

WEATHER REPORT

The period from Apr 2011 to Mar 2012 recorded a normal weather condition in terms of temperature but a below normal rainfall trend. Following were the variations in weather parameters recorded at Agro-met Observatory, Gori Research Farm, ICAR, Basar (Table1). Two additional Automatic Weather Stations i.e. one under IMD and other under NICRA were established at Research Farm, Gori and Experimental Farm, Bam, respectively.

Table 1 Monthly weather data for the period from Apr 2011 to Mar 2012 and their comparison with normal

Months	Mean max. temp. (°C)	Normal max. temp. (°C)	Mean min. temp. (°C)	Normal min. temp. (°C)	Monthly rain (mm)	Normal monthly rain (mm)	Total rainy days	Normal rainy days
Apr	22.3	22.6	14.6	14.9	84.4	158.6	12	5
May	25.9	25.8	17.7	17.5	222.4	213.3	12	11
June	27.4	27.5	20.2	20.4	225.8	428.4	14	11
July	28	28.1	21.5	21.6	592.1	485.6	21	14
Aug	28.9	28.8	20.9	21.2	269	321.8	8	15
Sep	27.9	27.9	19.8	20	97	317.5	8	20
Oct	26.1	26.3	17	17.4	34.2	132.6	3	21
Nov	23.3	23.5	11.1	11.4	15.4	41.3	2	15
Dec	19.7	19.7	8.2	8.2	27.4	26.4	3	15
Jan	17.1	16.9	6.8	6.8	101.9	48.0	10	8
Feb	17.7	17.4	8.8	8.9	17	84.6	2	4
Mar	20.2	20.1	11.4	11.1	100.5	103.2	10	3
Mean/Total	23.7	23.7	14.8	15.0	1787.1	2361.3	105	142

The mean monthly maximum temperature varied from 17.1°C in Jan to 28.9°C in Aug. The mean monthly minimum temperature varied from 6.8 °C in Jan, 2012 to 21.5 °C in Jul, 2011. Highest maximum temperature recorded for a single day was 35.1°C on 12th Aug 2011, and lowest temperature recorded was 4.8 °C on 13th Jan 2012. Figs 1 and 2 show the variation in mean maximum temperature and mean minimum temperature, respectively, during Apr 2011 to Mar 2012 as compared to normal values.

The total rainfall recorded during Apr 2011 to Mar 2012 was 1787.1 mm which was below normal value of 2361 mm. The total rainy days were 105 which were below normal value of 142 days. Fig 3 shows the monthly rainfall trend.

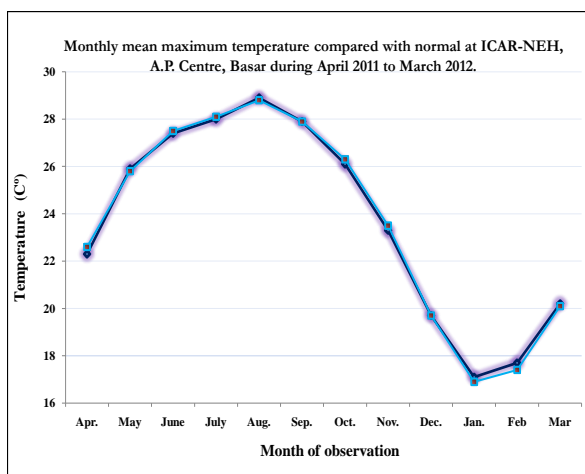


Fig 1 Mean monthly maximum temperature trend compared to normal during Apr 2011 to Mar 2012

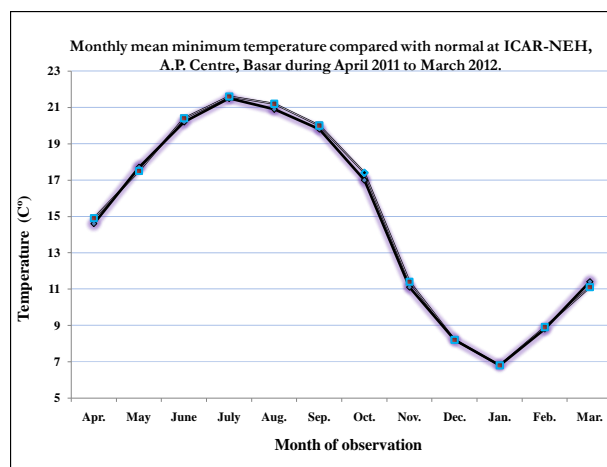


Fig 2 Mean monthly minimum temperature trend compared to normal during Apr 2011 to Mar 2012

