

<b>Area</b>	<b>Recommendations</b>
<b>Gujarat</b>	On long term basis, nutrient management of Sorghum + Cowpea - Lucerne system through 25% NPK from FYM + 50% NPK from inorganic fertilizer along with bio-fertilizer is more beneficial than 100% NPK through inorganic fertilizers long term sustainability.
	Lucerne (Anand-2) growers of middle Gujarat agro-climatic zone- III (Varodara region) are advised to apply 25 kg ZnSO <sub>4</sub> and 50 kg FeSO <sub>4</sub> per ha every year besides application of 20:40:40 kg NPK/ha for optimum seed yield and net returns on soils having marginal Zn and deficient Fe status.
	Planting of <i>Cenchrus ciliaris</i> with <i>Desmanthus virgatus</i> in 1:1 ratio on ridges and furrow is recommended for improving productivity, availability of green fodder as well as higher profits under rain fed condition of middle Gujarat agro-climatic zone- III (Varodara region).
	Growing of BN hybrid (Co-3) in open condition supplemented with 125% of recommended N (50 kg ha <sup>-1</sup> ) is recommended for higher productivity of quality fodder and remuneration, eradicating the possibility of accumulation of anti quality elements.
	It is recommended that the pearl millet variety GFB-1 and BAIF Bajra-1 should be fertilized with 150 % of RDN (100 kg N ha <sup>-1</sup> ) and harvested once at 50 DAS for green fodder and left for grain to obtain maximum yield and remuneration.
	For dual purpose, cutting of wheat at 50 DAS and leaving for seed production showed economically highest values GF, DM, CP, grain and straw yields.
	Sorghum accessions PB-215, PB-257, IS-3260, IS-7053, IS-7650, IS-23262 and SS-96-784 were found to be resistant or moderately resistant against shoot fly. These accessions can be used in breeding programme for developing resistant varieties against shoot fly.
	The farmers of middle Gujarat agro-climatic zone- III (Varodara region) are advised for sowing of fodder sorghum variety GFS-5 latest by 30 <sup>th</sup> June to get higher yield and net profit.
	The farmers of middle Gujarat agro-climatic zone- III (Varodara region) growing oat (Kent) for seed purpose are advised to give six irrigations each of 50 mm (first five irrigation at 15-20 days interval and 6th irrigation at 13-15 days interval after fifth irrigation) along with nitrogen application @ 75 kg/ha (50 % N should be applied at the time of sowing and remaining 50 % nitrogen should be given at 30 and 60 days after sowing in equal splits) for higher seed yield and net return.
	The farmers of middle Gujarat agro-climatic zone- III (Varodara region) growing multicut forage sorghum cv. CoFS-29 are recommended to apply 160 kg N/ha along with phosphorus @ 60 kg/ha for higher green forage, dry matter, crude protein yields and net realization. Nitrogen to be applied in four equal splits at basal, 30 DAS, after first cut (55 DAS) and second cut (100 DAS) and entire dose of phosphorus to be applied as basal.
	The farmers of middle Gujarat agro-climatic zone- III (Varodara region) growing hybrid napier are recommended to grow variety Co-3 and to fertilized with 75 kg N/ha after each cut upto three years along with common dose of 50

	<p>kg N/ha + 50 kg P<sub>2</sub>O<sub>5</sub>/ha has basal to obtain higher green forage, dry matter, crude protein and net realization.</p> <p>The farmers of middle Gujarat agro-climatic zone- III (Varodara region) are advised to spray GA<sub>3</sub> (Growth regulator) @ 40 milligram/litre to the lucerne (var. Anand-2) crop at 30 days after sowing for achieving higher forage yield, better quality and more net realization.</p>
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<b>Zone</b>	<b>Recommendations</b>
<b>Rajasthan</b> (Hyper arid and partially irrigated western plains)	Dual purpose barley should be supplied with 2/3 basal nitrogen as +1/3 immediate after first cut for higher green fodder and grain yield.
	In dual purpose pearl millet (GFB-1) should be fertilized with 150% RDN (90 kg N /ha) and harvested at 40 DAS for green fodder, thereafter left for grain to fetch higher GFY, grain yield, net returns with the highest B:C ratio under irrigated arid condition.
	Dual purpose oat fertilized with 12.5 kg/ha ZnSO <sub>4</sub> at sowing followed by two foliar sprays of 0.5% ZnSO <sub>4</sub> (+1.5% Urea) solution produces grain and straw yield equal to 25 kg ZnSO <sub>4</sub> /ha as basal application. Thus saves approx. 10 kg ZnSO <sub>4</sub> .
	For dual purpose forage crop, oat proved best and hence recommended to cut at 60 green fodder and then left for grain to harvest higher green fodder, dry matter, grain and straw yields along with higher equivalent yields, net returns, B:C ratio under light soils of western Rajasthan.

