

Agricultural activities

during July

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In general, the south-west monsoon covers the whole country in the month of July. Farmers must take advantage of the rainy season in sowing/planting the crops, conserving valuable water in the soil, ponds and other structure for future use. As far as possible, the water of rain should not be allowed out of the fields and especially in the rainy conditions, it should be stored in the soil. Also, water logging in some areas may cause damage to certain crops, e.g. arhar, urad, mung, soybean, groundnut, maize, sorghum and pearl millet, etc. Hence, draining off excess water from such lands may be given priority. The transplanting of rice would continue during this month also. Sowing of crops, like, jowar, bajra, maize, urad, moong and fodder crops can be accomplished in this month. Apart from the above activities, many types of cultural operations in vegetables, flowers and some fruit trees are also accomplished in this month. Therefore, in the present article, the major agricultural activities during July are discussed.

Key word: Agricultural activities, Fodder, Maize, Oilseed, Pearl millet, Rice, Sorghum

Rice transplanting

In the previous issue of this magazine (May 2019), detailed information had been given about the sowing/ transplanting of rice. Rice transplanting should be completed in June. It can be accomplished manually or by using paddy transplanter. After a week of transplanting, check if plants have died or been uprooted. At such vacant places, new seedlings should be transplanted to get the optimum plant population. Also, use the one-third quantity of urea (nitrogen) after 5-8 days of transplanting. Crop should be regularly supplied with water so as to avoid the dryness of soil under irrigated conditions. Emphasis should be given on the management of weeds in rice. Simultaneously, farmers should regularly visit the fields to monitor the infestation of insect-pests.

Cultivation of maize, sorghum and pearl millet

Sowing of maize

July is a suitable month for sowing

of maize. In northern India, it should be sown by mid-July. It can be grown in all types of soils, but for good growth and productivity, the sandy loam to loam soil is suitable. Based on the maturity period, many hybrid and varieties that give high yields are available. The list of maize varieties suitable for different State of India is given in Table 1. If rain does not occur in time, then pre-sowing irrigation can be given for better germination. For field preparation, one deep ploughing and two ploughing by cultivator are enough. The land should be levelled by a plank before sowing. The crop should be sown on ridges in areas with high rainfall. For this, immediately after the final cultivation, the ridges should be made at a set distance and sowing to prevent the moisture loss, which may reduce the germination. Treat the seed with insecticide imidacloprid (4.0 g/kg seed), which reduces the incidence of insects in the stage of germination and early crop growth. In maize, the plant spacing is

75 cm × 20 cm or 60 cm × 25 cm. Keep them. Seed rate is 20-22 kg/ha. If sowing is done for baby corn and popcorn, the appropriate plant spacing is 60 cm × 20 cm.

If there is a shortage of organic matter in the soil, add 6-8 tonnes/ha FYM about 15-20 days before sowing. The FYM should be properly mixed in the soil. Generally, for the full-time, medium and early varieties, the N application rates are 120-150, 80-100 and 60-80 kg/ha, respectively. While 60 kg phosphorus (P₂O₅) and 40 kg K₂O/ha is essential for varieties of all sections. If maize sowing is done in sandy soil or there is deficiency of zinc in the field, apply 25 kg/ha zinc sulphate before sowing. Add one-fourth of nitrogen and full amount of phosphorus, potash and zinc sulphate into the soil at the time of last ploughing. Top-dress the remaining amount of nitrogen in two equal parts at knee-high and tasselling stages.

Sowing of sorghum

Sorghum should be sown within

one week of monsoon's first rain. The list of sorghum varieties suitable for different State is given in Table 2.

The sowing of *kharif* sorghum starts from the last week of May and should end by the second fortnight of July in the country. Optimum seed rate for grain sorghum is 8-10 kg/ha. Before sowing, the seed should be treated with fungicide, like captan @ 2.5 g/kg seed. New seeds should be used every year for the sowing of hybrids. For the preparation of the field, first ploughing should be done with a soil-turning plough, followed by 2-3 ploughing by the cultivator. Before planting, the field should be levelled by running the plank.

