

Abstract of Theses

Characterisation of Tank Sediments of Dharwad District

N.R. RAMESH

2002

MAJOR ADVISOR: Dr. GURUPAD N. DANDAGI

An investigation was undertaken to study the physico-chemical properties of tank sediments of selected tanks representing Kalaghatgi, Dharwad, Hubli, Kundagol and Navalgund taluks of Dharwad district and also to study the physico-chemical properties of soils and crop performance in soils receiving tank sediments and in comparison with soils not receiving tank sediments.

The results indicated that the per cent sand, fine sand and silt values were lower in comparison with clay contents in respective tank sediments. The clay content was higher in sediments of tanks in taluks receiving lower rainfall with plain catchment topography.

Tank sediments of taluks with higher annual average rainfall possessed lower values of maximum water

holding capacity, pH, electrical conductivity, cation exchange capacity, total and available phosphorus, potassium, total copper, zinc and manganese. In contrast, these sediments had higher organic carbon, total and available nitrogen, iron, available copper, zinc and manganese. The reverse trend was visible in tank sediments from catchments of lower average annual rainfall.

Practice of addition of silty loam tank sediment to clay soils resulted in increased sand and silt content, bulk density, initial as well as basic infiltration rate and slight decrease in maximum water holding capacity. Chemical properties indicated decrease in soil pH, electrical conductivity and increase in organic carbon, total and available nitrogen, phosphorus, available potassium and micronutrients. Higher average bengalgram yields were recorded in fields receiving tank sediments.

Studies on Soils and their Interpretative Grouping under Distributory No.18 in Malaprabha Command Area

K. NAGARAJ

2002

MAJOR ADVISOR: Dr. G. S. DASOG

A study was conducted to characterize, map, determine land capability, land irrigability, land suitability for crops, land cover map and also the productivity of these soils under distributory No. 18 in Arekurahatti village of agro-climatic zone-8 of Karnataka.

Soils studied were clayey and the clay content increased with depth. The infiltration rate ranged from 0.8 to 1.1 cm ha. The pH was alkaline and EC increased with depth. Organic carbon decreased and calcium carbonate content increased with depth. Calcium and magnesium were the dominant exchangeable cations followed by sodium and potassium. CEC values were high. ESP values increased with depth. The available nitrogen, available phosphorus and available potassium values were low, medium and high respectively. Crop cutting experiments showed that the yields of maize ranged from 40.8-64.6 q ha⁻¹ and wheat from 46.0-58.0 q ha⁻¹, and chickpea yields ranged from 19.0-26.4 q ha⁻¹.

Soil survey revealed that majority of the soils belonged to the order Vertisols and were sub-classified as Sodic Haplusterts and Typic Haplusterts. Eight mapping units were identified out of which five related to Kiresur series, two to Hanchinal series and one to Budihal series. Land capability classification showed that majority of soils belonged to class II followed by class III. Soil irrigability classes were B and C class. Majority of the land was under land irrigability class 2 followed by class 3 with root zone limitations. Soil site suitability for some crops showed that it was both moderately (S_2) and marginally suitable (S_3) for maize, and moderately suitable (S_2) for cotton, wheat and soybean. Land cover map using remote sensing imagery revealed that during rabi, 2001, chickpea had occupied 25.27% of area, 10.04% was covered by wheat and the area with other crops accounted for 10.23%, fallow land occupied 37.69% and other miscellaneous land constituted 16.77%.

AGRICULTURAL ENTOMOLOGY

Evaluation and Utilization of *Nomuraea rileyi* (Farlow) Samson in the Management of Lepidopterous Pests

G.S. SURENDRA

2002

MAJOR ADVISOR: SOMASHEKAR

Evaluation and utilization studies on *Nomuraea rileyi* (Farlow) Samson was carried out at UAS Campus, Raichur during 2000-2001 to know the natural incidence, pathogenicity to different test insects and evaluation under field condition in different crop ecosystems.

Survey conducted in three districts of Region-1 viz., Raichur, Gulbarga and Bidar revealed the existence of the entomopathogenic fungus *N. rileyi* on *S. litura* in Raichur taluk. The highest natural incidence of 74.65 per cent was recorded at Tuntapur village of Raichur taluk. The

natural incidence of *N. rileyi* was not observed in Gulbarga and Bidar districts.