<b>Tamil Nadu</b>	Integrated application of 75% NPK through inorganic fertilizers with 25 N through FYM/ poultry manure is recommended to achieve yield and economic advantage in multicut fodder sorghum CO (FS) 29, black gram [VBN (Bg) 4] system in Tamil Nadu
	Maize (Baby corn) + Cowpea (Fodder) – Maize (Baby corn) – Maize (Baby corn) + Cowpea (Fodder) is recommended as most productive baby corn based cropping system for Tamilnadu.
	BN hybrid grass (CO-4) fertilized with 100% RDF with proved highest yielder (9470.94 q green fodder/ha). The irrigation with waste water is recommended to obtain higher remuneration (net return and BC ratio).

	<p>Under rainfed condition of Tamilnadu, Intercropping fodder pearl millet (CO 8) + horse gram (Paiyur 2) at 2:1 ratio or fodder sorghum (CO 27) + horse gram (Paiyur 2) at 2:1 ratio in the alleys of subabul (Puthiya Soundal) is suggested for improved green fodder and grain yield.</p>
	<p>Application of recommended dose of NPK along with <math>\text{FeSO}_4</math> @ 50 kg/ha and <math>\text{ZnSO}_4</math> @ 25 kg/ha was found to be advantageous in enhancing the growth, yield and quality of BN hybrid grass CO (CN) 4.</p>

<b>Maharashtra</b>	<p>Application of 25 % of recommended N through FYM + 50 % N and 100 % PK <math>\text{ha}^{-1}</math> through inorganic fertilizers+ biofertilizer to sorghum + cowpea (fodder) – Lucerne cropping sequence resulted in significantly higher green fodder equivalent yield of 1879.85 q <math>\text{ha}^{-1}</math> with net return of Rs. 68437/ha/year at National level and net monetary returns of Rs.1, 01, 815 <math>\text{ha}^{-1}</math>. Hence, it was recommended for Western Maharashtra.</p>
	<p>Application of 10 t FYM + 20: 80: 40 kg NPK + 30 kg S through elemental sulphur+ 1 kg Mo (Sodium molybdate- 39% molybdenum) + 4 kg B through Borax(11% boron) is recommended for superior fodder yield and quality.</p>
	<p>In medium deep soil of Western Maharashtra, to obtain the maximum green forage, seed yield and net returns from perennial Lucerne, following technology is recommended: the Lucerne seed should be sown at 30 cm apart in line and crop should be harvested for green fodder up to one and half year. Thereafter, the crop should be left for seed production during second week to last week of March for the first time. After first seed production, the crop should be harvested for green fodder take seed production for second time.</p>
	<p>Following integrated nutrient management for sorghum + cowpea (2:2)-lucerne is recommended for obtaining maximum forage yield, monetary returns and sustaining soil fertility from forage based cropping system.</p>
	<p><b>Sorghum + cowpea (2:2) inter crop during kharif season</b></p> <ul style="list-style-type: none"> <li>• Seed treatment with <i>Azotobacter / Rhizobium</i> @ 25 gm <math>\text{kg}^{-1}</math> of seed.</li> <li>• Application of 4.5t FYM + 312 kg SSP and 67 kg MOP <math>\text{ha}^{-1}</math> as basal dose and 108 kg <math>\text{ha}^{-1}</math> Urea at 30 DAS as top dressing</li> </ul> <p><b>Annual Lucerne during rabi season</b></p> <ul style="list-style-type: none"> <li>• Seed treatment with <i>Rhizobium</i> @ 25 gm <math>\text{kg}^{-1}</math> of seed.</li> <li>• At the time of sowing soil application of 9qkg FYM + 32 kg Urea + 500 kg SSP + 67 kg MOP <math>\text{ha}^{-1}</math> as basal dose.</li> </ul>