Sowing spacing is 45 cm (row to row) × 15 cm (plant to plant). The crop is sown by bullock-drawn seed-drills with 2 or 3 coulters at 7 cm depth in the soil. The seeds are covered by one harrowing after sowing by seed drill. Crop can also be sown by tractor-drawn seed-drill with 4 coulters by simultaneous covering of seeds by blade attached to the seed-drill. If FYM or compost is available, then apply @ 8-10 tonnes/ha, 15-20 days before sowing. The manure should be thoroughly and uniformly mixed in soil. To achieve the good yield, use nitrogen 100-120 kg/ha, phosphorus 50-60 kg/ha and potash 40-50 kg/ha under irrigated

condition and nitrogen 50-60 kg/ha, phosphorus 30-40 kg/ha and potash 30-40 kg/ha. Half the amount of nitrogen under irrigated condition and full amount of phosphorus and potash should be used at sowing. Top-dress the remaining half nitrogen after 30-35 days of sowing. Weeds can be managed by application of atrazine @ 0.5 kg/ha as a pre emergence spray, i.e. within 2-3 days of sowing. Sorghum with red gram as an intercrop has been found appropriate in 2:1 or 3:3 row proportions. In some parts of the country, soybean is also becoming another important intercrop with sorghum.

Table 1. List of recently released maize hybrids suitable for cultivation in *kharif* season

Cultivar	Maturity	Area of adaptation
<i>Normal maize</i>		
KNMH-4010141	Medium	Maharashtra, Karnataka, Andhra Pradesh, Telangana and Tamil Nadu
Central maize VL 55 (FH3605)	Medium	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, NE Hills, Maharashtra, Karnataka, Tamil Nadu, Telangana and Andhra Pradesh
<i>Pant Sankar Makka- 4</i> (PSM -4)	Early	Uttarakhand
GAYMH-1 (1H0461/GYH-0461)	Early	Gujarat
CoH (M) 10 (CMH 08-433)	Medium	Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Rajasthan, Gujarat, Madhya Pradesh and Chhatisgarh
HM-13 (HKH-317)	Early	Jammu and Kashmir, Himachal Pradesh and Uttarakhand
PMH 6 (JH 31292)	Medium	Bihar, West Bengal, Jharkhand, Odisha and Uttar Pradesh
CoH (M)7 (CMH 08-287)	Late	Uttar Pradesh, Bihar, Jharkhand, Odisha, Andhra Pradesh, Telangana, Tamil Nadu, Maharashtra and Karnataka
CoH (M)8 (CMH 08-292)	Medium	Uttar Pradesh, Bihar, Jharkhand, Odisha, Andhra Pradesh, Telangana, Tamil Nadu, Karnataka, Rajasthan, Gujarat, Madhya Pradesh, Chhattisgarh, Punjab, Haryana, Delhi and Maharashtra
CoH (M) 9 (CMH 08-350)	Medium	Uttar Pradesh, Bihar, Jharkhand, Odisha, Rajasthan, Gujarat, Madhya Pradesh and Chhattisgarh
DHM 121 (BH 41009)	Medium	Odisha, Bihar, Jharkhand, West Bengal, Gujarat, Rajasthan, Chhattisgarh and Madhya Pradesh
GH 0727 (Shrushti)	Late	Karnataka
Vivek maize hybrid 47 (FH 3513)	Early	Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim
Vivek maize hybrid 53 (FH 3556)	Extra-early	Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Uttar Pradesh, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim
Vivek maize hybrid 51 (FH 3554)	Extra-early	Gujarat, Rajasthan Chhattisgarh and Madhya Pradesh
<i>Specialty corn hybrids</i>		
DMRHP1402 (Popcorn)	Early	Punjab, Haryana, Delhi NCR & Western Uttar Pradesh, Rajasthan, Madhya Pradesh, Chattisgarh & Gujarat
Vivek hybrid 27 (Central maize VL Baby Corn 2 (Baby corn))	Early	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Telangana, Andhra Pradesh, Gujarat, Rajasthan, Chhatisgarh and Madhya Pradesh
BPCH-6 (Popcorn)	Medium	Across Country
Central maize VL sweet corn 1 (FSCH18)(Sweet corn)	Medium	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, NE Hills, Punjab, Haryana, Delhi, Western Uttar Pradesh, Karnataka, Tamil Nadu, Telangana, Andhra Pradesh, Gujarat, Rajasthan, Chhatisgarh and Madhya Pradesh
<i>Biofortified maize hybrids</i>		
Pusa Vivek QPM-9 (APQH9)	Ex. Early	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, NEH states, Maharashtra, Karnataka, Andhra Pradesh, Telangana and Tamil Nadu
Pusa HM4 (AQH-4)	Medium	Punjab, Haryana, Delhi, Uttarakhand (Plain), Uttar Pradesh (Western region)
Pusa HM8 (AQH-8)	Medium	Maharashtra, Karnataka, Andhra Pradesh, Telangana and Tamil Nadu
Pusa HM9 (AQH-9)	Medium	Bihar, Jharkhand, Odisha, Uttar Pradesh (Eastern region), West Bengal
Pratap QPM Hybrid-1 (EHQ-16)	Medium	Rajasthan, Gujarat, Madhya Pradesh and Chhatisgarh