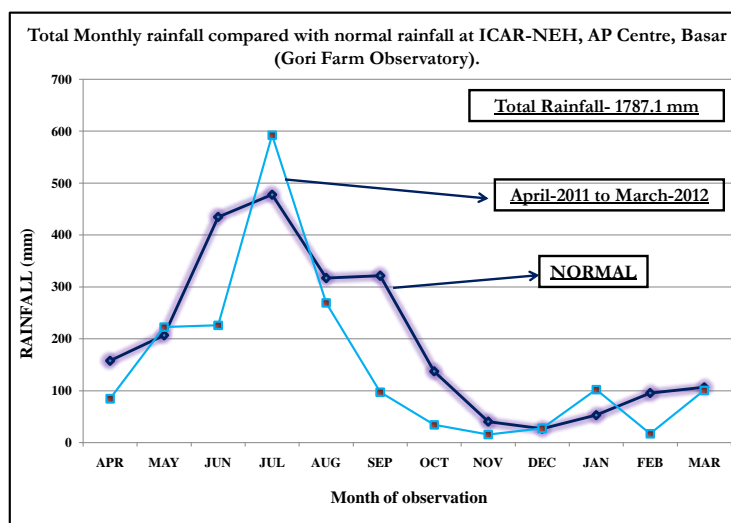


Fig 3 Monthly rainfall trend compared to normal during Apr 2011 to Mar 2012

CROP PRODUCTION

RICE

Evaluation of rice varieties

In lowland, 40 entries were grown. The highest no of panicle/.m² (198) was recorded in RCPL 1-401. In upland, 16 entries were tested. The highest no. of panicle/m² was in IR 46 (160) followed by RCPL 1-412 (140). The highest grain yield was recorded in RCPL 1-128 and RCPL 1-413 (2.0 t/ha) followed by RCPL 1-303(1.8 t/ha). The highest plant height of 148 cm was in RCPL I-147 followed by 120 cm in RCPL 1-473. The highest grain yield was recorded in RCPL 1-1609 (3.2 t/ha) and RCPL 1-303 (2.5 t/ha)

Collection, screening and improvement of *jhum* rice for increasing production and productivity of *jhum* cultivation

Selected 14 local *jhum* rice varieties were grown for study and characterization as per DUS testing guidelines. The highest plant height was recorded in Bamtere (144 cm) and lowest in Amchiri (105 cm); the highest number of EBT/hill was observed in Ampu (9) and lowest in SARS 1 (3); number of panicle/m² was recorded highest in Ampu (65) and lowest in SARS 1 (42). The number of spikelet/panicle was recorded highest in Bali white (203) and lowest in Yabar (80). Similarly, all other 56 characters were recorded for all the 14 rice cultivars.

Residue management for improving soil and crop productivity

Different residue management (Fig 4) treatments viz., 100% crop residues, 100% weed biomass, 50% crop residues + 50% weed biomass, 50% crop residues and 50% weed biomass was assigned to main plot and two fungi i.e. *Trichoderma* and *Pleurotus* were applied in sub plots. Local rice var. *Mipun* was used as test variety for the study. The growth and yield attributes were recorded higher in 50% weed biomass and 50% crop residues along with highest yield of 3.90 t/ha followed by 100% weed biomass (3.79 t/ha). The lowest yield was harvested with 100% crop residues (2.83 t/ha). *Trichoderma* recorded 3.60 t/ha and *Pleurotus* 3.21 t/ha yield.

During the winter, mustard var. TS 38 was sown with same treatment combinations. Among the various residue management practices, 50% crop residues and 50% weed biomass recorded the yield of 1.10 t/ha followed by 100% weed biomass (1.02 t/ha). The lowest yield was recorded when mustard was grown with 100% crop residues (0.84 t/ha). The fungi used as decomposing agents i.e. *Trichoderma* recorded the highest yield of 1.05 t/ha followed by *Pleurotus* 0.90 t/ha.



Fig 4 Rice under residue management

DISEASES

Screening of collected rice germplasm/varieties against rice leaf blast

One hundred thirty four rice entries were screened under uniform blast nursery (UBN) pattern (Fig 5). It was observed only ten entries showed resistance reaction while twenty three entries showed tolerant reaction and one hundred and one entries showed susceptible reaction with moderate disease pressure of LSI 5.5.



Fig 5 Rice under UBN

AICRP on screening nurseries for host plant resistance against leaf blast

Under National Screening Nursery 1 (NSN 1), 171 entries were evaluated in UBN pattern. Disease pressure was low with LSI of 3.98. National Screening Nursery Hills (NSN- H): 79 entries of NSN-H were also evaluated UBN pattern and showed moderate disease pressure with LSI of 3.9.

MAIZE

Evaluation of growth performance and weed dynamics of various intercrop with maize

Maize was intercropped with cowpea, French bean and blackgram at 1:1, 1:2 and 1:5 row proportions (Fig 6). The growth parameters were recorded higher on sole maize. However, the dry matter accumulation/plant, maize equivalent yield (MEY) and land equivalent ratio (LER) were recorded higher on maize/cowpea 1:5 row proportions followed by maize/black gram 1:5. Sole crop was harvested with maize (4.34 t/ha), cowpea (5.15 t/ha), French bean (4.0 t/ha) and black gram (1.28 t/ha). The lowest weed density and weed dry weight were measured on sole cowpea. However, weed control efficiency was recorded highest for sole cowpea followed by maize/cowpea.1:5