	<p>Growing of BN hybrid in un-shaded condition supplemented with 125% of recommended N was proved most productive and remunerative with good quality fodder hence recommended in Hill, Central and South Zone</p>
	<p><b>Integrated Pest Management in seed crop of Lucerne:</b> An IPM module for the management of <i>Helicoverpa armigera</i> developed and recommended to Lucerne seed crop.</p> <ul style="list-style-type: none"> <li>• Spraying of <i>HaNPV</i> 500 ml /ha in 500 litres of water at an appearance of 2 larvae/m<sup>2</sup></li> <li>• Two releases of <i>Trichogramma chilonis</i> @ 100,000 parasites/ha; the first release with the appearance of <i>H. armigera</i> larvae followed by second release one week after first release.</li> <li>• Spraying <i>Bacillus thuringiensis</i> @ 1.0 kg/ha in 500 litres of water 8 days after second release of <i>T. chilonis</i>.</li> <li>• Installation of 'T' shaped perches for birds @ 15/ha.</li> </ul>
	<p><b>Management of sucking pests in forage cowpea seed production:</b></p> <ul style="list-style-type: none"> <li>• It is recommended to apply three sprays of <i>Verticillium lecanii</i> 1.15% WP (<math>1 \times 10^8</math> cfu/g) @ 50g/10 lit. of water at 10 days interval for the control of sucking pests and maximum seed production of forage cowpea during kharif season, if the infestation of sucking pests is noticed.</li> </ul>
	<p><b>Management of cowpea sucking pests and yellow mosaic virus in cowpea seed production:</b> Two sprays of imidacloprid 17.8 SL @ 0.3 ml/lit at 15 days interval can significantly reduce the sucking pests and yellow mosaic virus incidence followed by two sprays of <i>Vetricillium lecanii</i> @ 5 g/lit at 10 days interval as non-chemical management and recommended for management of sucking pests and yellow mosaic virus in cowpea seed crop.</p>
	<p>For rust free Lucerne seed production, spraying of mancozeb (2.5 g/lit) and tebuconazole (0.5 ml/lit) alternately at 15 days interval is recommended for superior seed yield over control.</p>
	<p><b>Bio intensive pests and disease management in Lucerne:</b> Seed treatment with NSKP (50 g/kg) followed by foliar spray of NSE (5%) at 15 days interval after each cut reduces the pest and disease incidence in lucerne and increases the fodder and seed yield.</p>
	<p><b>Management of Sorghum shoot fly in forage sorghum:</b> Seed treatment with thiamethoxam @ 2g/kg seed remarkably reduces the shoot fly incidence and increases the forage yield of sorghum.</p>

Punjab	Application of 37.5 kg N/ha to seed crop of ryegrass is recommended for higher seed yield and to prevent lodging
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	Tracer (spinosad 48.5C) and Thiodan (endosulfan 35 EC)@ 150 ml and 2.5 l/ha, respectively, are recommended for the management of gram caterpillar <i>Helicoverpa armigera</i> in berseem and Shaftal seed crop.
	Gram caterpillar in berseem seed crop can effectively be controlled with Chlorantraniliprole 18.5 SL @ 125 ml or Indoxacarb 15 EC @ 500ml/ha

<b>Tarai region of Uttarakhand</b>	Integrated application of nitrogen 50% through FYM and 50% through inorganic sources are recommended for maximum green forage yield equivalents, net returns and nitrogen use efficiency can of ‘Paddy– Berseem– Maize + Cowpea rotation with in Tarai region of Uttarakhand.  Rotation Maize (Baby corn) + Cowpea – Maize (Baby corn) – Maize (Baby corn) + Cowpea or Napier Hybrid + Cowpea – Berseem – Maize + Cowpea are recommended for year round green forage production with maximum green forage yield equivalent, crude protein yield and net returns in U.P. and Uttarakhand.
	Cowpea varieties UPC 626 and UPC 629 may be grown with 80 kg P/ha for higher green forage yield, dry matter yield as well as crude protein production.
	It is recommended that the Berseem should be fertilized with 10 T FYM + 30 kg sulphur + 4 kg boron + 1kg molybdenum /ha for higher green forage yield and quality of Berseem
	Teosinte should be sown at 30 kg seed rate/ha with application of 50 kg N/ha for higher green and dry forage yield as well as crude protein production
	Sorghum – Wheat – Maize’ may be grown with application of 75% recommended nitrogen for higher green forage yield, crude protein and economics
	Application of Pendimethalin @0.3 kg ai/ha + Imazethapyr @ 0.1 kg ai/ha to berseem after first cut is recommended as it reduced weed population and showed higher weed control efficiency and gave highest green forage yield, dry forage yield, seed yield, gross returns, net returns and B:C ratio.
	Oat varieties;UPO-12-1, JHO-2012-1 and RSO-59 are recommended to grow with application of 120 kg N, 60 kg P <sub>2</sub> O <sub>5</sub> and 40 kg K <sub>2</sub> O/ha for higher productivity and quality of oat fodder in rabi season

<b>Southern and Eastern dry zone</b>	<b>Production packages for fodder cowpea variety KBC-2</b>  Cultivation of cowpea with spacing of 30X10cm with seed rate of 35 kg/ha & NPK levels of 25:50:25 kg/ha is recommended for higher green forage yield (25 t/ha), dry matter yield (4.5 t/ha) and crude protein (0.8 t/ha).
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Karnataka

### **Production packages for BN hybrid variety Co-3**

Planting geometry of 90 X 60 cm with nutrient levels of 180:120:80 NPK kg/ha should be adopted for higher green forage yield (128.93 t/ha) with maximum net returns of Rs. 46063/ha.

