millet/ Soybean <u>Variety</u> Black gram- Birsu 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), Birsu soybean 1 black(120-125), JS 335 Birsu safed soybean 2 (105-110), RKS 18, RAUS 5 Cowpea- Birsu sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) Pigeonpea- Birsu 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 Mould Board 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- Flucloalalin 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 phospho gypsum 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, Cow pea 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
Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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 disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign through RKVY , ATMA, 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 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

- 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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit, Gundhi bug,leaf folder and BPH -Quinolpos 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

4c) 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 Birs 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

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, 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 Chlorpyrifos @ 2ml/lit 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 Quinolpos @ 1 ml/lit 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/lit 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/lt. 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/lt 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.
4c) 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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
Suggested Contingency measures	
• Crop management	
<u>Don 2</u> • 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	
<u>Don 3</u> • 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 <i>kharif</i> sorghum and pearl millet.
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

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 <u>Don 2 and Don 3</u> • 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 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 • 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 subsidised 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	
- 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 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% 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
a) Change management	
- 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	
- 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>	
- 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/lt - 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, pearmillet, maize, cowpea, black and green gram that can be harvested for fodder use	

4b) Rabi crop planning • 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. • 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 turbutries	
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	

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation ^f	Normal Crop/cropping system ^g	Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
Delayed release of water in canals due to low rainfall	Medium land sandy/clay looms	Medium land rice – IR – 36, IR – 64.	Aerobic rice var. Naveen, Shabhagi, Vandana.	Limited irrigation by the sprinklers.	Said through RKVY, NFSM (Pigeon Pea)
			Maize + Arhar (Pigeon Pea)	Irrigation through drip or alternate row irrigation.	
			Arhar + Sesame		
			Vegetable – Tomato, Chillies		
			Seeded Cucurbits		

Condition	Suggested Contingency measures				
	Major Farming situation ^f	Normal Crop/cropping system ^g	Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
		rice	Aerobic rice / transplanted rice var. Naveen, Shabhagi, Vandana.		
			Pigeon Pea + Sesame Maize + Pigeon Pea Tomato Chillies		
	Medium land	Medium maturing rice varieties	Direct sown (Aerobic) rice var. Naveen Shabhagi, Vandana, IR - 64		
On release of water in canals under delayed onset of monsoon					

Condition	Suggested Contingency measures				
	Major Farming situation ^f	Normal Crop/cropping system ^g	Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
		rice	aerobic rice / transplanted rice var. Naveen, Shabhagi, Vandana. Pigeon Pea + Sesame Maize + Pigeon Pea Tomato Chillies		
	medium land	medium maturing rice varieties	direct sown (Aerobic) rice var. Naveen Shabhagi, Vandana, IR - 64		
in catchment					
lack of inflows into tanks due to insufficient /delayed onset of monsoon					
insufficient groundwater recharge due to low rainfall					

Resource management technologies

- DSR with var. IR64 Drt-1: for mitigation of drought in rainfed medium lands
- Zero tillage: Alleviating heat and moisture stress in rabi crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	GIRIDIH
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	971.3	More than 19%	Less than 786.753
June	188.4		
July	303.2		
August	234.4		
September	245.3		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	38323	Gross irrigated area:	41778
Net Rainfed area	18693	Gross rainfed area	106613

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	11402	12883
Tanks	10425	11834
Other sources	16496	17061

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	82172	0	
2	Jowar	285	-	
3	Maize	14801	197	14604
4	Bajra	81		81
5	Ragi	1101		1101

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	-		
2	Groundnut	337		337
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	4		4
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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

B1. Major Farming Situation/Land Situation: Upland Shallow red soil	
Normal Crop/cropping system	Maize (Suwan), Pigeonpea, Black gram, Finger millet
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice crop	
<u>Sole Crop</u>	
Pigeonpea, Maize, Black gram, Finger Millet, Cowpea, Sesame, Turmeric, Soybean <u>Intercrop</u>	
Maize + Pigeonpea (1:1), Maize + Cowpea (1:2), Pigeonpea + Black gram (1:2), Pigeonpea + Turmeric (1:2) Pigeonpea + Sesame (1:2), Pigeonpea + Lady's finger (1:1)	
<u>Horticulture crop</u>	
<u>Vegetable</u> -Tomato/Brinjal/Frenchbean,/Cowpea, Radish/ Cauliflower/ Lady's finger,/Chili/Cucubits/Oel <u>Variety</u>	
Pigeonpea- Birsar Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)	
Maize- Birsar 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)	

Black gram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), WBU 109 (70-75), Uttara (75-80 small grain)
 Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149
 Cowpea-rainy – Birsa sweta(80-90), Swarn sweta(80-90), Swarn harit (80-90)
 Sesame- RT 346 (90), Kanke safed (95-100), Krishna (95-100)
 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
 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
 Frenchbean- Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless, Creeper- Kentucky wonder, Birsa priya, Swarna lata
 Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati Creeper- Birsa sweta, Swarna sweta, Swarn harit Radish- Pusa chetki (summer), Pusa deshi, Kashi hansh, Jaunpur/ Pusa himani, Japanese white, Pusa roshni Cabbage- early- Golden acer, Early drumhead, Pride of India Late- Late drunhead, sabyay cabbage, 7 Ganga, Jamuna, Kaveri, Shri ganesh cabbage 8
 Cauliflower-Summer- Early kuwari, early- Kuwari, Pusa katki, Pusadipali, Early synthetic, Mid early- Pusa ketaki, Pusadipali, Pusa him jyoti, Pant subhra, Late- Maghi, Srobowl 16, dania, Pusa srobowl, K Pusa srobowl, Hybrid-Himani, Swati, Endum early Pusa hybrid 1
 Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika
 Chili- Spices- Andhrajyoti, Pusasadabaha, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat
Cucurbits-
 Bitter gourd- Arka hait, 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

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- Dobha construction for In-situ rain water conservation Line sowing in upland rice areas through Oel-Gajendra, Vidhan, Kusum, Shri pada Turmeric – Rajendra sonia 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- Flucloalrin or Basalin and also for vegetables
- Bund construction for Unbunded uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal pplication 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 phospho gypsum 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, Imaidacloprid @ 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, Chilli, 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, Cow pea 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
- Disease and Pest managemnt- Maize- Stem borer Monocrotophos @ 1ml/ltr. water; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/ltr. water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/ltr. water., Mosaic-Methyl Demoton @ 1.5 ml/ltr. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr. water, Groundnut-Tikka and leaf minor-

Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy caterpillar –Quinolphos 1.5ml /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/m ² 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 , ATMA and NFSM • Vermicomposting awareness through KVKs, ATMA and NHM • Backyard Goatery and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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 sandy clay Loam soils.	
Normal Crop/cropping system	Transplanted paddy (IR 36, Sita, Swarna local)
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> DSR (Improved rice varieties) Var- Sahbhagi Dhan, Abhishek, IR 64-Drt 1, IR 64 Sukha, BVD 111, Rice + Dhaincha/Sunhemp (Green manuring/ Brown manuring) in DSR Transplanting (Hybrid Ricevarieties)Var.-Arize Tej (Gold), PAC 801, PAC 807, 27P31, CR Dhan 40 <u>Don 3</u> Ridge and Furrow method or raise bed broad furrow along the slope: Replace rice with Cereal/Pulses/ vegetable/ fodder crop Cereal – Maize/Sorghum Pulses- Pigeonpea+ Lady's Finger/Black gram/Soybean/ /Maize/Cowpea Vegetables- Radish/Amaranthus leaf/ Spinach/ Colocasia/ Yam/ French Bean/ Dolichos Bean/ Tomato/ Brinjal/Cucurbits/ Cowpea/ Chilli/ lady's finger <u>Fodder Crop</u> Rice bean (Moth bean)/ Maize / Cowpea/ Sweet Sorghum/Sudan grass <u>Variety</u> Maize- Birsamakka (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) Sorghum- CSV 20-110-20, MP chai, CSV 1616 Pigeonpea- Birsarhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200) Black gram- Birsaurd 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), Birsasoybean 1 black(120-125), JS 335 Birsasafed soybean 2 (105-110), RKS 18, RAUS 5 Cowpea-rainy – Birsasweta(80-90), Swarn sweta(80-90), Swarn harit (80-90) <u>Vegetable crops</u> Radish- Pusa chetki (summer), Pusa deshi, Kashi hanshi, Jaunpur/ Pusa himani, Japanese white, Pusa roshni Spinach- Pusa jyoti, Allgreen, Deshi, Pusa madhawi Oel-Gajendra, Vidhan, Kusum, Shri pada Frenchbean- Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless, Creeper- Kentucky wonder, Birsapriya, Swarna lata Dolichos bean-Swarna utkrist, Swarna rituwar Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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 Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati Creeper- Birsasweta, Swarna sweta, Swarn harit Chili- Spices- Andhrajiyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika Cucurbits- Bitter gourd- Arka hait, Pusa domasami 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

Fodder crop

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

Cowpea-EC-4216, UPC-287, UPC-5286, GFC-1, GFC-2 and GFC-4.

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- 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- Flucloalalin or Basalin and also for vegetables
- Bund construction for Unbunded uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal pplication 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 phospho gypsum 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, Imaidacloprid@ 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, Chilli, 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, Cow pea 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
- Disease and Pest managemnt- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/lit. water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit. water., Mosaic-Methyl Demoton @ 1.5 ml/lit. water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit. water, Groundnut-Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy catterpillar –Quinolphos 1.5ml /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.
- Rice disease and pest 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 Natio @ 0.04 %.
- Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign trough RKVY , ATMA, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be aware 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 throuh 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 Sandy Clay Loam soils	
Normal Crop/cropping system	Transplanted paddy (IR 36, Sita, Swarna local)
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 Shabhagi, IR 64-Drt 1, IR 64 Drt 1, Abhishek (120 days), MTU-1001, MTU 1010, Rice + Dhaincha/Sunhemp as green/brown manuring in DSR Transplanting (Hybrid rice varieties)Var.–Arize 6444 (Gold), IET 5656, PHB 71, 25P25, 27P31, 27P36, NK 15620	
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 mentiond 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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit, 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 Nativio @ 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 throuh Birs 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	

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 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/lt. 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/lt 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	
B21.Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u>	
- 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	
<u>Don 3</u>	
- 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 <i>kharif</i> sorghum and pearl millet.	
b) Soil nutrient & moisture conservation measures	
b) Foliar spray of KCl or ZNSO ₄ @ 2 per cent	
c) 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	
d) 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	
<u>Don 2 and Don 3</u>	
- 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 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 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	
- 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/ltr water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/ltr water are advised. - Life saving irrigation	
b) Soil nutrient & moisture conservation measures	
- 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 subsidised basis through State Govt. schemes.	

B6. At flowering/ fruiting stage	
B6.1. Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils	
Normal Crop/cropping system	Rice
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 or Casugamycin @ or Kasu B @ 2 ml/ltr. 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% 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhindi + Maize
Suggested Contingency measures	
a) Change management	
- 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	
• 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> • 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 Chlorpyrifos dust or Monocrotophos @ 1 ml/lt • 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, pearlmillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
• 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. • 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	
Prefere 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	

Resource management technologies

- DSR with var. IR64 Drt-1: for mitigation of drought in rainfed medium lands
- Zero tillage: Alleviating heat and moisture stress in *rabi* crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	HAZARIBAG
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	1052.5	More than 19%	Less than 852.525
June	193.2		
July	321.5		
August	274.1		
September	263.7		

Forecast probability for the season (as per IMD): Normal

Irrigation info:

Net irrigated area:	8973	Gross irrigated area:	9626
Net Rainfed area	25103	Gross rainfed area	25684

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	724	728
Wells	3439	3619
Tanks	1919	2229
Other sources	2891	3050

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	20184	0	
2	Jowar	-	-	
3	Maize	2610	17	2593
4	Bajra	-		
5	Ragi	390		390

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	250	17	233
2	Groundnut	87		87
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	7	6	1
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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	Rice/ Maize/ Pigeonpea
Suggested Contingency measures	
a)Change in crop/cropping system	
Discard Rice	
<u>Sole Crop</u>	
Pigeonpea, Maize, Finger millet, Gundli, Sorghum, Black gram, Rainy 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+ Black gram/Green gram (1:2)	
<u>Horticulture Crop</u>	
Vegetables : Brinjal/ Tomato/ Cucurbits,/Cowpea,/Beans, Lady's Finger/ Chili <u>Variety</u>	
Pigeonpea- Birsar Arhar 1 (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), ICPH 2671 (200)	
Maize- Birsar makka (Vikash) 2 (75-80), Pusa HM 9(Improved AQH 9), KDMH, P3544, LG 32-81 –Yuvraj gold (80-85), Malvia makka 2 (90), Vivek hybrid 9 (80)	
Finger millet- BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149	
Gundli- Birsar gundli 1 Sorghum- MP cheri, CSV 1616	
Black gram- Birsar urd 1 (75-80), PU 19/31/35 (70-75), WBU 109 (70-75) Green gram-	

HUM 16, IPM-02-03-60-65

Vegetable crops

Brinjal- Pusa purple long, Swarn pratibha, hybrid-Swarn shakti , Vijay, Swarna sampada 6 Tomato- Swarn

lalima, Samrat, Hybrid- Swarn sampada, Swarn samridih, Pusa hybrid 1 Suraksha Cucurbits

Bitter gourd- Arka hait, Pusa domausami,

Bottle gourd- Arka bahar, PusaMeghdoot, Coimbtor long green, Arka harit

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

gourd- Satputia, Swarn manjari, Swarn uphar, Swarn baha

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

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

Pant anupma, Swarna priya, Arka Komal, Stringless, Creeper- Kentucky wonder, Birs priya, Swarna lata

