Research project proposals for the year 2013-14

For funding under

Rastriya Krishi Vikas Yojana (RKVY)

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Rajendranagar, Hyderabad – 500 030
INTRODUCTION

Andhra Pradesh with a net cultivated area of 109 lakh hectares out of a total geographical area of 278 lakh hectares with a population of 84.66 millions is the fourth largest state in India, geographically. Agriculture is the main stay of livelihood to nearly 65% of the population in the state. However, the contribution of agriculture to the state GDP has gone down from 29% in 1999-2000 to 21% in 2010-11. Growing population, rapid urbanization, shrinking land holdings, depleting natural resources, acute labour shortage, erratic distribution of the rainfall, high cost of the cultivation, lack of market information, insufficient processing and value addition facilities have brought new challenges to agriculture. Andhra Pradesh contributes 7.01% of food grain, 9.75% of total pulses, 6.03% of oilseeds production in the country. The state contributes a major share of production in many of the crops and occupies less than fifth rank in India like Tobbaco (51.99%), Sunflower (31.74%), Groundnut (18.53%), Maize (16.52%), Cotton (13.43%), Rice (11.83%), Gram (11.32%), Jowar (6.52%), Redgram (8.24%), Sugarcane (4.00%). However, the productivity of many of the crops are low compared to highest attained productivity in India. Hence, the present day agriculture research needs good infrastructure, state-of-the-art equipment and facilities combined with participatory technology development and transfer.

Hence the following Project proposals were submitted with the major objective of increasing the yield, income to the farmers and reduce the cost of cultivation for achieving overall growth rate of 4% in agriculture.

PRODUCTION GROWTH PROJECTS

I. Production and productivity growth in major food crops such as paddy, coarse cereals, minor millets, pulses, oilseeds, cotton, sugarcane etc.

The CGR for production of most of the crops has gone down during the 90’s compared to earlier decades. To accelerate the growth, three factors need to be considered; Policy, strategy and technology. The University is playing a major role in technology development with intensified efforts to keep pace with the growing needs and demands. In Andhra Pradesh, about 49% of the gross cropped area is irrigated and 51% of the area is under rainfed condition. Rice is the major crop under irrigated conditions while cotton, groundnut, pulses, castor occupy the major share of rainfed areas. The productivity of these crops is low and stagnated particularly in the last decade due to many constraints as detailed below:
Rice

- Low yields in delayed sowings due to delay in onset of monsoon and late release of canal water
- Grain Shattering
- Low water use efficiency and consumption of large quantity of water
- Lodging
- Non availability of quality rice hybrids

Millets

- Non availability of early and medium duration drought tolerant maize single cross hybrids
- Non availability short Duration Pearl Millet Varieties and Hybrids
- Non availability of high yielding drought tolerant varieties in foxtail millet (Setaria italica L. Beauv.)
- Refined technology for Jowar under Zero tillage in Kharif Rice Fallow situation

Pulses

- Non availability of production and post harvest technology of seed in Soybean
- Standardised agro-techniques to rabi pigeonpea
- Extra Early Short Duration Redgram varieties
- High yielding and extra large seeded kabuli chickpeas suitable for export purpose

Oilseeds

- Promising Sesame Genotypes with export Potential
- Non availability standardised agro techniques for rabi groundnut in Southern Telangana Zone
- Availability of quality sunflower hybrid seed

Commercial crops

- Low yields and non availability of quality seed material
- Suitable varieties and package of practices for cluster bean for gum purpose
To address the above constraints the following projects are proposed