Pathogenicity of *N. rileyi* on lepidopterous pests in laboratory indicated that the cumulative mortality of larvae increased with increase in concentration and exposure period. The fungus was found to be pathogenic to all the six test insect species studied. The highest concentration (1.2×10^8 conidia/ml) caused 66.76 per cent mortality of *S. litura* followed by *H. armigera* (55.36%), *A. janata* (52.94%), *P. gossypiella* (31.50%), *A. modicella* (27%) and lowest in *E. vittella* (26.75 %) after 10 days of exposure period.

Bioefficacy of *N. rileyi* against *H. armigera* was studied under field condition on cotton and bengal gram. The higher concentration of *N. rileyi* (3.9×10^8 conidia/ml) caused 48.48 per cent mortality of *H. armigera* larvae. Efficacy of *N. rileyi* at 26×10^8 conidia per ml was superior over *N. rileyi* at 13×10^8 conidia per ml with grain yield of 1320 kg per hectare compared to 1075 kg per hectare at lower concentration in bengal gram. The efficacy of *N. rileyi* against *S. litura* in mentha was highly impressive by recording the highest mortality of 62.96 per cent. The habitat management seems to be one of the key factors in increasing the effectiveness of *N. rileyi* and its utilization in IPM programmes.

Evaluation of Diflubenzuron 25% W.P. on Cotton Insect Pests, Natural Enemies and Its Integration Plant Protection Schedule

YOGESH GOWDA

2002

MAJOR ADVISOR: Dr. B.V. PATIL

Studies on evaluation of diflubenzuron 25% W.P. on cotton insect pests, natural enemies and its integration in plant protection schedule were undertaken at the Department of Agricultural Entomology, College of Agriculture and Regional Research Station, Raichur.

There was no effect of diflubenzuron at 100 g.a.i./ha on cotton early sucking pests viz., leafhopper, aphids, whiteflies and trips. Diflubenzuron on third instar larvae of *H. armigera* (Hubner), *Eariar vittella* (Fabricus) and *Pectinophora gossypiella* (Saunders) caused cent per cent mortality on fifth, fifth and sixth day after treatment respectively. Similarly diflubenzuron on cotton defoliators viz., third instar larvae of *Spodoptera litura* (Fabricus), *Anomis flava* (Fabricus) and *Sylepta derogata* (Fabricus) caused cent per cent mortality on sixth, fourth and sixth day respectively after treatment. Diflubenzuron on late sucking pests viz., Red cotton bug and dusky cotton bug caused only 35 and 30 per cent mortality respectively.

The effect of diflubenzuron on predators viz., *Chrysoperla*, spiders and coccinellids showed no

significant effect as compared to insecticide. Similarly diflubenzuron had lesser effect on *Trichogramma chilonis* egg parasitoid adult emergence as compared to insecticide.

Dose response studies on diflubenzuron on *H. armigera* third instar larvae ranging from 25 to 200 g.a.i./ha recorded 15 to 90 per cent mortality and attained 50 per cent mortality at 100 g.a.i./ha.

Integration of diflubenzuron at 100 g.a.i./ha in cotton plant protection schedule indicated no significant difference between diflubenzuron integrated treatment and non integrated treatments, against population of leafhoppers, aphids, white fly, thrips *Chrysoperla*, spiders and coccinellids under field conditions. Against cotton boll worm, it indicated that at least two combination application of diflubenzuron at 50 g.a.i./ha recorded significantly lower larvae population, lower bolloworm damage, higher GOB and lower BOB per plant and maximum cotton seed yield as compared to recommended package of practice of plant protection schedules under irrigated conditions.

Survey and Evaluation of Entomopathogenic Nematodes, Against Cotton Boll worm Complex

A.A. MUKESH

2002

MAJOR ADVISOR: Dr. B.V. PATIL

Survey and evaluation of entomopathogenic nematodes against cotton boll worms was carried out at Department of Agricultural Entomology, College of Agriculture, Raichur during 2000-2001 to know the natural incidence, compatibility with selective pesticides and entomopathogens, bio-efficacy and evaluation against cotton boll worm in field conditions.

Survey was conducted in and around Raichur at different agro eco.-systems like Grape, Citrus, Paddy, Brinjal, Cotton and Jasmine fields. The highest nematodes recovery of 27.5 and 22.5 per cent was recorded in grape and citrus fields in Regional Research Station, Raichur, respectively. The nematodes isolated from citrus and grape field was identified as *Steinernema* and *Heterorhadtis* sp.