Fig 6 Maize/blackgram with 1: 5 row proportion

PULSES

FIELD PEA

Evaluation of field pea varieties against location specific diseases

Four varieties of pea (Fig 7) viz., Azad Pea 1, Arkel, DS 10 and VL 42 were sown on 19th Nov. 2011. Azad pea 1 germinated in 8.3 days followed by DS 10 (9 days). The highest green pod yield was recorded with Azad pea 1 (3.3 t/ha) followed by Arkel (1.6 t/ha). However, lowest yield was harvested from DS 10 (0.6 t/ha). VL 42 took longest time (80.7 days) to get 50% flower, whereas, Azad pea 1 took 54 days. The occurrences of rust and pod rot were noticed earlier in Azad pea 1 followed by Arkel. Similarly, the incidences of rust and pod rot were severe in case of Azad pea 1 followed by Arkel. However, lowest incidences of rust and pod rot were noticed in VL 42.



Fig 7 Screening of pea varieties

BLACK GRAM

Impact of different weed control measures on weed dynamics

Black gram was imposed with different weed management practices, among the various treatments, weed free recorded 1.38 and 3.44 t/ha of grain and stover yield respectively followed by twice weeding at 15 and 25 days after sowing (DAS) i.e. 1.32 and 3.31 t/ha respectively over control (0.77 and 2.19 t/ha respectively). Among the weedicide treatments, pendimethalin and fluchloralin at 1.5 litre /ha were inferior to same chemicals with one additional hand weeding at 25 DAS. Harvest index ranged from 0.26 to 0.32. Among the weed parameters, weed dry weight (WDW) at harvest was nil with 100% weed control efficiency on weed free followed by twice weeding (9.6 g/m² and 83.7% respectively). The highest WDW was recorded in control (59.2 g/m²).

OILSEEDS

TORIA

Evaluation of toria varieties against location specific diseases

Four toria varieties viz., TS 36, TS 38, TS 46 and M 27 were sown at two different dates i.e. on 1st and 15th Nov 2011. It was recorded that TS-36 registered 57.9% higher seed yield followed by TS 46 (12.6%) over M 27. Among the different dates early sowing at 1st Nov recorded 7.40% higher seed yield than sown at 15th Nov 2011. Among the varieties, incidence of alternaria blight was recorded 15.8% lower in TS 36 and TS 46 compared to M 27 and TS 38. However, M-27 was tolerant to white rust. Sowing dates had no impact in incidence and severity of alternaria blight and white rust.

MUSTARD

Effect of tillage and mulches on growth and yield of mustard

Mustard variety TS 38 (Fig 8) was sown in split plot design. Main plots were assigned for tillage viz., conventional tillage, minimum tillage and no tillage and sub plots were assigned for mulches viz. paddy straw, maize stubble, *Imperata cylindrica* and no mulch. The highest yield of 1.21 t/ha was obtained with minimum tillage followed by conventional tillage (1.12 t/ha) and least with no tillage (0.93 t/ha). Similarly, among the mulches, higher seed yield was harvested with maize stubbles (1.24 t/ha) followed by paddy straw mulch (1.21 t/ha). However, lowest yield of 0.84 t/ha was recorded with no mulch. In contrary to yield, weed dry weight (WDW) varied with the imposed treatments and interestingly, no tillage recorded lowest weed dry weight (22.0 g/m²) followed by minimum tillage (24.8 g/m²), however, higher WDW was recorded on conventional tillage (30.0 g/m²). Among the mulches, lowest to highest WDW was recorded with *I. cylindrica* < paddy straw mulch < maize stubbles < no mulch (10.6, 16.5, 17.6 and 57.6 g/m² respectively).



Fig 8 Mustard under minimum tillage

CROPPING SYSTEM

Evaluation of maize-French bean- mustard cropping system under different land configuration and mulching

Four land configuration viz. flat bed; raised bed, ridges and furrow and broad bed and furrow were allotted to main plots and two mulches viz. no mulch and paddy straw mulch (at 4.0 t/ha) were placed in sub plots with three replications. Maize var. RCM 1-3 was sown with above said treatments. It was observed that broad bed and furrow recorded 29.8% higher maize grain yield followed by ridges and furrow (23.9% over flat bed). However, stover yield was comparable to each other. Among the mulches, maize recorded 11.8% higher yield (Fig 9) over no mulch.

After maize, French bean seeds were dibbled with the same imposed treatments. Maize stubbles were used as mulch treatment. The growth and yield attributes of French bean were

highest with broad bed and furrow but were close to ridges and furrow. Green pod yield was highest with broad bed and furrow (3.32 t/ha) followed by ridges and furrow (3.18 t/ha). However, the lowest yield was obtained with flat bed (2.80 t/ha). Broad bed and furrow and ridges and furrow had 18.8 and 13.7% respectively higher yield over flat bed planting. The mulched plot recorded higher growth and yield attributes with higher green pod yield of (3.29 t/ha) over no mulch (2.87 t/ha). It was noticed that mulched plot had 14.4% yield advantages over no mulch.