Source: ICAR-Indian Institute of Maize Research, 2019

Table 2. High yielding hybrids and varieties of sorghum recommended for different state and production condition

Recommended hybrid	Recommended variety	Production condition	Region /State
CSH 16, CSH 18, SPH388, CSH 23, CSH 25, CSH 30	CSV 15, PVK 400, CSV 17, CSV 20, CSV 23	Medium to heavy soil areas	Maharashtra
CSH 14, CSH 17, CSH 30,	CSV 17	Low rainfall areas	Karnataka
CSH 16, CSH 13, CSH 18, CSH 23, CSH 30	CSV 15, DSV 2, DSV 3	Normal rainfall areas	
CSH 14, PSH 1	CSV 15, CSV 17, CSV 20, CSV 23	Low rainfall areas	Andhra Pradesh
CSH 23, CSH 25, CSH 30	CSV 15, CSV 20, CSV 23	Normal rainfall areas	
CSH 16, CSH 17, CSH 18, CSH 23, CSH 25	CSV 15, CSV 17SPV 235, JJ 741, JJ 938,	Entire state	Madhya Pradesh
CSH 16, CSH 17, CSH 18, CSH 23, CSH 27	CSV 15, GJ 38, GJ 40	Normal rainfall areas	Gujarat
CSH 17, CSH 13, CSH 16, CSH 18	CSV 15, CSV 17, GJ 38, GJ 39, GJ 40, GJ 41	Low rainfall areas	North Gujarat and Saurashtra
CSH 14, CSH 23, CSH 25, CSH 27	CSV 15, CSV 17, CSV 20, CSV 23	Medium to heavy soil zone	Rajasthan
CSH 16, CSH 18, CSH 23		Semi-arid and transitional zones	
CSH 14, CSH 17	CO 26, CSV 15, CSV 17, CSV 20, CSV 23	Coimbatore and Madurai districts	Tamil Nadu
CSH 14, CSH 16, CSH 18, CSH 23, CSH 25, CSH 27	CSV 15, CSV 17, CSV 20, CSV 23		Entire State
CSH 22 SS	SSV 84, CSV 19 SS	All above sorghum growing States	Sweet sorghum (All India)
SSG 59 3, PC 106, CSH 20 MF, CSH 24 MF	HC 308, HC 171, HC136, HC 260, CSV 15, CSV 20	All above sorghum growing States	Forage sorghum (All India)

Source: ICAR-Indian Institute of Millets Research, 2019

Sowing of pearl millet

Sowing of pearl millet should be completed in the first fortnight of July. Pearl millet crop can be grown in all types of soils having proper drainage (Fig. 1). Heavy soil is not suitable for pearl millet. The list of varieties suitable for different State for pearl millet is given in Table 3.