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

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board or dics
- 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 unbanded 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 phospho gypsum 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 neemcake @ 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, Cow pea 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
- Disease management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit, Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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/lit. water

c) Remarks on Implementation

- Linkage with RKVY , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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 sandy loam soils

Normal Crop/cropping system

Rice: IR -36, IR – 64, Lalat

Suggested Contingency measures

a) Change in crop/cropping system

Don 2

DSR (Improved rice varieties) Var-IR- 64 Drt 1, Shabhazi Dhan, Abhishek, Hazari Dhan Transplanting
(Hybrid rice varieties) Var.-ArizeTez (Gold), PAC 801, 807

Don 3

Replace rice with Pulses/vegetable/ Fodder crop

Pigeonpea/Sorghum

Pulses-Black gram/ Soybean/Cowpea /Pigeonpea+ Fodder (2:1)/ Pigeonpea + Black gram/Maize/Finger millet/ Lady's finger

Vegetables- Lady's finger/ Amaranthus leaf/ Coriander leaf/ Dolichos

bean/ Fodder Crop

Brachiaria grass/ Guinea grass /Rice bean (Moth bean)/ Maize/Cowpea Variety

Black gram- 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),

Birsa safed soybean 2 (105-110), RKS 18, RAUS 5

Cowpea-rainy – 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)

Maize- Birsa makka (Vikash) 2 (75-80), Pusa HM 9(AQH 9), LG 32-81 –Yuvral gold (80-85), Malvia makka 2 (90), Vivek hybrid 9 (80)

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

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board or dics
- 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- Flucloalrin 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 phospho gypsum 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, Chilli, 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, Cow pea 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

Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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/lit. water. Rice disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign trough RKVY , ATMA, 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-weathet insurance to meet losses in case of drought/cyclone situation

B3. Major Farming Situation/Land Situation: Lowland sandy loam soils	
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, Abhishek	
Transplanting (Hybrid rice varieties) Var.- PAC 801, 807, Arize 6444 (Gold), 25P25, 27P31, 27P36	

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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr, Gundhi bug,leaf folder and BPH -Quinolpos 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 Birs 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

Contingency measures- Mid season

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

B1. At vegetative phase

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

Normal Crop/cropping system

Upland rice, Maize, Vegetables, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 Chlorpyrifos @ 2ml/ltr 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 Quinolpos @ 1 ml/ltr 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/ltr 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/lt. 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/lt 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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
Suggested Contingency measures	
• Crop management	
<u>Don 2</u> - 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 <u>Don 3</u> - 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 <i>kharif</i> sorghum and pearl millet.
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

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 <u>Don 2 and Don 3</u> • 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 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 • 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 subsidised basis through State Govt.schemes.

B6. At flowering/ fruiting stage	
B6.1 Major Farming Situation/Land Situation: LOW LAND Sandy clay loam soils	
Normal Crop/cropping system	Rice
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 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% 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
a) Change management - 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 - 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> - 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/lt - 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, pearnmillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
- 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	

C3.1 Major Farming Situation/Land Situation: LOW LAND Sandy loam soils		
Normal Crop/cropping system	Rice	
Suggested Contingency measures		
a) Crop management		
• _ 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 Uear @ 2 per cent • Mid early rice crop may be harvested at Physiological maturity • Cultivate vegetables like Tomato, Brinjal, Capsimum, Shimla mirch, Broccoli, Cabbage and Cauliflower, green pea and potato as per suitability near and around turbutries		
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		

Resource management technologies

- Zero tillage: Alleviating heat and moisture stress in rabi crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	JAMTARA
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	1073.1	More than 19%	Less than 869.211
June	204.9		
July	331.4		
August	266.9		
September	269.9		

Forecast probability for the season (as per IMD): Normal

Irrigation info:

Net irrigated area:	2303	Gross irrigated area:	2539
Net Rainfed area	14637	Gross rainfed area	19714

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	399	399
Wells	1043	1182
Tanks	304	371
Other sources	557	587

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	17411	0	
2	Jowar	-	-	
3	Maize	679		679
4	Bajra	-		
5	Ragi	-		

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	4		4
2	Groundnut	-		
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	59		59

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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

B1. Major Farming Situation/Land Situation: Upland red sandy loam soils	
Normal Crop/cropping system	Direct sown Rice, Pigeonpea, Maize, Pigeonpea + Blackgram,
	Cowpea /Dolichos Bean
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice crop <u>Sole Crop</u> Pigeonpea, Maize, Blackgram, Soybean, Sesame, Turmeric <u>Intercrop</u> Pigeonpea + Blackgram (1:1), Maize + Cowpea (1:1), Pigeonpea + Lady's finger (1:2) <u>Horticulture</u> Tomato/Brinjal/ French bean/ Cowpea/ Radish/ Cole crop/ Lady's finger/ Chili/ Cucurbits <u>Fodder</u> <u>Crop</u> Sorghum/ Maize/ Cowpea/ Black gram <u>Variety:-</u> Pigeonpea- Birsa Arhar (200-220), Narendra Arhar 1 and 2 (240-250), Asha (200-220) Maize- Birsa makka (Vikash) 2 (75-80), HQPM 1 (90-100), Shaktiman 1(105-1010), Pusa HM 9(AQH 9), KDMH Black gram- Birsa urd 1 (75-80), PU 19/31 (70-75), WBU 109 (70-75), Uttara (75-80) Soybean- R 518 (110), JS 9752 (100), Birsa soybean 1 black(120-125), JS 335	

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

Rajendra sonia

Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati, Swarn harit

Vegetable crops

Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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

Frenchbean- Bushy- Arka Komal, Stringless, Birsa priya, Swarna lata

Radish- Pusa chetki, Pusa deshi, Kashi hansh, Jaunpur/ Pusa himani, Japanese white Cabbage- early- Golden acer, Early drumhead, Jamuna, Kaveri, Shri ganesh cabbage 8

Cauliflower- Early Kuwari, Pusadipali, Pusa himjyoti, Pant subhra, K Pusa srobowl, Hybrid- Himani, Swati, Endum early Pusa hybrid 1

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

Chili- Spices- Andhrajyoti, Pusasadabhar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat

Cucurbits-

Bitter gourd- Arka hait, Pusa domasami,

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

Fodder crop

Sorghum-Pant Chari-5, Pant Chari-6 and Sorghum Sudan hybrid.

Maize- African tall, JS-1006 Cowpea- UPC-287, GFC-1, and GFC-4.