After harvesting of French bean (Fig 10), mustard (cv.TS 38) was dibbled with the same treatment as for maize-French bean. The French bean stover was used as mulch for mustard. The growth and yield attributes were recorded higher with broad bed and furrow followed by ridges and furrow. The maximum yield was recorded with broad bed and furrow (1.12 t/ha) followed by ridges and furrow (1.01 t/ha). However, lowest yield was harvested with flat bed (0.85 t/ha). Among the mulches, mulch had registered 9.7% higher yield (1.02 t/ha) over no mulch (0.93 t/ha). In all the crops, weed parameters and water contents were measured, it was recorded that method of planting had no significant effect on weed parameters, but among the mulches, weed dry matter was recorded lower with mulched treatments for French bean and mustard. Similarly, moisture content was recorded higher in broad bed and furrow and ridges and furrow over flat. However, mulched plot conserved more moisture than no mulch.



HORTICULTURE

FRUITS

CITRUS

Performance of *khasi* mandarin under drip irrigation and mulching

The experiment was laid out on split plot design. Main plots were allotted for irrigation levels (i.e. L₁: 1.0 Epan through drip, L₂: 0.8 Epan through drip, L₃: 0.6 Epan through drip and L₄: 1.0 Epan with flood irrigation (FI)) and sub plots were mulched (i.e. M₁: No mulch, M₂: Black polythene mulch (BPM; 40 µ thickness), M₃: Transparent polythene mulch (TPM; 40 µ thickness), M₄: Paddy straw mulch (PSM; 20 kg/tree). All the



Fig 11 *Khasi* mandarin with black polythene mulch

growth parameters like plant height stem girth, no. of branches and canopy spread was recorded significantly higher on drip irrigation at 1.0 Epan followed by drip irrigation at 0.8 Epan. However, lower values in flood irrigation. Among the mulches, black polythene mulch (Fig 11) recorded higher growth attributes over other mulch. Yield attributing parameters viz., no. of fruits/plant, fruit weight, fruit girth and fruit volume was recorded highest when plants were supplied drip irrigation at 1.0 Epan along with black polythene mulch with fruit yield of 78 kg/plant. However, lowest yield was in flood irrigation with no mulch (51 kg/tree).

Efficacy of different methods for controlling lichens in *khasi* mandarin

Manual cleaning with 3 different methods viz., hand plucking, cotton cloth cleaning and iron brush, along with the application of *Trichoderma viride* and coltex (2 ml/l) were carried out. Among the six treatments imposed on *Khasi* mandarin to reduce the menace of lichen. It was recorded that the application of coltex along with manual cleaning with cotton cloth has reduced the lichen growth. However, the application of *Trichoderma viride* after cleaning with iron brush was observed to be the least effective. The lichen growth was measured by recording dry weight of lichen.

INSECT PESTS

Pest dynamics in *khasi* mandarin and their effective management under mid hill conditions

Trunk borer and fruit fly was the major insect pest observed during the study. Stem borer can be managed with the application of Bordeaux paste on trunk up to the height of one meter to avoid egg-laying by the female and inserting of kerosene dipped cotton inside the bored hole and sealing it with mud are the effective management practices. To minimize the menace of stem borer tolerant and/or resistant root stocks such as *Tanyum* and Volkamariana may be used to restrict the infestation of trunk-borer. However, manual collection of the trunk borers using hooks and manual killing were also found to be effective. Fruit fly is another major problem, the prophylactic measures viz. collection and destruction (covering in the pit) of the fallen fruits, use of poison baits and methyl euginol pheromone trap can be used to reduce the damage of fruit fly.

PINEAPPLE

Effect of mulching and nutrient application

Experiments with three different mulching materials viz., paddy straw, thatches grass and pine needles at the rate of 4 t/ha and no mulch were conducted in the 3rd week of Sept at Research Farm Gori. Nitrogen was applied with 0, 100, 150 and 200 kg/ha. The growth, yield and weed parameters were recorded, Among the mulch, paddy straw mulch recorded higher yield (1.65 kg/fruit) followed by thatches grass and pine needle (1.35 and 1.18 kg/fruit resp.). However, among the nitrogen levels, highest yield was recorded with 200 kg/ha followed 150 kg/ha. Apart from these, it was also observed that paddy straw conserved more soil moisture followed by thatches grass (*Imperata cylendrica*). However, pine needle was found effective in restricting weed growth.

HDP in pineapple

The 1500 numbers of pineapple suckers and crowns collected from different parts of West Siang district were planted under high density planting (Fig 12) viz., 30x60x90 cm



Fig 12 Pineapple under HDP

(across the slope), 30x45x60 cm (across the slope) and 30x45x60 cm (along the slope) as followed by farmers. The data growth, yield and quality attributes were recorded. The result showed that planting of pineapple in 30x60x90 cm showed better growth attributes like plant height (86 cm), no. of leaves (64), canopy (138 cm) and formed more no. of daughter suckers (4). But it was also observed that man-days requirement for intercultural operations (weeding, manuring, earthing up) were comparatively lower across the slope than the along the slope planting. This method of planting had also advantages of effective controlling of soil erosion and nutrient loss.