For field preparation, a deep ploughing should be done by soil-turning plough, followed by 2-3 cultivation by harrow, cultivator or *desi* plough. Optimum seed rate for pearl millet is 5 kg/ha. If the sowing of pearl millet cannot be done on time, it is very beneficial to go for transplanting in the late season. To

raise seedlings for one-hectare area, 2.0-2.5 kg seeds should be sown in 500-600 square metres nursery area. Seeds should be sown in the nursery in early July. About 2 to 3 weeks old seedlings should be used for transplanting. As far as possible, the transplanting of seedlings should be done on a rainy day. Seedlings can be

Table 3. Recommended hybrids and varieties of pearl millet suitable for cultivation during *kharif* season in India

Recommended hybrid	Recommended variety	Region/State
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173, HHB 67	MBC 2, PC 443, JBV3, PC 383, ICMV 221, Raj 171	Rajasthan
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173, HHB 67	MBC 2, PC 443, JBV3, PC 383, ICMV 221, Raj 171	Gujarat
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173, HHB 67	MBC 2, PC 443, HC20, JBV 3, PC 383, HC10, ICMV 221, Raj 171	Haryana
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173	PCB 164, ICMV 221, Raj 171	Punjab
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173	JBV 3, PC 383, ICMV221, Raj 171	Delhi
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173	JBV 3, PC 383, ICMV221, Raj 171	Uttar Pradesh
KBH 108, GHB 905, 86M89, MPMH 17, Kaveri Super Boss, Bio 448, MP 7872, MP 7792, 86M86, 86M66, RHB-173	JBV 4, JBV 3, PC 383, ICMV 221, Raj 171	Madhya Pradesh
Kaveri Super Boss, Pratap, PKV Raj, Shine, MP 7792, 86M86, PAC 909, 86M64, 86M53	ABPC-4-3, PC 612, Parbhani Sampada, Samrudhi, ICMV 221, Raj 171, ICMV 155	Maharashtra
Kaveri Super Boss, Pratap, Co 9, Shine, MP 7792, 86M86, PAC 909, 86M64, 86M53	PC 612, CoCu 9, Samrudhi, ICMV 221, Raj 171, ICMV 155	Tamil Nadu
Kaveri Super Boss, Pratap, Shine, MP7792, 86M86, PAC 909, 86M64, 86M53	PC 612, Samrudhi, ICMV 221, Raj 171, ICMV 155, Ananta	Andhra Pradesh
Kaveri Super Boss, Pratap, Shine, MP7792, 86M86, PAC 909, 86M64, 86M53	PC 612, Samrudhi, ICMV 221, Raj 171, ICMV 155	Karnataka

Source: ICAR-Indian Institute of Millets Research, 2019

transplanted at 50 cm × 10 cm spacing, using one plant at one place. Transplanting during the third week of July to the second week of August gives a good yield. For irrigated area: nitrogen 80 kg, phosphorus 40 kg and potash 40 kg/ha; for Barani regions: nitrogen 60 kg, phosphorus 30 kg and potash 30 kg/ha. In both cases, half the amount of nitrogen and the full amount of phosphorus and potash should be put at a depth of approximately 3-4 cm in the soil. The remaining quantity of nitrogen should be top dressed and mixed in the soil after 4-5 weeks of sowing.

Care of cotton and sugarcane

Generally, cotton crop is damaged severally by the weeds in July. Weeds should be managed by ploughing with cultivator or other cultural practices and through chemical means. During this month, cotton can also be damaged considerably by the brown caterpillar. It damages the cotton crop by cutting the leaves and bud leaves. Simultaneously, sucking pests like aphids cause significant damage to the crop by sucking the sap. An integrated approach of weed management is a better practice and it is advisable to go for integrated management of insect-pests in cotton. Such practices are good for soil, water, environment, consumers and farmers.