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Virulence of the isolated nematodes were tested on final instar larvae of *G. mellonella*. *Steinernema* sp. (RC-2) and *Heterorhabditis* sp. (RG-3) recorded 100 and 83.3 per cent mortality at 24 hours and these two strains were used for further evaluation against cotton bollworms.

Dose mortality of the cotton bollworms due to *Steinernema* Sp. (RC-2) were studied and LD₅₀ and LT₅₀ were determined. The third instar *H. armigera* recorded LD₅₀ of 11.6 IJs/Larva and LT₅₀ of 56.4 hours/larva. Similarly fifth instar of *H. armigera*, *E. Vittelina* and *P. gossypiella* recorded LC₅₀ of 80.6, 13.8 and 10.0 IJs/Larva and LT₅₀ of 66.4, 65.7 and 48.7 hours, respectively.

Compatibility of *Stinemema* (RC-2) with selective pesticides and other entomopathogens was carried. The result obtained indicated that the pesticides showed varied reactions. Pesticidea like cypemethrin at 0.05 per cent, monocrotophos at 0.1 per cent, carbendazim at 0.1 per

cent, chlorpyripho at 0.2 per cent and neem oil at 0.25 per cent recorded 71.3, 66.6, 52.0, 13.0 and 23.3 per cent mortality at 12 hours respectively. Entomopathogens like *B. thuringiensis*, *HaNPV*, *B. bassiana* and *N. rileyi* proved to be safer at the beginning and registered 30.9, 25.0, 17.0 and 14.3 per cent mortality of nematodes at 96 hours, respectively.

Field evaluation of *Steinernema* sp. (RC-2) and *Heterorhabditis* Sp. (RG-3) alone and with combination of glycerol (0.5 %) or Vijay neem (0.2 %) or *HaNPV* 100 LE and chlorpyriphos (0.2 %) were tested on cotton bollworms. T_s (*Steinernema* sp. (RC-2) 50 million/hectare + chlorpyriphos 0.2 % + glycerol 0.5%) recorded less per cent of bad opened bolls and square damage and highest number of good opened bolls and seed cotton yield as compared to all other treatments. This was followed by Ts; (*Steinernema* sp. (RC-2) 50 million/hectare + Vijaya neem 0.25 % glycerol 0.5%).

Survey and Management of Brinjal Pests With Special Reference to Biology of *Leucinodes orbanalis* (Guen.)

V. ANAND KUMAR

2002

MAJOR ADVISO: Dr. A. NAGANAGOUD

Studies on the survey and management of brinjal pests with special reference to biology of *Leucinodes orbanalis* (Guen.) was carried out at college of Agriculture, Regional Research Station, Raichur- 584101 during 2000-2001. Results of roving survey on the insect pests status in three districts, (Raichur, Gulbarga and Bidar) covering different locations of North Eastern Dry Zone revealed the highest shoot and fruit infestation in Raichur (20.09%) and Bidar (31.03%) districts respectively. The highest whitefly and mites population was recorded in Gulbarga and Bidar with 5.17 and 31.73/leaf respectively.

Fixed plot survey during different months indicated maximum and minimwn shoot infestation in September and November with 21.50 and 10.22 . per cent respectively. Highest fruit infestation was observed during October (38.39 %) with a lowest during February (1 6.64%). the biology of *L. orbanalis* revealed the mean incubation period of 4.12 days. The first, second, third, fourth and fifth

larval instars lasted for 1.40, 1.82, 2.15, 2.72 and 3.47 days respectively, lasting for an average larval period of 11.45 days. The average pupal period of male and female lasted for 7.35 and 7.75 days respectively. Adult female lived longer (5.20 days) compared to males (2.65 days) with an average fecundity of 170.65 eggs. The mean total life cycle of male and female lasted for 22.0 and 24.5 days respectively.

Among all the new molecules of insecticides tested, spinosad excelled by recording lowest mean shoot and fruit infestation of 10.77 and 9.95 per cent respectively, with a maximum marketable fruit yield of 382.14 q/ha. The overall mean whitefly population was least in plots treated with difenthiuron at 875 g/ha (3.22 immatures and 5/52 adults/leaf and imidacloprid at 250 ml/ha (3.51 immatures and 5.03 adults/leaf). The overall mite population was lowest in difenthiuron treated plot @ 875 g/ha with a population of 12.38 /leaf.