STRAWBERRY

Establishment of agro techniques

Strawberry (*Fragaria x ananassa* Duch) runners were imposed three different pruning treatments viz., pruned upto two leaves, four leaves and un-pruned and executed with and without dipping in Bavistin solution (2 gm/l) before transplanted into poly bags. It was observed that pruning upto two leaves along with Bavistin dip treatment showed better survival rate and early establishment followed by four leaves. These plantlets were planted in main field during last week of Dec 2012. Approximately 500 numbers of healthy runners were planted in geometry of 45 x 45 cm in 15 cm raised beds. The runners with the aforementioned pruning treatments were planted in separate beds. The observations taken in the second week of Feb showed that the runners pruned up to four leaves stage were established earlier than other pruned treatments. Similarly, growth attributes such as number of leaves, canopy, no. of flowers etc were also recorded higher with the same treatment.

GUAVA

Integrated Nutrient Management

A field trial was executed with different doses of FYM (3 kg/plant), mustard cake (0.5 kg/plant), vermicompost (3 kg/plant) along with full (60:120:60 g NPK/plant) and half doses of NPK and their combinations. The data on different growth yield and quality attributes were recorded. The result showed that vermicompost along with half dose of NPK showed better growth performance followed by combination of FYM and half NPK. The FYM + vermicompost + mustard cake and full NPK dose showed average performance in terms of growth attributes as well as minimize the fruit drop. However use of mustard cake with half NPK dose was not found effective in terms of growth attributes and fruiting characteristics. It was observed that vermicompost + Half NPK dose recorded highest yield (68 kg/plant) followed by FYM + half dose of NPK (59 kg/plant) while, lowest in Neem cake + half dose of NPK (39 kg/plant).

VEGETABLES

CABBAGE

Effect of different levels of nitrogen, *Azospirillum* and *Trichoderma* on cabbage

A study was conducted in split-split plot design with four level of nitrogen (0, 50, 100 and 150 kg/ha) was assigned to main plot, three level of *Azospirillum* (0, 1.25 and 2.50 kg/ha) was applied in sub plot and *Trichoderma harzianum* was applied in sub-sub plot [with and without root dipping and soil application (5 g/kg of FYM)]. Healthy seedlings were planted in second week of October. Growth and yield attributes were recorded. The crop was harvested thrice with

in an interval of 10 days. The total yield was recorded highest in N₁₅₀:A_{2.5}:T_{RD} (1063 g/ plant) followed by N₁₀₀:A_{2.5}:T_{RD} (994 g/plant) over control.

INSECT PESTS

Study the pest dynamics of cabbage under mid hill conditions

Cut-worms were observed on up to one month old cabbage plants. Infestation were recorded on two varieties (Rareball and Purple) grown in the farm. The infested plants were made on count to estimate the infestation. An infestation level of 32% was found on the variety 'Rareball' while on 'Purple' it was up to 45%. Larvae of *Pieris rapae* were found (1 to 2 larvae/10 plants), infestation was not severe. Flea beetle was also found in some places in farmers' field.

FRENCH BEAN

Performance of French bean under different spacing

A field trial was conducted to evaluate the effect of different in row spacing treatments on the growth and yield parameters of French bean. Nine different spacing (plant to plant) treatments were imposed viz. 5 cm, 10 cm, 15 cm, 20 cm, 25 cm, 30 cm, 35 cm, 40 cm and 45 cm. The row to row spacing was fixed at 30 cm. Before land preparation, 5 t/ha of FYM was applied in the entire area of experiment and recommended dose of NPK/ha were applied at the time of sowing. The highest green pod yield was recorded at the spacing of 15 cm (4.6 t/ha) followed by 20 cm (4.1 t/ha).

COWPEA

Effect of nutrient management on growth and yield

Cowpea variety CP-04 was sown in split plot design where potassium was applied in main plot and phosphorus in sub plot. It was recorded that growth and yield attributes was recorded higher when cowpea was grown with 100% P and K. Similarly, crop was harvested with 4.42 and 12.37 t/ha of green pod and stover yield on 100% P and K over control (2.99 and 7.80 t/ha respectively). From the study it was noticed that as phosphorus and potassium level decreased from recommended dose (60: 40 kg P and K/ha respectively) yield of green pod and stover yield reduced drastically. But, harvest index did not follow any trend and ranges from 0.24 to 0.28.

SPICES

GINGER

Standardization of organic growing of ginger

Ginger was sown during June under six treatments viz., T₁: Vermicompost (VC; 2.5 t/ha), T₂: Poultry manure (PM; 1.25 t/ha), T₃: Swine manure (SM; 3.0 t/ha), T₄: Cow dung manure (CDM; 10.0 t/ha), T₅: Farm yard manure (FYM; 10.0 t/ha) and T₆: Control and replicated thrice to study the effect of applied organic nutrients on growth and yield attributes of ginger. The growth attributes such as plant height, numbers of leaves, leaf length and width, etc. were recorded during the said period and yield attributes like rhizome size, weight, and yield were recorded at the time of harvesting. It was found that growth attributes were higher with VC followed by PM. The highest rhizome yield was recorded from VC (25.5 t/ha) followed by PM (23.4 t/ha) while, lowest in control (15.5 t/ha).