Black gram- PU 19/31/35 (70-75)

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- 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, Imaidacloprid @ 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, Cow pea 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

- Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/lit. water; Black gram and green gram- 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, Groundnut-Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy caterpillar –Quinolphos 1.5ml /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 , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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 land rainfed loamy soils..	
Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> Sahbhagi Dhan, Abhishek, IR 64-Drt 1, IR 64 Drt 1, BVD 111, Rice + Dhaincha/Sunhemp (Green manuring/ Brown manuring) in DSR Transplanting (Hybrid Rice varieties)Var.-Arize Tej (Gold), PAC 801, PAC 807, 27P31, CR Dhan 40 <u>Don 3</u> Ridge and Furrow method or raise bed broad furrow along the slope : Replace rice with Cereal/Pulses/ vegetable/ Fodder crop Cereal – Maize/Sorghum Pulses- Pigeonpea+ Lady's Finger (1:1)/Black gram (1:2)/Soybean (1:2)/ /Maize (1:1)/Cowpea (1:2) Vegetables- Radish/Amaranthus leaf/ Spinach/ Colocasia/ Yam/ French Bean/ Dolichos Bean/ Tomato/ Brinjal/All gourds/ Cowpea/ Chili/ lady's finger <u>Fodder Crop</u> Rice bean (Moth bean)/ Maize / Cowpea/ Sweet Sorghum/Sudan grass <u>Variety</u> Maize- Birsamakka (Vikash) 2 (75-80), VMH 4106 (Sweet corn hybrid), Malviamakka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80) Sorghum- CSV 20-110-20, MP chari, CSV 1616 Pigeonpea- Birsarhar (200-220), Malvi 13 (240-250), ICPH 2671 (200) Black gram- Birsaurd 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), Birsasoybean 1 black(120-125), JS 335 RKS 18, RAUS 5 Cowpea-rainy – Birsasweta(80-90), Swarnsweta(80-90), Swarnharit (80-90) <u>Vegetable crops</u> Radish- Kashi hansi, Jaunpur/ Pusa himani, Japanese white, Pusa roshni Spinach- Pusa jyoti, Allgreen, Deshi, Pusa madhawi Oel-Gajendra, Vidhan, Kusum, Shri pada Frenchbean- Bushy- Pant anupma, Swarna priya, Creeper- Kentucky wonder, Birsapriya, Swarna lata Dolichos bean-Swarna utkrist, Swarna rituwar Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, Pusa hybrid 1 Suraksha Brinjal- Pusa purple cluster, Mukta keshi, Swarn mani, Swarn shayamali, hybrid-Swarn shakti , Vijay, Swarna sampada 6 Chili- Spices- Andhrajyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika Cucurbits- Bitter gourd- Arka hait, Pusa domasami, 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

Fodder crop-

Maize- African tall, JS-1006 and Vijaya

composite. Cowpea-EC-4216, UPC-287

Sorghum- HC-171, PSC-1, Pant Chari-5, Pant

Chari-6 and Sorghum Sudan hybrid.

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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 unbund 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 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, Cow pea 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
- Disease management- Maize- Stem borer Monocrotophos @ 1ml/ltr water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/ltr water or Cartap hydrochloride @ 2 gm/ltr water, hairy caterpillar – Quinolphos 1.5ml /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 disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /ltr water. Termite- Methyl parathion dust @ 25 kg/ha

4 (c) Remarks on Implementation

- A campaign through RKVY , ATMA, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be aware 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 Birs 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 rainfed clay soils.	
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 Don 2 in Don 1	
DSR(Improved Rice varieties) Var.- Shabhagi Dhan, IR 64-Drt 1, IR 64 Drt 1, Abhishek (120 days), MTU-1001, MTU 1010, Rice + Dhaincha/Sunhemp as green/brown manuring in DSR	
Transplanting (Hybrid rice varieties) Var.-Arize 6444 (Gold), IET 5656, PHB 71, 25P25, 27P31, 27P36, NK 15620	
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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr, 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 Nativio @ 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 Birsra 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	

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 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/lt. 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/lt 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	
B2.2.Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhindi + Maize
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
Suggested Contingency measures	
Crop management <u>Don 2</u> - 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 <u>Don 3</u> - 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 <i>kharif</i> sorghum and pearl millet 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	

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	
Crop management <u>Don 2 and Don 3</u> - 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 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 - 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/ltr water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/ltr water are advised. - Life saving irrigation	
• Soil nutrient & moisture conservation measures - 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 - 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 or Casugamycin @ or Kasu B @ 2 ml/ltr. 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% 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
a) Change management - 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	
• 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> • 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/lt • 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, pearmillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
• 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. • 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	
Prefere 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	

Resource management technologies

- Zero tillage: Alleviating heat and moisture stress in *rabi* crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	KODARMA
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	891.3	More than 19%	Less than 721.953
June	155.7		
July	274.2		
August	223.5		
September	237.9		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	2387	Gross irrigated area:	2676
Net Rainfed area	5579	Gross rainfed area	5768

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	1003	1153
Tanks	552	620
Other sources	832	903

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	3286	0	
2	Jowar	-	-	
3	Maize	362	2	360
4	Bajra	-		
5	Ragi	133		133

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	183		183
2	Groundnut	25		25
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

4 Weeks Delay (Onset: 2nd Week of July) – Early Season Drought

B1. Major Farming Situation/Land Situation: Upland sandy lateritic soils	
Normal Crop/cropping system	Pigeonpea, Groundnut, Upland Rice, Blackgram, Greengram, Vegetables- Brinjal, Tomato, Sponge gourd
Suggested Contingency measures	

a) Change in crop/cropping system

Discard Rice crop

Sole Crop

Pigeonpea, Guarfalli, Blackgram, Maize

Intercrop

Pigeonpea + Lady's finger (1:2), Pigeonpea + Maize (1:1), Pigeonpea + Guarfalli (1:2) Maize + Beans (1 :2), Maize + Lobia (1 :2)

Horticulture crop

Vegetables- Cucurbits/Cow pea/ Lady's finger/chili

Fodder Crop

Sorghum/ Maize/ Cowpea/ Black gram

Variety

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

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

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)

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

crops

Cowpea- bushy- CP 4, Arka garima, Pusa komal, Pusa barsati Creeper- Birsa sweta, Swarna sweta, Swarn harit Lady's finger- Pusa A 4, Arka anamika, Varsa uphar, Hybrid- Sonal, Sarika

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

Cucurbits-

Bitter gourd- Arka hait, 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

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

Black gram- WBU 109 (70-75), Uttara (75-80)

b) Agronomic Measures

- Summer deep ploughing with Mould Board or dics
- 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 pplication 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 phospho gypsum 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, Cow pea 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 (Pendimethalin) or Post-emergence 18-28 DAS (Bispyribac).
 - Irrigate only at critical stages
- Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit. water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/lit. water; Black gram and green gram- 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, Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit. water or Cartap hydrochloride @ 2 gm/lit. water, hairy caterpillar –Quinolphos 1.5ml /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 , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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** sandy loam soils..