SERICULTURE

Studies on Rearing Performance of New Bivoltine Breeds of Silkworm, *Bombyx mori* L. on Improved Mulberry Varieties

RAVINDER

2002

MAJOR ADVISOR: S.G. RAYAR

The studies on the rearing performance of CSR-18 and CSR-19 breeds on improved mulberry varieties were

conducted at Department of Sericulture, University of Agricultural Sciences, Dharwad during summer and pre-

rainy season. In both the rearings CSR-18 and CSR-19 breeds performed better than NB₄ D₂ in most of the economic traits. Among the breeds, the performance of CSR-19 was superior in chawki larval weight, full grown larval weight, fifth instar larval duration, total larval duration, silk productivity, cocoon weight, cocoon shell weight, cocoon shell ratio, number of cocoon per kg, cocoon yield per 10,000 worms, cocoon filament length, pupal weight, pupal duration, moth emergence, flacherie incidence. Whereas, CSR-18 was superior in effective rate of rearing, per cent pupation, pupal duration, fecundity, by recording lower grasserie incidence. Whereas, the fifth instar larval duration was short in NB₄ D₂ as compared to CSR-18 and CSR-19.

Among the mulberry varieties, V-1 fed silkworms produced the highest chawki larval weight, silk productivity, effective rate of rearing, cocoon and shell weight, cocoon shell ratio, least number of cocoon per kg, cocoon yield per 10,000 worms, filament length, pupal weight, per cent pupation, pupal duration, moth emergence, fecundity, hatching percentage and least grasserie incidence. However, S-41 was on par with V-1 in chawki larval weight, silk productivity, effective rate of rearing, cocoon weight, cocoon shell weight, cocoon shell ratio, number of cocoon per kg, cocoon yield per 10,000 worms, filament length, pupal weight, per cent pupation, moth emergence and hatching percentage. S-41 was superior to S-54 and M-5 mulberry varieties. Superior denier was recorded in M-5 fed silkworms.

AGRICULTURAL MICROBIOLOGY

Performance of Ammonia Excreting Mutants of *Azospirillum* in Wheat (*Triticum aestivum* L.)

SRIKANT N. ACHANUR

2002

MAJOR ADVISOR: V.P. SAVALGI

An experiment was conducted to study the performance of ammonia excreting *Azospirillum* mutants inoculated to the wheat. Ten ammonia excreting *Azospirillum* mutants (GWAS-15-3, GWAS-15-7, GWAS-15-9, GWAS-15-20, GWAS-15-21, GWAS-15-23, GWAS-15-26, GWAS-15-51 and GWAS-15-56) were selected based on their ammonia excreting capacity and N-fixing ability under lab conditions, which were mutated by previous student. The preliminary screening of these mutants conducted in pot culture experiment and compared with the wild type *Azospirillum* as well as ACD-15 (check). Two mutants (GWAS-15-3 and GWAS-15-7) selected were further inoculated to the wheat crop in field experiment.

The results in pot culture experiment indicated the enhanced plant growth parameters, dry weight of the plant and per cent nitrogen content of the plant due to the inoculation of ammonia excreting *Azospirillum* mutants.

Two mutants (GWAS-15-3 and GWAS-15-7) were selected for further study under field experiment.

In field experiment the treatment inoculated with the mutants GWAS-15-3 and GWAS-15-7 have shown increase in plant growth parameters viz., dry matter of the plant, plant height and number of tillers. The mutants also increased the per cent nitrogen content of the plant, spike length and number of seeds per spike. Inoculation of *Azospirillum* mutants increased the colonization of *Azospirillum* in the rhizosphere and endorhizosphere. Increased plant growth and per cent nitrogen content of the wheat crop influenced the yield parameters. The treatment inoculated with mutants and supplied with 100% N of RD shown the higher yield, whereas the treatment inoculated with mutant along with 75% N of RD was on par with the treatment supplied with 100 per cent N of RD with nitrogen economy of 25 per cent.