### **Production packages for fodder sorghum variety CoFS-29**

Planting geometry of 30 X10 cm with seed rate of 10 kg/ha and nutrient levels of 90:50:40 NPK kg/ha is recommended for remarkably higher green forage yield.

### **Production packages for fodder oat variety OS-6**

Sowing of fodder oat during second fortnight of October with seed rate of 100kg/ha at spacing of 25cm between rows and NPK levels of 100:60:40 kg/ha should be adopted to achieve higher green forage yield (27.5 t/ha), dry matter yield (5.25 t/ha) and crude protein (0.41 t/ha).

### **Production packages for fodder cowpea variety MFC-08-14 and MFC-09-1**

Fodder cowpea should be planted at geometry of 30 X 10 cm with seed rate of 35 kg/ha and fertilized with 25:50:25 NPK kg/ha for optimum and economical quality green fodder.

### **Forage legumes as intercrop in BN hybrid**

Inter sowing of cowpea (Kharif) followed by lucerne (Rabi) as in Napier bajra proved superior and recommended for higher green forage yield(147.17 t/ha),dry matter yield (31.04 t/ha), crude protein (3.3 t/ha) in places where BN hybrid is growing as sole crop

### **Double story cropping of forages in coconut garden**

The cultivation of cowpea followed by lucerne as under story crop in inter spaces of coconut plantation in the garden is recommended significantly higher green forage yield (65.0 t/ha), dry matter yield (14.9 t/ha) and crude protein (2.6 t/ha).

### **Remunerative forage based cropping system for sustaining productivity under irrigated situation**

In the irrigated areas Maize + Cowpea (Fodder) – Sunflower (Grain) – Finger millet (Grain) should be given priority over sole BN Hybrid for superior productivity of quality fodder as well as higher net monetary returns (65487 Rs/ha/yr).

	<p><b>Intensive forage production through silvipasture system under rainfed ecosystem</b></p> <p>For small farm holders under rainfed situation Subabul + Pearl millet + Horse gram (3:1) system is advocated for food as well as fodder availability (Green forage-410.93 q; dry matter 87.58 q; net returns 22009 Rs/ha and B:C ratio 2.87).</p>
	<p><b>Soil amendments for fodder sorghum in alkali soil</b></p> <p>Application of 400 kg gypsum (100 % GR) with recommended NPK + FYM (10 t ha<sup>-1</sup>) + ZnSO<sub>4</sub> 20 Kg ha<sup>-1</sup> is advocated for significantly higher green fodder (252.48 q ha<sup>-1</sup>), dry matter yield (68.02 q ha<sup>-1</sup>), crude protein yield (4.62 qha<sup>-1</sup>) and net monetary return (8335 Rs. ha<sup>-1</sup>).</p>
	<p><b>Forage production from rice fallows</b></p> <p>The sowing of maize + cowpea cropping supplemented with 100% RDN produced additional forage yield of (465.16 q green and 113.51 q dry matter ha<sup>-1</sup>) during summer season.</p>
	<p><b>Forage production during lean period</b></p> <p>Fodder pearl millet grown during September to November recorded significantly higher green forage yield (373.18 q ha<sup>-1</sup>), with higher water use efficiency (14.69q ha<sup>-1</sup>cm) with irrigation at IW/CPE ratio of 1.0.</p>
	<p><b>Standardization of production packages for BNH-10 (BN hybrid)</b></p> <p>The BNH-10 variety of BN hybrid should be planted at 90cm X 60cm with 150% recommended dose of fertilizer recorded for optimum and economical green forage yield (148.4 t/ha) and B:C ratio (3.17).</p>
	<p><b>Production packages for guinea grass variety JHGG-08-1</b></p> <p>The Guinea grass variety JHGG-08-1 should be planted at 60cmX 45cm 150% recommended dose of fertilizer higher green forage yield and economy in the production.</p>