Normal Crop/cropping system	Rice
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> DSR (Improved rice variety) Var.-Sahbhagi Dhan, Abhishek, IR 64-Drt 1, BVD 111, Dhaincha/Sunhemp (Green manuring/ Brown manuring) in DSR Transplanting (Hybrid Rice varieties)Var.-Arize 6444 (Gold), Arize Tej (Gold), PAC 801, 807, 27P31, DRRH 2 Don 3 Ridge and Furrow method or raise bed broad furrow along the slope : Replace rice with Cereal/Pulses/ vegetable/ Fodder crop Cereal – Maize/Sorghum Pulses- Pigeonpea+ Lady's Finger/Black gram/Soybean/ Groundnut/Maize Vegetables- Lady's Finger/ Cowpea/ Dolichos bean/ <u>Fodder Crop</u> Rice bean (Moth bean)/ Maize / Cowpea/ Sweet Sorghum <u>Variety</u> Maize- Birsma 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) Sorghum- CSV 20-110-20, MP chai, CSV 1616 Pigeonpea- Birsma 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

Black gram- 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

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

Vegetable crops

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

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

Fodder crop

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

Cowpea-EC-4216, UPC-287, UPC-5286, GFC-1, GFC-2 and GFC-4

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

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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- Flucloalrin or Basalin and also for vegetables
 - Bund construction for unbunded 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 phospho gypsum 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, Chilli, 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, Cow pea 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
- Disease management- Maize- Stem borer Monocrotophos @ 1ml/ltr water; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/ltr water; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/ltr. water, Mosaic- Methyl Demeton @ 1.5 ml/ltr water; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/ltr Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/ltr water or Cartap hydrochloride @ 2 gm/ltr water, hairy caterpillar – Quinolophos 1.5ml /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.
- Rice disease and pest management -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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /ltr water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign through RKVY , ATMA, NFSM, KVKs, NHM programme and other State Govt. line departments are needed to be aware 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** sandy clay loam soils.

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 Don 2 in Don 1

DSR(Improved Rice varieties) Var.-)- Shabhazi Dhan, IR 64-Drt 1, Abhishek (120 days), MTU-1001, MTU 1010, Transplanting (Hybrid rice varieties)Var.- Arize 6444 (Gold), Uday 111, PHB 71, 26P52, 25P25, 27P31, 27P36 Vegetable-

Cucurbits-

Bitter gourd- Arka hait, Pusa domasami,

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

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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit, 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 Nativio @ 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

Contingency measures- Mid season**Mid season drought (long dry spell, consecutive 2 weeks rainless (<2.5 mm))**

B1. At vegetative phase	
B1.2. Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Vegetables, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 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/lt. 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/lt 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 dovass	
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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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 dovass 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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u> - 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	
<u>Don 3</u> - 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 <i>kharif</i> sorghum and pearl millet.	
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	

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	
<u>Don 2 and Don 3</u> - 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 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
- 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/ltr water or Tricyclazole @ 6g/10 lt or carbendazim @ 2 g/ltr water are advised. - Life saving irrigation
b) Soil nutrient & moisture conservation measures
- 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
4 (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 or Casugamycin @ or Kasu B @ 2 ml/ltr. 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% 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

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize

Suggested Contingency measures	
a) Change management - 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 - 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> - 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 Chlorpyrifos dust or Monocrotophos @ 1 ml/lt - 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, pearnillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning - 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. - 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 turbutries	
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	

Resource management technologies

- Zero tillage: Alleviating heat and moisture stress in *rabi* crops

- Green manuring for In-situ moisture conservation
- Nadikund

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	LATEHAR
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	1018.5	More than 19%	Less than 824.985
June	175.8		
July	327.9		
August	274.8		
September	240		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	11695	Gross irrigated area:	14465
Net Rainfed area	19258	Gross rainfed area	27610

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	268	268
Wells	3760	5255
Tanks	4261	5436
Other sources	3406	3506

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	16617	6829	9788
2	Jowar	21	-	
3	Maize	6822	37	6785
4	Bajra	4		4
5	Ragi	211		211

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	1535		1535
2	Groundnut	868		868
3	Sesamum	1134		1134
4	SOyabean	-		
5	Sunflower	97		97
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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
Discard Rice crop <u>Sole Crop</u> Pigeonpea, Maize, Finger millet, Gundli, Sorghum, Black gram, 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+ Black gram (1:1)/Green gram (1:1) <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), HQPM 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 Black gram- 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 Gundli- Birsa gundli 1

Cowpea- bushy- Pusa komal, Pusa barsati ,Birsa sweta, Green gram- 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 samridih, Pusa hybrid 1 Suraksha Cucurbits- Bitter gourd- Arka hait, 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 Frenchbean- Bushy- Stringless, Kentuky wonder, Birsa priya, Swarna lata Chili- Spices- Andhraiyoti, Pusasadabahar, NP 46, Jwala, KA 2, California wonder, Chinese giant, Yellow wonder, Bharat	b) Agronomic Measures • Summer deep ploughing with Mould Board 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 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, Imaidacloprid@ 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, Cow pea 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 • Disease management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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/lit. water • 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- Flucloalalin 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
c) Remarks on Implementation	

- Linkage with RKVY , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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, Birsra 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-Black gram/ /Cowpea /Pigeonpea+ Fodder (2:1)/ Pigeonpea + Black gram (1:2) /Maize (1:1)/Lady's finger(1:1)/ Finger millet (1:1) <u>Vegetables-</u> Ladys's finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ Arvi <u>Fodder</u> <u>Crop</u> Sorghum/Brachiaria grass/ Ginuea grass /Rice bean (Moth bean)/ Maize/Cowpea <u>Variety</u> Black gram- Birsra urd 1 (75-80), PU 19 (70-75), WBU 109 (70-75), Uttara (75-80) Pigeonpea- Birsra Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200) Maize- Birsra makka (Vikash) 2 (75-80), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Vivek hybrid 9 (80) Cowpea-rainy – Birsra 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- Birsra arvi (80) – Arka anamika, Sonal, Shaktime, 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 Mould Board 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 pplication 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 phospho gypsum 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, Cow pea 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 (Pendimethalin) or Post-emergence 18-28 DAS (Bispyribac).
 - Irrigate only at critical stages
- Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demeton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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/lit. water.
- Rice disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign through RKVY , ATMA, 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 Birs 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 Don 2 in Don 1

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

Transplanting (Hybrid rice varieties)Var. - PAC – 807, Uday – 111, 27P31, Arize 6444 (Gold), MTU 1010, 1001 (130 days)

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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit, Gundhi bug,leaf folder and BPH -Quinolpos 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

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, 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 Quinolpos @ 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/lit 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u> - 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 <u>Don 3</u>	

- 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 <i>kharif</i> sorghum and pearl millet
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

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	
<u>Don 2 and Don 3</u> - 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 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	
- 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 subsidised 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
- 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 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.
4 (b) Soil nutrient & moisture conservation measures
- 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

Contingency measures- End of the season

C1. At fruiting/pre physiological maturity stage
Major Farming Situation/Land Situation: UP LAND Sandy red lateritic soils
Normal Crop/cropping system
Upland rice, Maize, Vegetables, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures
a) Change management
- 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
- 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>
- 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/lt