Growth and yield performance of ginger and turmeric under land configuration and mulching

Ginger and turmeric was grown under ridge and furrow (R&F) and flat method, and crops were imposed with three mulches (Figs 13 and 14) viz., Paddy straw mulch (PSM), *Crotalaria* leaf (at 5.0 t/ha) and no mulch. It was observed that the R&F method used water more efficiently than the flat method. However, R&F method of planting recorded 18.4 and 33.0% higher yield (22.18 and 27.36 t/ha, respectively) than traditional flat method (18.74 and 20.57 t/ha, respectively). Similarly, R&F method of planting recorded water use efficiency (WUE) of 16.64 and 20.04 kg/ha/mm, respectively. This clearly indicates that the R&F method of planting used harvested water more efficiently in producing rhizome than the flat method. Among the mulches, higher rhizome yield of ginger and turmeric was recorded with *Crotalaria* leaf mulch 22.65 and 26.90 t/ha, respectively which conceived 28.5 and 34.7% more yield followed by 21.12 and 25.02 t/ha, respectively by paddy straw mulch over no mulch. Similarly, WUE was recorded 17.41 and 20.27 kg/ha/mm, respectively by *Crotalaria* leaf mulch followed by paddy straw mulch (15.69 and 18.14 kg/ha/mm, respectively).



Fig 13 Turmeric with paddy straw mulch



Fig 14 Ginger with ridges and furrow

TUBER CROPS

COLOCASIA

Eighteen cultivars of colocasia was collected and screened and it was observed that growth attributes like, plant height, leaf length, leaf breadth, leaf area, leaf area index did not follow any trend, but yield attributes like, no. of corms, weight of corm, girth and length of corm was higher along with yield (18.5 t/ha) in APTC 5 followed by Muktakeshi (17.4 t/ha). However, least yield was recorded with TRC 1 (10.73 t/ha).

TAPIOCA

Eight varieties of tapioca was collected and screened, it was recorded that growth attributes did not followed and trend among the varieties. However, Sree Rekha has higher yield of 37.6 t/ha followed by H 226 (35.5 t/ha). The lowest tuber yield was recorded in Sree Jaya (28.0 t/ha) followed by Sree Vijay (29.8 t/ha).

SWEET POTATO

Among the eight collected cultivars of sweet potato highest yield attributes and yield was recorded with ST 12 (23.57 t/ha) followed by Sourin (21.60 t/ha). However, lowest yield was with BDSP 13 (9.47 t/ha).

DISCOREA

Nine landraces of Discorea were collected and evaluated the performance. Among these, APTD 1 was recorded higher yield attributes and yield with 23.4 t/ha followed by APTD 6 (21.2 t/ha). However, lowest yield attributes with lower yield was recorded in TRC 1.

ELEPHANT FOOT YAM

Two varieties were screened and it was recorded that all the growth and yield attributes of Gajendra (Fig 15) variety were higher with 52.6 t/ha yield followed by TRCB-1 (42.3 t/ha).



Fig 15 Elephant foot yam cv. Gajendra

ANIMAL SCIENCE

Pig farming practices and adoption level of pig farmers in West Siang district of Arunachal Pradesh

All the circles of West Siang district were surveyed and data were collected by personal interview through interview schedules. The farmers were asked to give their opinion about adoption of feeding practices on four point continuum scale and scores were allotted. The perceived constraints were categorized and based on frequency, ranking was done.

Farming practices

- a. **System of rearing:** The system of rearing depends on the topographic location. In majority of the areas the system of rearing based on scavenging system 87.5% followed by 7.7% semi intensive and 4.8% intensive system. Cent percent of the farmers kept the hog (castrated male) in intensive system.
- b. **Housing:** The housing for pigs depends on the availability of the material in the areas. 95.2% of the respondents prepared *kuccha* house of locally available material and 4.8% cemented type. Flooring material used was 77.3% bamboo, 17.9% wooden planks and only 4.8% made of cement flooring. Majority of the farmers used bamboo (68.42%), followed by wooden planks (26.78%) and cement concrete (4.8%). Dimension of the traditional pig

housing system was average height of the house 1.09 ± 0.389 m, average length 2.53 ± 0.21 m, breadth 1.967 ± 0.02 m.