<b>Madhya Pradesh</b>	<p><b>Maize grown for baby corn and green cob</b></p> <p>Maize (BC) + cowpea (fodder) – berseem – maize (BC) + cowpea (fodder) proved most productive and remunerative cropping system for maize growers of urban</p>
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	<p>vicinity. The system recorded significantly higher net return of Rs. 110056/ha/year as well as fodder equivalent yield of 2298.9 q/ha/yr.</p>
<b>Tillage and nutrient management of rice- oat cropping system</b>	
<p>In rice- oat cropping system, the green fodder (682.26 q/ha) and economics of oat (net monetary returns Rs.70758/ha/year and benefit: cost ratio (2.79) was highest with minimal tillage both the crops, fertilized with 100% recommended dose of fertilizer along with bio fertilizer (Azotobacter + PSB).</p>	

area	Technology details
<b>Sodic soil in NEPZ</b>	<b>Rice-berseem cropping system in sodic soil</b> In sodic soil rice-berseem cropping system, is recommended with the application of 120 kg N + 60 kg P <sub>2</sub> O <sub>5</sub> + 40 Kg K <sub>2</sub> O + Gypsum@75% GR+FYM 10 tons/ha for higher grain yield of rice (34.45 q/ha) as well as berseem forage equivalent yield (498.40 q/ha).
	<b>Production technology of guinea grass under sodic soil</b> The guinea grass should be plant at 75 x 60 cm without mulch for superior GFY (360.51 q/ha) and DMY (81.20 q/ha). This also recorded significantly higher N, P and K uptake.
<b>Andhra Pradesh and Telengana</b>	<b>INM in dual purpose sorghum:</b> Application of 100% N through poultry manure resulted in higher sorghum (dual purpose) and seed yield. Crude protein yield was higher with the application of 75% N through inorganic + 25% N through poultry manure.
	<b>Seed yield of lucerne:</b> Seed yield of lucerne was significantly higher with the application of 20 kg S/ha through gypsum and 10 kg Zn/ha through Zn SO <sub>4</sub> .
	<b>Pillipesara and sunhemp after normal paddy crop with residual moisture:</b> In southern and coastal districts of Andhra Pradesh, short duration legumes like pillipesara and sunhemp are recommended after the harvest of normal paddy crop with residual moisture available in paddy fields. It is also possible to grow horse

	gram and moth bean in the residual moisture after harvest of paddy crop in Telangana and coastal districts of AP.
	Higher seed yield of maize (26.00 q/ha) and higher seed yield of lucerne (2.09 q/ha) and higher net returns of the entire sequence (Rs.27081/ha) was obtained with application of 10 kg Zn/ha every year through Zn SO <sub>4</sub> OR 20 kg S/ha every year through gypsum (25.75 q/ha, 2.10 q/ha and Rs.25823/ha, respectively). In cowpea higher GFY (94.5 q ha <sup>-1</sup> ) was recorded with application of zinc @ 10 kg ha <sup>-1</sup> Zn SO <sub>4</sub> and application of ZnCl <sub>2</sub> (92.0 q /ha). Crude protein content and crude protein yield were higher with application of sulphur through water dispersible granules.
	Para grass can be grown under waste water irrigation as the establishment percent and green fodder yields were highest in para grass which is much superior to those observed in APBN-1 and guinea grass. The highest dose of NPK i.e., 100 % showed significantly highest green fodder yields in all crops. The crude protein yield was however, highest in lucerne (13.98 q ha <sup>-1</sup> ) owing to its leguminous nature. The effect of sewage irrigation was not observed in quality parameters
	Fodder trees evaluated for quality viz., <i>Albizzia lebbeck</i> , <i>Acacia nilotica</i> , <i>Subabul</i> , <i>Bahaunia variegata</i> , <i>Moris alba</i> , <i>Hardwickia binata</i> , <i>Cordia dichotama</i> , <i>Thespesia populnae</i> , <i>Holoptelia integrifolia</i> , <i>Ficus religiosa</i> , <i>Albizzia saman</i> , <i>Delbergia sisoo</i> and many more trees can be effectively used during lean period by supplementing along with other feed sources.
	The husk of the maize baby corn can also be used as fodder as it contains commendable CP % i.e., 11-12% crude protein (average of first, second and third cobs).
	In rice fallows among the forage legumes studied sunnhemp and Lucerne performed well with GFY of 57 and 46 q/ha, respectively
	The per cent dead hearts due to shoot fly and stem borer was less when sorghum was intercropped with leguminous fodders like cowpea, cluster bean, lablab bean, moth bean, soybean and pillipesara compared to sole crop of sorghum
	Lucerne crop can be protected from pea aphid, spotted alfalfa aphid and rust disease by taking control measures like seed treatment with carbendazim @ 3 gm per kg seed, application of carbofuran 3 G @ 3 gm per meter row and spraying 3 per cent neem seed kernel extract.
	Seed treatment with either neem seed powder @50g/kg of seed or <i>Trichoderma viridi</i> 5g/kg seed followed by spraying of neem seed extract @3% at 30 and 45