Studies on Cyanobacteria and their Inoculation Effect on Paddy

CHHAYA D. SABOJI

2002

MAJOR ADVISOR: Dr. GEETHA SHIRNALLI

A study was conducted to isolate efficient cyanobacterial strains from paddy and sugarcane cultivated soils of Northern Karnataka. Accordingly 18 strains were isolated and identified based on morphological characters which belonged to the genera *Anabaena*, *Nostoc*, *Calothrix*, *Westiellopsis*, *Scytonema* and *Cylindrospermum*. Further characterisation was made with respect to biomass, pigment

production, protein content and plant growth promoting substances. Based on their nitrogen fixing ability the strains of *Anabaena* sp. BGA-A2 and BGA-A3, *Calothrix* sp., BGA-C5 and BGA-C8 *Hapalosiphon* sp. BGA-1-H2 and BGA-H13, *Nostoc* sp. BGA-N14 and strains belonging to *Westiellopsis* sp. BGA-W16, BGA-W17 and BGA-W18 were found to be efficient nitrogen fixers. These efficient strains

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were further tested for their growth and nitrogen fixation in different concentrations of KNO_3 , urea and P_2O_5 . The strains BGA-C5 and BGA-C8 among the *Calothrix* sp. were found to be tolerant to high concentration of KNO_3 and urea. The total bio-mass and nitrogen content of the strain BGA-C5 increased at higher concentration of P_2O_5 and the strains BGA-C5, BGA-C8, BGA-H13 and BGA-W16 were unaffected by medium (RDF) concentration of P_2O_5 . BGA-C5 responded well for P uptake also.

The isolates were mass cultivated and tested for their efficiency in pot experiment using Amrut variety of paddy in terms of yield and yield parameters. These isolates were compared with the standard strains obtained from IARI, New Delhi and TNAU, Coimbatore. It was observed that there was significant difference at 1 per cent in yield parameters of paddy. Regarding the grain yield and grain N, BGA-C5 was on par with 100 per cent N fertilizer and most of them could substitute for 25 per cent N fertilizer.

Study on the Use of Recombinant Human Interleukin -2 (rhIL-2) For Proliferation and Immunoglobulin Secretion by Bovine B- Cells

P. SANGANAGUDA

2002

MAJOR ADVISOR: Y. HARI BABU

Prescapular lymph node collected from cattle of three years age, was used in the study.

Based on the observation of several workers B Cells from lymph node were cultured at the concentration of 3×10^5 cells/ml culture medium. B cells at the concentration of 3×10^5 cells /ml were cultured with treatment of recombinant human interleukin -2 at the rate of 20 units/ml. Culture supernatant was kept for 24-48 hours for incubation for assessing proliferation. Incubation period was extended for 7 days for assessing immunoglobulin secretion.

Proliferation of B cells from the prescapular lymph node was assessed before and after inoculation of rhIL-2 into media. The cell count was enormously increased to 39.55×10^6 cells/ml with rhIL-2 inoculated after 48 hours of inoculation.

Immuno-diffusion test (ID) was carried out to establish presence of secreted immunoglobulins.

The culture supernatant with secreted immunoglobulin was subjected to gel diffusion test and counter Immunoelectrophoresis for the assessment of IgG using anti -IgG. On 5th day itself, precipitation line could be observed indicating the abundant presence of IgG in the supernatant. It was further confirmed on counter immunoelectrophoresis.

Further, culture media with immunoglobulin secretion subjected to radial immuno diffusion for quantification of the immunoglobulin secretion, it was found to be 8.46 mg/ml of culture media.

IgG secreted was subjected to immunoelectrophoresis showed single specific line, suggesting the monospecific nature of the IgG.

Immunoglobulin secreted from B cells were further analysed on SDS-PAGE which revealed, Ig having molecular weight of 150 k Da.

AGRICULTURAL ECONOMICS

Performanace of Organic Farming in Shimoga District of Karnataka - An Economic Analysis

SURESH HUCHHAPPALAVAR

2002

MAJOR ADVISOR: Dr. L.B. KUNNAL

The study was undertaken in Shimoga district of Karnataka, to analyse the economics of organic farming in two major irrigated crops paddy and sugarcane. The multistage sampling technique was employed to select the farmers to get the field level data. The data for the agricultural year 2000-2001 was collected surveying 120 farmers (30 practicing organic farming and 30 practicing inorganic farming in each crop). The techniques of tabular and functional analysis were employed to analyse the data.