If the sowing of sugarcane was done in late summer, then proper irrigation, weed management and care should be taken. The crop should be regularly monitored to check the incidence of insect-pests and diseases (Fig.2). Necessary measures should be taken to manage the insect-pests and diseases at the right time by adopting the appropriate chemical, biological or cultural methods. Sugarcane crop may lodge during July-August due to excessive rainfall and strong winds, which can have an adverse impact on the productivity and quality of the crop. To save the crop from falling,



Fig. 1. Pearl millet – hybrids give more yield than local varieties

the furrows should be opened in the interspaces and earthing-up should be accomplished. It helps in strengthening the sugarcane roots that can withstand the water logging and help in preventing the crop from lodging. After this, 50 cm from the ground, sugarcane clumps should be tied-up. The leaves of the same clump can be used to tie them. It is also necessary to drain the excess water during the rainy season. Continuous water logging should be avoided in sugarcane fields.

Contemporary practices in pulses

The sowing of *urad* (black gram) and *mung* (green gram) should be accomplished at the beginning of the rainy season. If the rainfall is delayed, then the sowing of these crops should be done in the first fortnight of July. Also, it is important to keep in mind that for sowing,

choose a field where water does not stay for a long time. Sowing of these crops should be done at a row spacing of 30-45 cm by using seed-drill or *desi* plough. The plant to plant spacing of 7-10 cm in rows can be maintained by the thinning operation. Depending upon varieties, the suitable seed rate of *urad* and *mung* is 15-20 kg/ha. Before sowing, the seeds should be treated with rhizobium culture after proper treatment of fungicides such as thiram

or bavistin (2.5 g/kg seed). The total quantity of fertilizers needed during sowing period is nitrogen 20 kg/ha, phosphorus 40 kg/ha and sulphur 20 kg/ha. If weeds are to be managed by chemical method, then use pendimethalin (1 kg a.i./ha) in 800 liters of water and spray within 1-2 days of sowing. The *arhar* crop sown last month should be kept free of weeds by inter-cultural operations (hoeing). Necessary steps should be



Fig. 2. Tying of sugarcane is essential to prevent lodging

Table 4. State wise recommended high yielding varieties of soybean

Suitable varieties	State
Ahilya 1 (NRC 2), JS 80-21, Samrudhi (MAUS 71), Pratap Soya (RAUS 5), Bragg, Indira Soya 9	Arunachal Pradesh and Assam
PK 416, Pusa 16, Pusa, 24, Pant Soybean 564, Pant Soybean 1024, Pant Soybean 1042, Bragg and SL 525	Bihar
Ahilya 1 (NRC 2), Ahilya 3 (NRC 7), Ahilya 2 (NRC 12), Ahilya 4 (NRC 37), JS 71-05, JS 335, JS 80-21, JS 75-46, MACS 58, JS 9041, Indira Soya 9, JS 93-05, Kalitur, Parbhani Sona (MACS 47), Pratishtha (MAUS 61-2), Monetta, Punjab-1, PK 472, Shakti (MAUS 81), Samrudhi (MAUS 71) and Pratap Soya (RAUS 5)	Chhattisgarh
Gujarat Soybean 1, Gujarat Soybean 2, JS 93-05, JS 335, JS 80-21, JS 75-46, MACS 58, Monetta, Parbhani Sona (MAUS 47), Pratishtha (MAUS 61-2), Shakti (MAUS 81) and PK 472	Gujarat
Punjab-1, Pk 416, Pusa 16, Pant Soybean 564, Pant Soybean 1024, Pant Soybean 1042 and SL 525	Haryana
VL Soya 2, VL Soya 47, Shilajeet, Shivalik, Bragg, Pusa 16, Hara Soya and Palam Soya	Himachal Pradesh
Birsa Soybean 1, Ahilya 1 (NRC 2), JS 80-21, Samrudhi (MAUS 71), Pratap Soya (RAUS 5) and Bragg	Jharkhand
Hardee, Bragg, Sneha (KB 79), KHSb-2, Pratikar (MAUS 61), Pant Soybean 1029, MACS 124, MACS 450 and Pooja (MAUS 2)	Karnataka
Ahilya 1 (NRC 2), Ahilya 3 (NRC 7), Ahilya 2 (NRC 12), Ahilya 4 (NRC 37), JS 71-05, JS 335, JS 80-21, JS 75-46, MACS 58, JS 90-41, Indira Soy 9, JS 93-05, Kalitur, Parbhani Sona (MAUS 47), Pratishtha (MAUS 61-2), Monetta, Punjab-1, PK 472 and Shakti (MAUS 81)	Madhya Pradesh
Ahilya 1 (NRC 2), JS 335, JS 93-05, JS 80-21, MACS 58, Parbhani Sona (MAUS 47), Pratishtha (MAUS 61-2), Shakti (MAUS 81), MACS 13, Monetta, Prasad (MAUS 32) PK 472, Shakti (MAUS 81), TAMS-38 and Phule Kalyani (DS-228)	Vidharbha and Marathwada region of Maharashtra
MACS 124, MACS 450, Pant Soybean 1029, Pooja (MAUS 2), Pratikar (MAUS 61), Prasad (MAUS 32), MACS 13, Monetta and Phule Kalyani (DS-228)	Southern Maharashtra
PK 416, Pusa 16, Pant Soybean 564, Pant Soybean 1024, Pant Soybean 1042, SL 295, Bragg and SL 525	Punjab
Pratap Soya (RAUS), Bragg, Punjab-1, PK 472, MACS 58, JS 80-21, JS 335, Ahilya 4 (NRC 37), Parbhani Sona (MAUS 47), JS 93-05, Pratishtha (MAUS 61-2) and Shakti (MAUS 81)	Rajasthan
Pusa 16, Pant Soybean 1092, Pant Soybean 1042, Pant Soybean 1024, Pant soybean 564, PK 472, PK 472, PK 416, Pratishtha (MAUS 61-2), JS 93-05, Ahilya 4 (NRC 37), JS 335, SL 525, PS 1241, PK 262 and PK 327	Uttar Pradesh
Hara Soya, Palam Soya, Punjab-1, Pusa 16, PS 1241, VL Soya 1, VL Soya 2, VL Soya 21, VL Soya 47, Shilajeet and Pant Soybean 1092	Uttarakhand