	<p>days after sowing was found to reduce the pest and disease incidence in both sorghum and cowpea crops with increased green fodder yields</p>
	<p>Seed treatment with either <i>Trichoderma harzianum</i> @5g/kg seed or <i>Trichoderma viridi</i> @ 5g/kg seed or carbendazim @2g/kg seed or foliar application of neem seed kernel extract @3% will reduce the pest infested plants with flea beetle and aphids along with virus disease to a lower level along with higher yields in cowpea</p>
	<p>The pest and disease incidence in lucerne was reduced when integrated pest management module was adopted followed by spraying of neem seed kernel extract @ 5%. The module in which seed treatment with <i>Trichoderma viridi</i> @ 5g/kg seed , soil application of FYM @5t/ha, spraying of NSKE5% at late winter season and spraying of deltamethrin@ 0.0075%+ <u>carbendazim@ 0.1%</u>during rainy season gave higher yields with lower pest incidence.</p>
	<p>The IPM module consisting of spraying of <i>Bacillus thuringiensis</i> @ 1kg/ha at flowering stage,</p> <p>release of <i>Trichogramma chilonis</i>@1,00,000 parasites/week synchronizing the first release with the appearance of <i>Helicoverpa armigera</i> larvae, spraying of HNPV @ 250 IE/ha, one week after the release of <i>Trichogramma</i> parasites, and installation of bird perches@15/acre and spraying of Mancozeb@0.2% at the initiation of disease was found to be effective in management of Lucerne pest complex.</p>
	<p>The IPM module consisting of transplanting of marigold seedlings 0.5 apart around and inner border of Lucerne field one month after sowing, Seeds of castor sown 3m apart around and inner border area of Lucerne field at the time of sowing, Spraying of NPV and Spraying of endosulfan 0.07% on need based was found to be effective in the management of seed crop of Lucerne against pest complex</p>
	<p>Seed treatment with <i>Trichoderma viridi</i>@5g/kg seed + soil application of FYM @4t/ha, followed by foliar spraying of NSKE @3% at 30 and 45 DAS crop was found to be the effective treatment for the management of sorghum and cow pea pest complex with higher yields.</p>
	<p>Seed treatment with imidacloprid 70 WS @ 5g/kg seed+ carbendazim @ 2g/kg seed followed by foliar sprays of imidacloprid 17.8 SL @ 0.3 ml/l at 15 days interval for the management of insects and alternate foliar spray on mancozeb and metalaxyl + mancozeb @ 2.5 g/lit at 10 and 15 days interval for management of diseases recorded significantly lowest incidence of aphids (5/pt) and flea beetle</p>

	(17%) as against 181/pt and 87% in untreated control at 50 % flowering in cowpea.
	Among four cultivars of sweet sorghum viz., SSV 84, CSV 19 SS, CSH 22 SS and CSV 24 SS were tested for fodder quality and N levels, CSV19SS was most promising with respect to yields and fodder quality. CSV19SS has given highest green fodder yields of 458 q/ha at the 50% flowering, commendable brix and quality in terms of crude protein.
	Green fodder yield and dry fodder yield was maximum when grown in sun while highest GFY was recorded when N is applied at 100% and 125% of state recommendation. The fodder quality parameter viz., Crude protein was significantly more in shade while anti-nutritional factors viz., nitrates and oxalates were also significantly high when crop is grown in shade; however, these concentrations were much below the toxic levels.
	Silage was successfully made in 40 micron thick polythene bags. Silage was well formed even at 45 days. The colour was straw yellow / golden brown in all cases. Ranges of pH were in acidic i.e., 4.18-5.00. When double dose of molasses was used i.e., 4% in sugargraze silage was spoilt with fungus. When left for 6 months all Sugargraze based silage was found to be damaged. Legume when used as additive improved protein content of silage.
	Silvipastoral systems, Bajra Napier hybrid+ <i>Desmanthes/Stylosanthes</i> in the ratio of 3:1 under Subabul is most promising with appreciable green fodder and (509 q/ha/year),dry fodder (108 q/ha/year)and crude protein yields (15 q/ha/year) round the year besides improving soil fertility.
	BAIF bajra is the dual purpose multi cut variety suitable for southern zone. Harvesting of first cut for green fodder at 40-50 DAS and leaving for grain production is proved to be remunerative when dual purpose bajra variety BAIF bajra was grown with higher dose of nitrogen i.e. 150% RDN in food and fodder system