About six and four types of organic farming practiced by farmers under paddy and sugarcane cultivation respectively were identified in the study area. The organic farms produced 21.93 per cent higher yield of paddy and 18.10 per cent higher yield of sugarcane over the inorganic farms. The average cost of cultivation per acre of paddy and sugarcane on organic farms were Rs.8,509.52 and Rs.18,487.97 as against Rs.8,784.72 and Rs.19,193.31 on inorganic farms respectively. The per acre gross returns

from paddy and sugarcane on organic farms were higher compared to that on inorganic farms with a positive net returns on both categories of farms. The returns per rupee spent in paddy and sugarcane production were Rs.2.06 and Rs.2.04 on organic farms, respectively and Rs.1.61 and Rs.1.71 on inorganic farms respectively. The functional analysis revealed that, the MVP to MFC ratios were greater than one for bullock labour and seeds on organic farms of paddy and for plant protection chemicals and seeds on inorganic farms of paddy. In sugarcane cultivation this ratio was more than unity for FYM, organic fertilizers, plant protection chemicals and human labour on organic farms and for chemical fertilizers, plant protection chemicals and

seed on inorganic farms. Hence there scope for using additional units of these inputs to increase gross income. The mean technical efficiency of inorganic farms (85%) was comparatively less than that of organic farms (89%) in paddy production. The average technical efficiency of organic farms (88%) was marginally higher than that of inorganic farms (84%) in sugarcane production. The output of paddy and sugarcane on an average could be increased by 11 to 12 per cent and 15 to 16 per cent on organic and inorganic farms respectively by following the practices of most efficient farmers. Non-availability of required quantity of organic fertilizers, lack of technical knowledge and high cost of transportation were the major problems faced by the farmers in the study area.

Economic Analysis of Post - Harvest Management of Fruit Crops in Bijapur District

C.N HARISHA

2002

MAJOR ADVISOR: Dr. R.S. PODDAR

Karnataka is one of the progressive states of Indian with great potential for fruit crops development. Among the different districts in the state Bijapur is known for production of best quality grapes, lime and pomegranate. A large quantity of fruits is lost because of lack of scientific post-harvest management practices. Present study was conducted in Bijapur district to know the economics of post harvest management of grapes, lime and pomegranate. A multistage sampling procedure was adopted for the selection of samples. Data collected were subjected to growth rate analysis, tabular analysis and regression analysis.

Growth rate analysis with respect to area, production and productivity of lime, pomegranate, grape and total fruits showed positive growth. There were substantial differences in prices of fruit depending upon

the grades. Grade-1 fetched highest price as compared to other grades in all the fruits crops. The producers' share in consumers' rupee was very low and the share of market intermediaries very high. On an average farm, the post harvest losses in lime, pomegranate and grape amounted to Rs.6,714, Rs.3,552 and Rs.24,461. The per farm post harvest management cost of lime, pomegranate and grape was Rs. 15,768, Rs. 1,44,515 and Rs.79,962, respectively. Results of the study suggested that grading needs to be popularized among the growers; to increase the share of producers in consumers' rupee direct marketing of the produce in urban areas needs to be promoted through, co-operatives and self help groups or it needs to be taken up by an agency like APEDA; to reduce on-farm losses zero energy cool chambers should be popularized among the growers. Since there was no processing of lime or pomegranate processing industries need to be developed.

An Economic Analysis of Cropping Systems in Bidar District of Karnataka

BOGALE SANDEEP

2002

MAJOR ADVISOR: Dr. B.L. PATIL

The focus of the present study was on an economic evaluation of the cropping system in Bidar district. A sample size of 120 farmers was selected using simple random sampling method. Field level data were elicited for the agricultural year 2000-2001 through survey method. The techniques of tabular and functional analysis were employed. Paddy-wheat, greengram-rabi jowar, greengram-bengalgram + safflower, blackgram-rabi jowar, blackgram-bengalgram + safflower, blackgram + redgram, hybrid jowar redgram, redgram and sugarcane were the nine important cropping systems followed in the study area. Under irrigated conditions the per hectare net profit was found highest in sugarcane cropping system in case of both small

(Rs.52016.06) and large farms (Rs.49217.04) with a benefit cost ratio of 3.36 and 3.12 respectively. Under rainfed conditions the net profit was highest in redgram cropping system in case of both small (Rs. 12595.00) and large farms (Rs. 12491.25) with a benefit cost ratio of 2.40 and 2.34 respectively. The results of the functional analysis revealed that in majority of the cases, the ratio of MVP to MFC was greater than one for human labour, bullock labour, seeds, FYM and fertilizers indicating the scope for using additional units of these inputs to increase gross income. Majority of the farmers (77%) faced the problem of price fluctuations which led to uncertainty of income to the farmers.