Source: ICAR-Indian Institute of Soybean Research, 2019

taken to manage the insect-pests and diseases in arhar.

Management of oilseed crops

Soybean (Fig. 3), groundnut and *til* are the important oilseed crops in *kharif*. Sowing of these three crops should be accomplished in July. The emphasis should be given on selection of varieties which are high yielding and suitable for the region. List of soybean varieties is given in Table 4.

Sowing of fodder crops

Sowing of fodder crops such as chari (*jowar*), maize, pearl millet, *makchari*, lobia and *guar*, etc. should be carried out in July. The sowing of the above crops should be completed by the end of this month. It is more appropriate to plant them in rows. *Jowar* and cowpea seed rate is 40-45 kg/ha. The appropriate row spacing is 25-30 cm for cowpea and *jowar*. The seed rate of fodder maize is 50-60 kg/ha and distance from the row

is 25 cm is appropriate. The seed rate of *guar* is 35-40 kg/ha and a row spacing of 25 cm is recommended for fodder *guar*.

Crop management in organic farming

Some farmers are showing interest in organic farming of field crops, vegetables, fruit crops, seed spices and other economic plants. Almost all crops can be grown by organic methods. However, selection of crop for organic farming would depend upon the climate, region, availability of organic inputs and marketing facilities for organic products. A farmer interested in organic farming must know the four important aspects of organic farming, i.e. organic standards, certification of products, technology packages and marketing network. India has its own organic standards, which are generally acceptable to many countries in the world. The organic standards provide the list of do's and don'ts in production, processing and packaging of organic products. These standards also provide the list of permitted inputs, substances and ingredients, etc. in crop production and processing. The technology packages are the list of crop management/production practices for better output. It suggests suitable crop rotations, mix or intercropping practices, nutrient management options, weed management practices, insect-pests and disease management practices and post-harvest management for sustainable production, soil health and profitability. Marketing network is the last, but most important aspect of organic farming. Efficient marketing of organic products would help in fetching the remunerative prices.