- c. **Feeding:** Pig feeding is based on the availability of resources like household waste, agricultural byproducts and locally available tubers in the region. 11.9% of the farmer provided stall feeding whereas (88.1%) provided scavenging cum evening ration. Out of 11.9% of the farmers 100% provided stall feeding for fattening purpose. Majority of the farmers provided household waste and locally available feeds (97.6%), out of which major components were constitute rice husk (96.7%), rice brew (68.2%), and wild roots like tapioca, colocasia etc (41.9 %).
- d. **Health care:** It was found that majority of the farmers never did vaccination of their pigs (95.2%). Only 10.1% practiced deworming of pigs using indigenous traditional method. In the study area, majority of the farmers reported heavy mortality of pigs (82.2%) during the month of August to October.
- e. **Breeds:** In the study area the local breeds (99.3%) and crossbred pigs (18.7%) were observed. Cent percent of the farmers practiced natural method of breeding. However, majority of the farmers reported age at first estrus was around 9 months onwards (89.88%) and average litter size at birth was 6.22 ± 0.02 reported.
- f. **Marketing:** Majority of farmers sold 2-3 months old piglets (89.13%) @ Rs 1500 to 2000/piglet, and 62% of the respondent reported their income in between 6000-8000/annum by sale of pigs.
- g. **Marketing channel:** The 78.2% of the farmers reported that they sold their piglets directly to market or customer. For fattener purpose 67% sold their pigs to middle men and finally to butcher and 33% sold directly to the butcher.
- h. **Adoption level of different practices:** During the study, it was found that the highest level of adoption 57.50% in feeding and the least adoption was 12.50% recorded in health practices.
- i. **Constraints**
The major constraints were non-availability of medicine and vaccine (89.17%) and high cost of feeds (87.6%) in the study area.

NAIP

The following *jhum* improvement activities were carried out at eight farmer's field at Daporijo Upper Subansiri district of Arunachal Pradesh.

- a. Soil and water conservation: After harvesting of rice panicle the paddy straw were slashed and spread on ground along with weed biomass grown at site as mulch materials and in-situ fertility maintenance.
- b. Sequence cropping of pea (1.75 ha), French bean (0.97 ha) and soybean (1.40 ha) was done after rainy season crops and harvested with 5.10, 2.10 and 0.87 t/ha, respectively. It was observed that these crops were not only source of income but conserved the soil and improved fertility being leguminous in nature.
- c. The available farm residues along with weeds were kept in pits for preparation of compost and the compost was recycled to crop plants as farmers do not use fertilizers in *jhum* land.
- d. High yielding varieties of cereal (rice and maize), pulses (blackgram), oilseeds (sesame in rainy and mustard in post rainy season) and vegetables (okra, tomato, brinjal, chilli, cucurbits

- like, pumpkin, cucumber, ridge gourd, bitter gourd, sponge gourd and ash gourd) were sown. The additional crop yields from per unit area increased employment of farmers by 30.3%,
- e. *Khasi* mandarin seedlings were planted in *jhum* area but establishment success was 60-65%.
 - f. Integrated weed, insect and disease management was done for poly-culture in *jhum*.

Thus, use of suitable varieties with the little change in existing practice not only helped the farmers to reap additional income but also made better use of land throughout the year with higher employment generation. It was noticed land use efficiency was 79.7% higher than previous land use.

NICRA

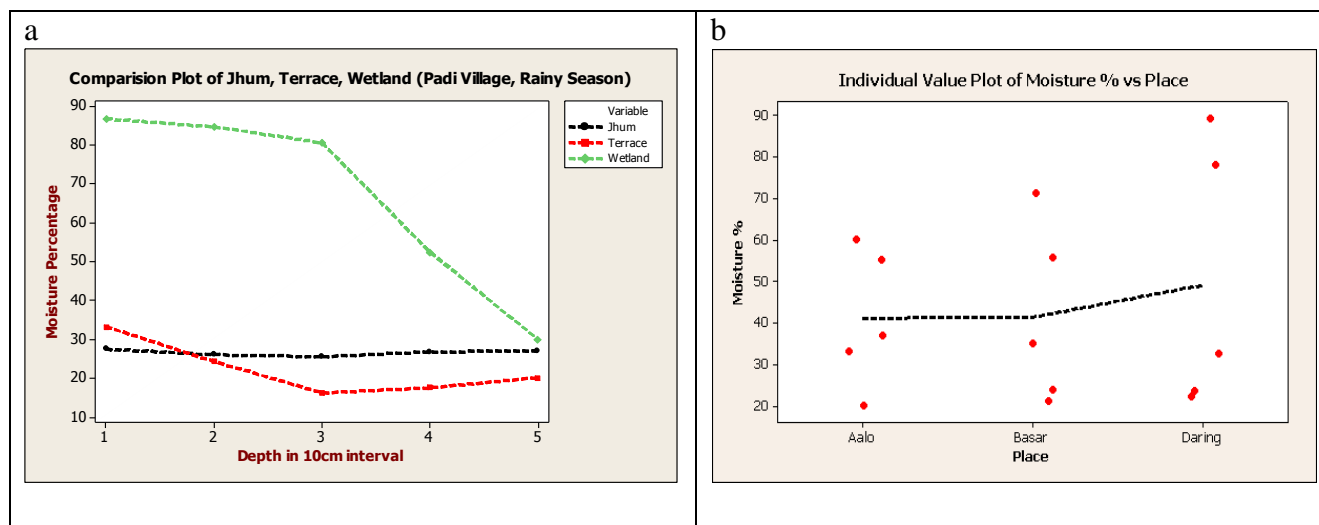
CROP SCIENCES

Effect of tillage and residue management on moisture conservation and carbon sequestration in maize based cropping system

Mustard was sown with three tillage like conventional (CT), minimum (MT) and no tillage (NT) in main plot and residue removal and residue retention in sub plot. The experimental findings clearly depicts that MT gave the seed yield of 0.98 t/ha which were statistically at par to CT (0.95 t/ha). However, the lowest yield was recorded with NT (0.78 t/ha). This is confirmed that MT registered 26.1% higher yield followed by 21.4% by CT over NT. Similarly, residue retention registered higher yield of 1.00 t/ha over residue removal (0.80 t/ha). Residue retention registered 24.8% higher seed yield over residue removal.