<b>Manipur</b>	Package of production technology for fodder rice bean for cultivation in valley and foothills of Manipur
	Package of production technology for fodder maize for cultivation in valley and foothills of Manipur
	Production package of fodder oat for availability of green forage throughout the winter
	Production package of perennial fodder Napier hybrid for cultivation in valley and foothills of Manipur

<b>Haryana</b>	Inoculation of oat seed with <i>Azotobacter</i> (3 packets/ acre of seed) increased the green fodder, grain and straw yields by 10-12 per cent over uninoculated. This recommendation has been included in the Package of Practices for <i>rabi</i> crops of CCS HAU, Hisar
	After the complete crop sequence (2005-06 to 2009-10) <i>i.e.</i> sorghum-berseem, on the basis of five years' average, the highest sorghum green fodder equivalent was obtained with the use of 50% RDF + 50 % N from FYM (1125.0 q/ha) followed by application of 75% RDF through inorganic fertilizers + 25% N through FYM (1120.4 q/ha). The highest net return of Rs. 31068/ha was obtained from the treatment having 50% RDF + 50% N from FYM followed by application of 75% RDF through inorganic fertilizers = 25% N through FYM (Rs. 30958/ha)
	After the complete crop sequence having Bajra (F)-Mung-Wheat gave highest net income (Rs.17779/ha/yr) in comparison to the traditional crop rotation of the region <i>i.e.</i> Cotton-Wheat (Rs.12714/ha/yr.).
	Seed treatment with carbendazim+thiram @ 2gm each/kg of seed significantly reduced the stem rot incidence in berseem.
	Seed treatment with <i>Trichoderma harzianum</i> +soil application of neem cake @ 400 kg/ha significantly reduced the root rot disease incidence in berseem
	Seed treatment with <i>Trichoderma viride</i> @ 5 g/kg seed significantly reduced the dry root rot in cowpea upto 45.4% and increased the GFY up to 34.8%. However, seed treatment with carbendazim @ 2g/Kg seed (recommended treatment) gave better results (52.0% decrease in dry root rot incidence and 39.5% increase in GFY) than former

<b>Central Zone</b>	<p>Among different forage based crop sequence, Maize (F) + Berseem-Sorghum (F) realized 54 percent higher net return than the most adopted sequence i.e. Soybean-Wheat -Cowpea (G).</p>
	<p>Pearl millet variety BAIF bajra-1 as dual purpose under two cuttings, first at 50 DAS and second at 40 days after first cut for green fodder and left for grain supplemented with 150 % Recommended dose of Nitrogen (RDN) was found most productive and remunerative.</p>
<b>Maharashtra</b>	<p>Application of RDF + 10 tonnes of FYM + Sulphur + Boron + Molybdenum applied to lucerne were superior in fodder yield and quality than RDF.</p>
	<p>Sowing of lucerne under line sowing + regular cutting for green fodder and leaving for seed production in second week of March every year realized seed yield of 2.14 q/ha/year and net monetary returns of Rs.1,05,211/ha/year with benefit cost ratio of 5.59.</p>
	<p>The application of boron @ 4 kg/ha and molybdenum @ 1 kg/ha has given highest seed yield (2.23 q/ha), number of capsules and 1000 seed weight in Lucerne</p>
	<p>In Berseem crop, application RDF + 10 tonnes of FYM + Sulphur @ 30 kg/ha through elemental S + Boron @ 4 kg/ha through Sodium borate + Molybdenum @ 1 kg/ha through Molybdate resulted in highest green fodder yield.</p>
	<p>Planting perennial grass and legume combination with Cenchrus ciliaris + Desmanthus vergatus in 1:1 proportion on ridges and furrow has given highest green fodder yield of 763.11 q/ha/year with net monetary returns of Rs. 55529.21/ha/year and benefit cost ratio of 2.72 under rainfed condition of Western Maharashtra</p>
	<p>Oat variety JHO-822 as dual purpose under cutting for fodder at 70 days after sowing and left for seed recorded highest green fodder, dry matter and crude protein yields of 514.92, 82.96 and 8.96 qha-1 respectively with net monetary returns of Rs. 1,01,924.02 ha-1, benefit cost ratio of 3.31 and maize fodder equivalent yield of 550.80 qha-1. This combination was found to be most productive and remunerative</p>
	<p>Effect of weed management on forage and seed yield of Berseem (<i>Trifolium alexandrinum</i> L.) Application of Oxyflourfen @ 0.100 kg a.i.ha-1 + Imazethapyr @ 0.100 kg a.i. ha-1 in Berseem variety Wardan recorded highest</p>