• 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, pearnillet, maize, cowpea, black and green gram that can be harvested for fodder use
b) Rabi crop planning • 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. • 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, Capsimum, 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	

Resource management technologies

- Zero tillage: Alleviating heat and moisture stress in *rabi* crops
- Green manuring for In-situ moisture conservation

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	LOHARDAGA
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	984.4	More than 19%	Less than 797.364
June	195		
July	311.4		
August	247.3		
September	230.7		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	9291	Gross irrigated area:	10237
Net Rainfed area	4674	Gross rainfed area	28172

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	158	192
Wells	2107	2473
Tanks	3003	3296
Other sources	4023	4276

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	17921	0	
2	Jowar	-	-	
3	Maize	3862	143	3719
4	Bajra	-		
5	Ragi	950		950

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	361		361
2	Groundnut	836		836
3	Sesamum	9		9
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

B1. Major Farming Situation/Land Situation: Upland sandy loam soils	
Normal Crop/cropping system	Pigeonpea + Maize, Rice, Blackgram, Rainy potato, Finger millet
Suggested Contingency measures	
a) Change in crop/cropping system	
Discard Rice crop	
<u>Sole Crop</u>	
Pigeonpea, Maize, Black gram, Sorghum, Finger millet, Rainy potato	
<u>Intercrop:</u>	
Pigeonpea + Lady's finger (1:2), Maize + Cowpea (1:2), Pigeonpea + Groundnut (1:2), Pigeonpea + Sorghum (1:1)	
<u>Horticulture</u>	
<u>Vegetable:</u> Tomato/Cucurbits/Sweet	
<u>Potatao Variety</u>	
Pigeonpea- Birsa Arhar (200-220), ICPH 2671 (200)	
Maize- Birsa makka (Vikash) 2 (75-80), Vivek hybrid 9 (80)	
Black gram- Birsa urd 1 (75-80)	
Sorghum- CSV 20-110-20, MP cheri, CSV 1616	
Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149	
Cowpea-rainy – Birsa sweta(80-90), Swarn sweta(80-90)	
Groundnut- Birsa mungfali 3, 4, Girnar 3	
<u>Vegetable crops</u>	
Rainy potato- Utimus, Kufri ashoka, Kufri pukhraj	
Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, Pusa hybrid 1 Suraksha	

Cucurbits-

Bitter gourd- Arka hait, Pusa domasami,

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 suryamukh

Sweet potato-Shribhadra (80-90), Kalinga, Birsa sakarkand 1, Gauri

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- 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- Flucloalrin or Basalin and also for vegetables
- Bund construction for Unbunded uplands
- Broadcast Well rotten FYM along with 1/4th N + Full basal ppplication 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, Cow pea 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
- Disease management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolpos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt; 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/lit. water

c) Remarks on Implementation

- Linkage with RKVY , ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM

- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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
Suggested Contingency measures	
a) Change in crop/cropping system	
<u>Don2</u> DSR (Improved rice varieties) Var- IR- 64 Drt 1, Shabhagi Dhan, Abhishek, Hazari Dhan Transplanting : Hybrid rice varieties) Var.-ArizeTez (Gold), PAC 801, 807	
<u>Don 3</u> Replace rice with Pulses/vegetable/ Fodder crop : Pigeonpea/Sorghum Pulses-Black gram/ Soybean/Cowpea /Pigeonpea+ Fodder (1:2)/ Pigeonpea + Black gram/Maize/ Finger Millet/Lady's Finger <u>Vegetables</u>- Lady's Finger/ Amaranthus leaf/ Coriander leaf/ Tomato/ Brinjal/ French bean/ Sweet potato <u>Fodder Crop</u> Sorghum/Brachiaria grass/ Guinea grass /Rice bean (Moth bean)/ Maize/Cowpea/ Berseem <u>Variety</u> Pigeonpea- Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), Sorghum- CSV 20-110-20, MP cheri, CSV 1616 Black gram- PU 19/31/35 (70-75), WBU 109 (70-75), Uttara (75-80 small grain) Soybean- R 518 (110), JS 9752 (100), Birsasoybean 1 black(120-125), JS 335 Maize- HQPM 1 (90-100), Shaktiman 1(105-1010), P3544, LG 32-81 –Yuvral gold (80-85), VMH 4106 (Sweet corn hybrid), Malvia makka 2 (90), Kanchan(K 25) 100-110 , Finger millet- A 404, BM 2, BM 3 (BBM 10), GPU 28, 67, VL 149 Cowpea-rainy – Birsasweta(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 Coriander- Pant haritima, Rajendra swati Tomato- Swarn lalima, BT 12, Swarn vaibhaw, Samrat, Hybrid- Swarn sampada, Swarn samridih, 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 Frenchbean- Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless, Creeper- Kentucky wonder, Birsapriya, Swarna lata Sweet potato-Shribhadra (80-90), Kalinga, Birsasakarkand 1, Gauri <u>Fodder crop</u> Sorghum- HC-171, PSC-1 and Sorghum Sudan hybrid. Maize- African tall, Cowpea-EC-4216, UPC-287	
b) Agronomic Measures	
• Summer deep ploughing with Mould Board 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- Flucloalrin 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, Cow pea 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 (Pendimethilin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
 - Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl Demeton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demeton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor- Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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/lit. water.
 - Rice disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign through RKVY , ATMA, 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 Birs 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

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 Don 2 in Don 1

DSR (Improved rice varieties) Var.- R- 64 Drt 1, Shabhagi Dhan, BVD 111, BVD 203, BVS 1 Abhishek Transplanting (Hybrid ricevarieties)Var. - PAC 801, 807, Arize Tej (Gold), Arize 6444 (Gold), 25P25, 27P31, 27P36

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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/ltr, Gundhi bug,leaf folder and BPH -Quinolpos 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 Birs 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

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 Chlorpyrifos @ 2ml/ltr 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 Quinolpos @ 1 ml/ltr 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/lit 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u> - 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	
<u>Don 3</u> 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 <i>kharif</i> 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	
<u>Don 2</u> and <u>Don</u> <u>3</u> • 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 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 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	
• 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% 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 - 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 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% 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

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures
a) Change management - 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 - 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>	
- 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/l - 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, pearmillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
- 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. - 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 turbutries	
b) Rabi crop planning	
Prefere 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	

Resource management technologies

- Green manuring *for In-situ* moisture conservation**
- Zero tillage: Alleviating heat and moisture stress in *rabi* crops**

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	PALAMU
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	849.6	More than 19%	Less than 688.176
June	121.6		
July	265.8		
August	245.3		
September	216.9		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	19813	Gross irrigated area:	20563
Net Rainfed area	31003	Gross rainfed area	38552

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	7381	7677
Tanks	6354	6578
Other sources	6078	6308

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	18756	6500	12256
2	Jowar	-	-	
3	Maize	9920	697	9223
4	Bajra	-		
5	Ragi	23		23