- Development of Package of practices for cluster bean (for gum purpose) cultivation in rainfed Alfisols of Andhra Pradesh
- suitable maize based cropping system for High Altitude and Tribal Zone
- Impact of Organic farming on rabi groundnut, sugarcane productivity, soil health and quality and its’ popularization in Andhra Pradesh
- Evaluation of different organic products on growth, yield and quality of Sugarcane
- Rice production technologies with less water
- Standardization of measures to overcome the ill effects of water logging stress conditions for cotton, maize and sunflower crops of vertisols and improve the productivity
- Production and Marketing of Oyster Mushrooms for increased income
- Seed production of popular varieties of ANGRAU in major crops
- Micropropagation in sugarcane to produce virus free seed material
- Molecular Mapping of QTLs governing Sheath Blight resistance in Rice (oryza sativa l.) and their introgression into BPT 5204
- Development of early and medium duration drought tolerant maize single cross hybrids
- Development of maize hybrids with enriched iron and zinc
- Development / identification of lodging resistant varieties for irrigated rice ecosystem using molecular markers
- Development of multiple resistance rice varieties suitable for cultivation under direct seeding in Andhra Pradesh
- Cold tolerant rice varieties
- Development and popularisation of Extra Early Short Duration Redgram varieties
- Development of nutrient use efficient rice varieties for phosphorous and zinc through biotechnological approaches
- Evaluation, development and identification of high yielding Blackgram varieties / entries suitable for rice based cropping system in rice fallows
- Identification/Development of suitable varieties for rice fallow situation in jowar.
• Sugarcane Seed Production through bud chip seedling development and popularization of mechanization
• Rice hybrids with gall midge resistance
• Development of high yielding and extra large seeded kabuli chickpeas suitable for export purpose and/or mechanical harvest
• Increased income & employment through mushroom cultivation
• Standardization & commercialization of the technology for jaggery powder

Budget for 2013-14: Rs 200.00 lakhs

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Budget for 2013-16: Rs 1244.26 lakhs

Expected output
• Good Hybrids/ Varieties will be available for cultivation
• Availability of suitable varieties for different locations
• Increased availability of breeder seed of popular varieties of ANGRAU
• Value added products
II. Enhancing the productivity of major crops by developing crop varieties for biotic and abiotic stresses through biotechnological approach and associated crop management technologies

Field crops

Rice, cotton, maize, pulses, oilseeds and sorghum are very important crops grown in Andhra Pradesh which have tremendous potential for improving crop yield and quality. The past few decades have witnessed dramatic changes in these crops through conventional plant breeding approaches. In the recent times biotechnological tools have become available to overcome the natural hybridization barriers and introduction of foreign genes to develop transgenic crops. These tools were successfully employed for DNA finger printing of germplasm and varieties. Gene transfer from resistance sources to susceptible varieties through marker aided selection, transfer of polygenic traits through molecular markers and genomic approaches have been the realities in the recent past. Hence, it is proposed to employ these tools for improving the yield and quality in rice, maize, pulses, oilseeds and cotton of Andhra Pradesh. There are some unsolved problems in the above crops limiting the productivity like Botrytis in castor in general in all the castor grown districts of the state and some problems viz., cold in rice in Northern Telangana zone and submergence in coastal region.

In view of the low productivity and the challenges faced in the above crops in Andhra Pradesh, the critical problems have been identified and the projects were proposed with the following objectives.

Specific objectives

- Development of high yielding drought tolerant varieties / hybrids in sorghum with resistance to shoot fly and effective control measures for grain mold
- Development of quality protein maize varieties
- Development of redgram varieties resistant to *Helicoverpa*, wilt
- Development of pigeonpea hybrids
- Development of PSND tolerant groundnut varieties and associated production technologies
- Development of varieties tolerant to *botrytis*, wilt in castor and suitable control measures
- Development of transgenic cotton and associated production technologies
- Development of varieties tolerant / resistant to yellow leaf disease in sugarcane and suitable control measures.
• DNA finger printing of ANGRAU varieties of different crops
• Improvement of blackgram genotypes for YMV resistance through biotechnology approaches

Approach

By employing conventional breeding coupled with biotechnological tools.