Soil moisture wise contingency crop planning to enhance climate resilience in NE Region (lowland/upland/*jhum* land)

The soil samples were collected for four seasons *viz.*, pre-monsoon (Mar-Apr), monsoon (Jul-Aug), post-monsoon (Sept.-Oct) and winter (Dec-Jan). Soil samples are collected from six soil depths *viz.* 10 cm, 20 cm, 30 cm, 40 cm, 50 cm and 60 cm. The comparative analysis of various soil samples collected from different locations with different land-use *viz.*, Upland, *jhum*, WRC and terrace were done (Figs 16 a and b)..



Figs 16 a & b Comparison of soil moisture at different land forms and in different circles of the district during pre-monsoon season.

Identification of Indigenous technology knowledge for soil and water conservation measures.

The information on indigenous soil and water conservation measures in different land forms viz., upland, wetland, terrace, and *jhum* was collected and it was found that conservation measures varied greatly with the land forms.

ANIMAL SCIENCES

PIGS

Morphometric characteristic: The indigenous/*desi* pigs had black coat colour (58.67%) and black coat colour and white strips in the forehead and legs region (41.44%). Cent percent had pointed snout and hoof line and with erected ears (86.67%). During the survey recorded pigs had concave top line (71.66%), bristle length (4-7cm) long (77.66%). Average ear, body length, front girth, hind girth & tail length of piglets were 6.2 ± 0.21 (cm), 41.79 ± 0.53 (cm), 38.38 ± 0.57 (cm), 41.42 ± 0.02 (cm) and 10.72 ± 0.71 (cm) respectively. Average ear, body length, front girth, hind girth & tail length of sow 8.7 ± 0.33 (cm), 67.9 ± 1.32 (cm), 80.3 ± 1.62 (cm), 83.3 ± 1.42 (cm) and 25 ± 0.23 (cm) respectively.

POULTRY

The *desi* bird had varied plumage colour, predominant being black with various shades of brown, comb colour light pink, black eye colour, wattle poorly developed, ear lobe and shank brown colour. Majority of the respondents (69%) reported average egg production was 60 – 70 eggs/year.

IMPORTANT EVENTS

Workshop

One day workshop on ‘Climate Change its Impact and Mitigation Strategies’ was organized at on 6th January, 2012, where 80 participants were attended the workshop.

Brainstorming session

‘Development of agriculture and role of KVKs’ was organized on 5th January, 2012.

Kisan Mela

‘Kisan Mela’ was organized on 7th January, 2012, where 500 farmers of the states were benefited.

Training

Three farmers’ trainings viz., ‘Strategic water management for sustainable production of field crops’, ‘Improving Agriculture Production Through Efficient Water Management’ and ‘Improving Agriculture Production Through Efficient Water Management’ under Scaling up of water productivity in Agriculture for livelihood (SWPAL) Project under Ministry of Agriculture were organized during 09th to 15th Sep, 2011, 6th to 12th Mar, 2012 and 16th to 22nd Mar, 2012 Altogether 150 participants (50 participants/ training) from different circle of West Siang, East Siang, Upper Subansiri and East Kameng attended the trainings. The trainings included lectures,

hands on training and field visits. The resource persons were scientists, subject matter specialists and technical staff of KKV. Then topics covered were; water management on different crops ; rain water harvesting; judicious use of harvested water; climate change and its impact on agriculture; improved methods of farming; SRI; soil and water management in terrace and wet land; post harvest and value addition; role of agromet advisory; role of agroforestry for carbon sequestration; conservation agriculture; contingent crop planning; use of improved varieties; selection of varieties as per topography and weather condition; mulch technology; mushroom cultivation; livestock farming etc. Technologies available at centre were showcased. At the end of the day feed back were collected from participants. It was reflected from the feedback that they were very much satisfied.

A Three days training programme entitled “Integration of different components: its introduction and management under IFS” was conducted from 1st to 3rd Feb, 2012 at Daporijo a project site under NAIP(Fig17-22). Altogether 25 participants from Gusar and Dumporijo circles of Daporijo attended the training.

A hand on training ‘Mushroom production technology’ was conducted at during 1st to 3rd Feb, 2012. Altogether 80 participants attended the training.



Fig 17 Visit to Agro-forestry



Fig 18 Construction proces of *Jalkund*



Fig 19 *Jalkund* with stored rain water



Fig 20 Demonstration of drip cum mulch in *khasi* mandarin



Fig 21 Demonstration of cover cropping (soybean)



Fig 22 Resource persons and participants