	green fodder, dry matter and crude protein yields of 343.87, 45.29 and 8.11 qha <sup>-1</sup> respectively with net monetary returns of Rs.1,34,048.47 ha <sup>-1</sup> , benefit cost ratio of 3.43 and maize fodder equivalent yield of 726.79 qha <sup>-1</sup> . The same weedicide combination was recorded highest seed yield of 4.73 qha <sup>-1</sup> , straw yield of 58.67 qha <sup>-1</sup> and weed control efficiency of 80.97 % with lowest weed dry matter yield of 0.49 qha <sup>-1</sup> . This was found to be most productive and remunerative
South Zone	Pearl millet variety BAIF bajra-1 as dual purpose under one cutting at 50 DAS for green fodder and left for grain supplemented with 150 % RDN was found most productive and remunerative

Kerala	Identified the best legume for intercropping in hybrid napier. This technology will help to promote cereal- legume mixture
	Standardised the nutrient schedule for the cereal- legume intercropping system
	The possibility of decreasing chemical fertilizer was also assessed. This technology helps in sustaining fodder production
	Standardised integrated nutrient management technology for major fodder crops and cropping systems
	Identified the suitable crop combinations for different cropping systems of Kerala

Assam Plains	production technologies for Seteria grass and Congosignal grass
	intensive cropping for increased production of forage crops
	Production of forage under shaded condition of tree, a suitable technology for Homestead Agroforestry system
	Intensive Food-Forage Cropping system suitable in respect of productivity and profitability
	<b>Forage based cropping systems in relation to acid soil management</b>

Rainfed area of Chhattisgarh	<p>Rice based cropping system: Under different tillage practices, conventional tillage produced maximum green fodder yield, dry fodder yield and crude protein of oat in rice based cropping system.</p> <p>Nutrient management As regards to nutrient management practices, 100% RDF + Biofertilizer (Azotobacter + PSB) proved superior over rest of the nutrient management practices for green fodder yield, dry fodder yield and crude protein yield of oat.</p> <p>Weed Management : Application of Oxyflourfen @ 0.1 kg ha<sup>-1</sup> +Imazethapyr@0.1 kg ha<sup>-1</sup> Just after 1<sup>st</sup> cut gave significantly higher green fodder yield, dry fodder yield and crude protein yield of Berseem than rest of the treatments except Pendimethalin @0.5 kg ha<sup>-1</sup> +Imazethapyr@0.1 kg ha<sup>-1</sup> Just after 1<sup>st</sup> cut</p>
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	Crop / system
WB, Orissa, MP, Jharkhand etc.	<p>Forage Based cropping sequence:</p> <ul style="list-style-type: none"> <li>• Rice - Fodder Oat - Sesame;</li> <li>• Rice -Fodder Lathyrus- Fodder Moong;</li> <li>• Rice bean- Fodder Oat – Fodder Moong</li> </ul>
WB, Orissa, Bihar, MP, Jharkhand, UP	Sequence wise highest forage equivalent yield and net return was obtained with Rice- Lathyrus (Relay) - Rice bean.
Lowland WB, Assam	Coix around the bunds of rice field
North-Eastern zone	Forage crops, like maize, oats etc.: Highest net return was obtained with GM+25% N FYM+50% NPK +BF.
WB	<p>Forage production potential of maize grown for baby corn and green cob:</p> <ul style="list-style-type: none"> <li>• Maize (baby corn) + Cowpea – Maize (baby corn) – Maize (baby corn + Cowpea gave the highest cob yield, GFY, DMY + CPY.</li> <li>• Maize (green cob) + Cowpea – Lathyrus – Maize (P) + cowpea gave the highest value for the same parameters.</li> </ul>
WB	Zero tillage system: Tillage and nutrient management on productivity of rice – oat cropping system: Zero tillage gave the maximum value of grain and straw yield with the crop rice in <i>kharif</i> season. In rabi season, conventional tillage showed the maximum value with respect to all the parameters of fodder oat. Among the nutrient management, M <sub>4</sub> - 100% RD+BF showed the highest value with all the parameters taken followed by M <sub>3</sub> - 100% RD, M <sub>2</sub> - 75% RD+BF and M <sub>1</sub> - 75% (RD) .