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	3775		3775
2	Groundnut	39		39
3	Sesamum	3036		3036
4	SOyabean	-		
5	Sunflower	3		3
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	97		97
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

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 , Birsar Arhar – 1, Bahar, BR-65, local, Rice- Vandana, Birsar Vikash Dhan- 109 , Blackgram
Suggested Contingency measures	

a) Change in crop/cropping system

Discard Rice crop

Sole Crop

Finger millet, Gundli, Sorghum, Sesame, Black gram, 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+ Black gram (1:2)/Green gram (1:2)

Horticulture

Vegetables : Brinjal(Aghanua)/ Tomato/ Cucurbits,/Cowpea,/Beans/ Lady's Finger/ Chili/ Dolichos bean Variety
Pigeonpea- Birsar Arhar (200-220), Malvia 13 (240-250), Narendra Arhar 1 and 2 (240-250), Asha (200-220), ICPH 2671 (200)

Maize- Birsar 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- Birsar gundli 1

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

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

Black gram- Birsar 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 samridih, Pusa hybrid 1 Suraksha

Cucurbits-

Bitter gourd- Pusa domasami,

Bottle gourd- Coimbatore long green, local, Arka harit

Sponge gourd- Rajendra nema, Long green, Long

white Ridge gourd- Swarn manjari, Pusa nasdar,

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

Cowpea- Pusa barsati, Birsar sweta, Swarna sweta

Frenchbean- Pant anupma, Arka Komal, Kentucky wonder, Birsar priya Lady's

finger- Hybrid- Sonal, Sarika

Chili- Andhrajyoti, Jwala, California wonder, Yellow wonder, Bharat Dolichos

bean-Swarna utkrist, Swarna rituwar

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- 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 intercropping 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- Fluclofalin or Basalin and also for vegetables Bund construction for unbanded 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, Imaidacloprid @ 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, Cow pea 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 (Pendimethalin) or Post-emergence 18-28 DAS (Bispyribac).
- Irrigate only at critical stages
- Disease management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demeton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lit; 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/lit. water

c) Remarks on Implementation

- Linkage with RKVY, ATMA and NFSM
- Vermicomposting awareness through KVKs, ATMA and NHM
- Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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	
<u>Don2</u> DSR (Improved rice varieties) Var- IR- 64 Drt 1, Shabhazi Dhan, Abhishek, BVD 203 <u>Transplanting</u> : <u>Hybrid rice varieties</u> Var.-ArizeTez (Gold), PAC 801, 807, 27P31, 25P25 <u>Don 3</u> <u>Replace rice with Pulses/vegetable/ Fodder crop</u> Pigeonpea/Sorghum Pulses-Black gram/ Soybean/Cowpea /Pigeonpea+ Fodder (2:1)/ Pigeonpea + Black gram/Maize/Lady's Finger Finger Millet <u>Vegetables</u>- Lady's Finger/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ <u>Fodder</u> <u>Crop</u> Ginua 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 utkrish, Swarna rituwar <u>Fodder crop</u> Maize- African tall,	
Cowpea-EC-4216, UPC-287	

b) Agronomic Measures

- Summer deep ploughing with Mould Board 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- Flucloalrin or Basalin and also for vegetables
- Bund construction for unbunded upland
- Broadcast Well rotten FYM along with 1/4th N + Full basal pplication 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, Imaidacloprid @ 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, Chilli, 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, Cow pea 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

- Disease and Pest managemnt- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demoton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt; 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/lit. water.
- Rice disease and pest 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 Nativio @ 0.04 %. Blast- Beam or Tricyclazole @ 0.6 gm /lit water. Termite- Methyl parathion dust @ 25 kg/ha

c) Remarks on Implementation

- A campaign trough RKVY , ATMA, 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-weathet 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
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.- 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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit, Gundhi bug,leaf folder and BPH -Quinolpos 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 Birs 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	

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 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/lt. 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/lt 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
uggested 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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u>	
- 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	
<u>Don 3</u>	
- 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 <i>kharif</i> sorghum and pearl millet.	
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, 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	
<u>Don 2 and Don 3</u>	
- 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 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	
- 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/ltr water or Tricyclazole @ 6g/10 ltr or carbendazim @ 2 g/ltr water are advised. - Life saving irrigation	
b) Soil nutrient & moisture conservation measures	
- 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 dohas, 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 subsidised 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	
- 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 ltr or Casugamycin @ or Kasu B @ 2 ml/ltr. 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 ltr. water.	
b) Soil nutrient & moisture conservation measures	
- 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 dohas, wells, ponds, check dams and bora bandh	
c) Remarks on Implementation	
Promote for the construction of Rain water harvesting structure watershed programme and MNREGA	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
a) Change management	
- 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 • 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> • 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 Chlorpyrifos dust or Monocrotophos @ 1 ml/lit • 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, pearlymillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
• 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. • 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	

Drought - Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in	Uplands	Rice (Rainfed condition)	Maize	Effective use of irrigation (Sprinkler)	Supply of seeds through D.A.O.

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
canals due to low rainfall			Vegetable	Limited irrigation	Supply of seeds through N.F.S.M.
			Aerobic rice		
	Mid land (Don-II) & low land (Don-I)	Rice	Adopt SRI cultivation	-	

Resource management technologies

- Green manuring *for In-situ* moisture conservation
- Zero tillage: Alleviating heat and moisture stress in *rabi* crops

Actionable Comprehensive Plans for Contingency

State	JHARKHAND	District	RAMGARH
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Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	1024	More than 19%	Less than 829.44
June	196.5		
July	306.3		
August	272.7		
September	248.5		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	2885	Gross irrigated area:	3172
Net Rainfed area	3084	Gross rainfed area	5688

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	-	-
Wells	1129	1308
Tanks	872	917
Other sources	884	947

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	4295	0	
2	Jowar	-	-	
3	Maize	901	95	806
4	Bajra	-		
5	Ragi	-		

Pulses & Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	130		130
2	Groundnut	-		
3	Sesamum	-		
4	SOyabean	-		
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	-		
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

4 Weeks Delay (Onset: 2nd Week of July) – Early Season Drought

B1. Major Farming Situation/Land Situation: Upland red sandy lateritic soils	
Normal Crop/cropping system	Upland rice, Maize, Pigeonpea, Groundnut, Black gram, Green gram, Soybean , Finger millet , Vegetables- Cauliflower, Cabbage, Brinjal, Tomato
Suggested Contingency measures	

a) Change in crop/cropping system

Discard Rice crop

Sole Crop

Pigeonpea, Sesame, Blackgram, Finger millet,

Intercrop

Pigeonpea and maize based with above mentioned crops and vegetables.