Fig. 3. Soybean – selection of right varieties is crucial for higher seed yield

A good organic farm mimics the biodiversity of nature through practices like intercropping, companion planting, establishment of beneficial habitats, crop rotations, etc. Farms with a diverse mix of crops have a better chance of supporting beneficial organisms that assist in pollination and insect-pests' management. Furthermore, organic cultivation should also encourage

diversity among enterprises. Good organic operations integrate the various enterprises of which they are comprised like crop husbandry, dairy, poultry, fishery, piggyery, sericulture, etc. The enterprise diversification helps in achieving sustainability in production, especially by minimizing the risks involved in conventional farming. Crop rotations, green manures, animal manures, composting, natural fertilizers (e.g. greensand, gypsum, rock phosphate, etc.) and biofertilizers are practical ways to supply plant nutrients under organic crops.

Cultural operations of vegetables in July

- In the early cauliflower for which nursery was sown in the previous month, the transplanting should be completed in the first week of this month. Use appropriate quantities of FYM, compost or vermicompost along with fertilizers at the time of transplanting. Apply 60 kg nitrogen, 50 kg phosphorus and 50 kg potash/ha. Transplanting should be done on ridges at a plant spacing of 40 cm × 30 cm.
- Land preparation and sowing of



Fig. 4. Onion – time for transplanting in July

carrots, radish and other root crops in high altitude region may be started.

- Cultivation of Oyster mushroom continues.
- The planting of tomato and eggplant (brinjal) must be completed by the end of this month using the nursery prepared last month. Apply the recommended amount of FYM, compost or vermicompost along with fertilizers at the time of transplanting. Apply 50 kg nitrogen, 40 kg phosphorus and 40 kg potash/ha in brinjal or tomato.
- Land preparation and sowing of lady's finger, bitter gourd and arbi, etc. in low altitude region should be accomplished.
- Land preparation and sowing of lettuce, cabbage, cauliflower for seed production in high altitude region completes.
- If the onion nursery was sown in the month of June, then it should be planted in the main field by the second fortnight of this month (Fig. 4). Use the recommended quantities of manures, fertilizers and biofertilizers at the time of

transplanting. It is normally transplanted at a spacing of 30 cm × 15.

Cultural practices in fruits, tea and flowers in July

- This month is suitable for planting the saplings of forest trees, such as *mahua*, *neem*, *khejri*, *arjun*, *sheesham*, *safeda*, *jatropha*, *karanj*, *kachnar* and *gulmohar*, etc. on the bunds, along the roadsides or in agricultural forestry.
- Harvesting of jackfruit, temperate fruits, mango, pineapple, lemon continues in this month.
- Transplanting of rootstock for grafting in the nursery should be finished.
- Plucking of tea leaves (two leaves and a bud) continues in July.
- The planting of suitable fruit trees should be completed in this month in pits that were dug last month. Mango plants should be planted at 8-12 meters, guava at 5-7, orange at 5-6 meters, lemon at 4-5 meters and *aonla* at 7-10 meters. If there is a shortage of rain, then the plants should be irrigated as per requirement.
- In case of no rain, irrigate, hoe and weed as required in the garden of *rajnigandha* and spray mixture of nutritive elements at an interval of 15 days.
- Pluck the spikes of *rajnigandha* on time this month.
- Do not let the water logging happen in the marigold and other flowering plants. Proper drainage should be carried out to avoid the damage by waterlogging.

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- A total of ₹ 788.33 crores have been sanctioned for opening six new agricultural colleges for eastern India under Central Agricultural University, Imphal, and a new Central Agricultural University in Meghalaya.
- For the establishment of two new agricultural research institutes in Assam and Jharkhand, a sum ₹ 100 crores was allocated.
- First academic session of the Rani Lakshmbai Central Agricultural University has been allocated for four new agricultural colleges in Datiya and Jhansi.
- An Memorandum of Understanding was signed for transforming the Rajendra Central Agricultural University, Pusa, Samstipur, Bihar. A proposal of ₹ 400 crores was submitted in EFC.
- Post-Graduate Institute of Horticulture was established in Amritsar, Punjab.
- Foundation stone of the Indian Institute of Agricultural Biotechnology was laid at Ranchi for promoting agricultural biotechnology.