Pigeonpea + Maize/Lady's Finger (1:1), Maize + Cowpea/ Frenchbean/ Cucumber (1:2) Horticulture crop

Vegetables – French bean/ Brinjal/Tomato/ Lady's Finger /beans/Cauliflower/ Cabbage, /chili/ cow pea (Lobia) Variety

Pigeonpea- Birsar Arhar (200-220), Malviya 13 (240-250), Narendra Arhar 1 and 2 (240-250)

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

Black gram- Birsar urd 1 (75-80), WBU 109 (70-75), Uttara (75-80 small grain)

Finger millet- A 404, BM 2, BM 3 (BBM 10)

Vegetable crops

French bean- Bushy- Pant anupma, Swarna priya, Arka Komal, Stringless

Brinjal- Pusa purple cluster, Banaras giant, Swarn mani, Swarn shayamali, hybrid-Swarn shakti Tomato-

Swarn samridhi, Pusa hybrid 1, Suraksha

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

Cauliflower- Early kuwari, early- Pusa katki, Pusadipali, Mid early- Pusa him jyoti, Pant subhra, Hybrid- Himani, Swati, Endum early Pusa hybrid 1

Cabbage- early- Golden acer, Early drumhead, Pride of India, cabbage 8

Chili- Spices- NP 46, Jwala, KA 2, California wonder, Yellow wonder, Bharat Lobia-

bushy- CP 4, Arka garima, Pusa barsati

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- 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 unbanded 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 phospho gypsum 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, Cow pea 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
- Disease management- Maize- Stem borer Monocrotophos @ 1ml/lit; Pigeonpea-leaf folder- Methyl demeton @

1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/lit., Mosaic- Methyl Demoton @ 1.5 ml/lit; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/lit Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/lit or Cartap hydrochloride @ 2 gm/lit, hairy caterpillar –Quinolphos 1.5ml /lit; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 lt; 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/lit. water
4 (c) Remarks on Implementation • Linkage with RKVY , ATMA and NFSM • Vermicomposting awareness through KVKs, ATMA and NHM • Backyard Goatry and poultry rearing awareness campaign through KVKs, ATMA 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 ATMA, 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 sandy loam soils	
Normal Crop/cropping system	Seedling raising
Suggested Contingency measures	
a) Change in crop/cropping system <u>Don 2</u> Transplanting (Hybrid rice varieties) Var.- Arize tej (Gold), PAC 801, 807, DSR (Improved Medium duration var)-Shabhagi Dhan , IR 64 Drt 1, BVD 203, Birsa Vikas Sugandh (BVS 1) <u>Don 3</u> DSR (Upland rice variety dry and wet method) BVD 109, 110, Anjali Replace rice with Pulses/vegetable/ Fodder crop (raised bed or ridge and furrow method) Pulses-Black gram/ Soybean/ /Pigeonpea+ Fodder (2:1) or (2:2)/ Maize/ Vegetables- Lady's Finger/ Cowpea/ Amaranthus leaf/ Coriander leaf/ Dolichos bean/ Fodder Crop - Guinea grass / Rice bean (Moth bean)/ Maize/ Cowpea (lobia) <u>Variety</u> Black gram- Birsa urd 1 (75-80), PU 19/31/35 (70-75), Uttara (75-80) Soybean- R 518 (110), RKS 18, RAUS 5, JS 9752 (100), Birsa soybean 1 black(120-125), JS 335 Birsa safed soybean 2 (105-110), Pigeonpea- Birsa Arhar (200-220), Asha (200-220), ICPH 2671 (200) Maize- Birsa makka (Vikash) 2 (75-80), Pusa HM 9(AQH 9), KDMH, P3544, LG 32-81 –Yuvral gold (80-85), Vivek hybrid 9 (80) <u>Vegetable crops</u> Lady's finger-Varsa uphar, Hybrid- Sonal, Sarika Cowpea- bushy- Pusa komal, Pusa barsati Creeper- Birsa sweta, Swarna sweta, Swarn harit Coriander- Pant haritima, Rajendra swati Dolichos bean-Swarna utkrist, Swarna rituwar <u>Fodder crop</u> Maize- African tall, JS-1006 and Vijaya composite. Cowpea- GFC-1, GFC-2 and GFC-4	

b) Agronomic Measures

- Summer deep ploughing with Mould Board or discs
- 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- Flucloalrin 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 phospho gypsum 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, Chilli, 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, Cow pea 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
- Disease and Pest management- Maize- Stem borer Monocrotophos @ 1ml/Lt; Pigeonpea-leaf folder- Methyl demeton @ 1.5 ml/t; Black gram and green gram- Leaf minor- Monocrotophos @ 1ml/Lt., Mosaic- Methyl Demoton @ 1.5 ml/Lt; Soybean- Cercospora leaf spot- Indofil M 45 1 ml/Lt Groundnut- Tikka and leaf minor-Hexaconazole(Cartap) @ 1ml/Lt or Cartap hydrochloride @ 2 gm/Lt, hairy caterpillar –Quinolphos 1.5ml /Lt; Finger millet- Leaf/finger/neck and collar blast- Tricyclazole @ 6 gm/10 Lt; 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. Rice disease and pest 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 Nativio @ 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 , ATMA, 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 sandy loam soils

Normal Crop/cropping system	Nursery raising of MTU- 7029, BPT 5204, Birsamati and Arize 6444
4Suggested 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	
<u>DSR (Improved rice)</u> Var.- IR- 64 Drt 1, Shabhagi, Abhishek, Birsamati Vikas Dhan 203	
<u>Transplanting (Hybrid rice varieties)</u> Var.-ArizeTez (Gold), PAC 801, 807, Arize 6444 (Gold), 25P25, 27P31, 27P36	
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 ½ 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 ½ N + full dose P₂O₅ + 2/3rd K₂O ; ¼th 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 Disease and pest management- Stem borer- Carbofuron 3 G 12 kg/acre , Gall midge- Monocrotophos @ 1ml/lit, 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 Birsamati 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	

Contingency measures- Mid season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + 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 Chlorpyrifos @ 2ml/ltr 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 Quinalphos @ 1 ml/ltr 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/ltr 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/ ltr or Imidacloprid 4 ml/10 ltr 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/ltr. 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/ltr 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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
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
Suggested Contingency measures	
a) Crop management	
<u>Don 2</u> - 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 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

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

- 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 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

- 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 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	
4 (c) Remarks on Implementation Awareness for Construction of Ponds, check dam through water shed management & MNREGA scheme through SHG or on subsidised 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 - 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 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% 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	

Contingency measures- End of the season

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, Cow pea, Groundnut+ Pigeonpea, Maize + Pigeonpea, Bhendi + Maize
Suggested Contingency measures	
a) Change management - 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 - 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> - 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/lt - 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, pearmillet, maize, cowpea, black and green gram that can be harvested for fodder use	
b) Rabi crop planning	
- 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. - 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, Capsimum, Shimla mirch, Broccoli, Cabbage and Cauliflower, green pea and potato as per suitability near and around turbutries	
b) Rabi crop planning	
Prefere 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	

Resource management technologies

- Green manuring for *In-situ* moisture conservation**
- Zero tillage: Alleviating heat and moisture stress in *rabi* crops**