Plan of action

• Molecular Characterization of germplasm in the above crops
• Development of SSR markers
• Development of protocols for genetic transformation
• Transformation of the varieties with the desired traits
• Standardization of the production technologies for the varieties

Budget for 2013-14: Rs 72.00 lakhs

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Expected output

• Lines with desired traits will be identified
  - Drought tolerance, sub-mergence tolerance, cold tolerance in rice
  - QPM in maize
  - Drought, shoot fly tolerance and suitable control measures in sorghum
  - Tolerance / resistance to wilt in redgram
  - Tolerance / resistance to PSND in groundnut
  - Tolerance to Botrytis in castor
  - Transgenic cotton
  - YLD tolerance in sugarcane and suitable control measures
  - Blackgram genotypes for YMV resistance
• The identified lines with desirable traits after further testing at different locations will be released as improved varieties for economic benefit of the farmers.

The increase in productivity of the above crops and decrease in the yield loss due to adoption of varieties resistant / tolerant to yield constraining stresses, improved production technologies and effective control measures will increase the production of the above crops contributing to GSDP. Thus there will be overall increase and agriculture growth in the state.

III. Standardization of the crop production technologies for reducing the cost of production and increasing the profitability

In the recent years the cost of production of many of the crops in the state is increasing resulting in negative net returns and making the crop production unremunerative. The following projects are aimed at reducing the cost of the production through management practices, nutrient management and other technologies.

• Nutrient management for pulses and commercial crops
• Yield maximization practices / techniques for major crops
• Improving the dryland productivity through efficient cropping system and farm pond technology

Budget for 2013-14: Rs.28.65 lakhs

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Budget for 2013-16: Rs.60.00 lakhs

Expected output

• Yield maximizing technologies for major crops
• Improving the productivity of dryland crops
IV. Seed Production and storage technology

The University has released good hybrids of castor viz. PCH 111 and PCH 222. The varieties are in great demand. To meet the demand of these varieties it is necessary to increase the breeder seed production to strengthen the seed chain.

It starts with the supply of appropriate varieties and their seed availability to growers. This project develops seed production technology and identifies seed production provenances in the state and understands the physiological and biochemical basis for seed deterioration for enhancing seed storability. This project also imparts the knowledge through training programmes, conducting demonstrations plots to convince the farmers regarding benefits of quality seed usage. The “train the trainers” sessions will demonstrate the principles of genetic identity preservation, seed production, seed storage and quality assessment. Confidence of the farmers will be built to produce, store and utilize high quality seed. Hence, the following projects are proposed.

- Standardization of hybrid seed production technology in pulses viz., pigeonpea, soybean
- Popularisation of rabi castor through large scale hybrid seed production

Budget for 2013-14: Rs. 21.50 lakhs

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Budget for 2013-16: Rs.58.50 lakhs

Expected output

- Seed production technology in hybrid seed production areas of redgram in Andhra Pradesh
• Seed production technology for soybean
• Productivity levels of redgram can be increased which in turn helps the farmers farm income
• High quality seed of castor made available by involving the stake holders

V. Improvement of soil health like efficient quality control of inputs, soil testing and distribution of soil health cards, micro nutrient demonstration, training of farmers for promotion of organic farming including printing of publicity literature or for amelioration of soils affected with conditions such as alkalinity and acidity

The state of Andhra Pradesh is bestowed upon with different kinds of soils, agro-climatic zones and a place of almost all crops of sub-tropical and tropical nature. The food grain production of the state fluctuated between 156 to 204.74 lakh metric tons during 2007-08 and 2011-12. If bad weather conditioned years of 2009-10 and 2011-12 are not considered, then the food grain production of the state is hovering around 200 lakh tons, though better prospects are anticipated in 2012-13.

At the same time, the fertilizer consumption to produce the same level of 200 lakh tons plus has increased from 53.58 to 70.84 lakh tons clocking an increased consumption of about 32 per cent in the last five years (2007-08 to 2011-12) at an average rate of 6.4 per cent. A look into the current soil fertility status of the state reveals that they are generally low in nitrogen, medium to high in potassium, interspersed with sulphur, zinc and iron deficiencies. The emergence of reports of phosphorous accumulation in soils across the state due its highly reactive and low efficiency usage nature has lead to re-think the usage of P-fertilizers in the state. It is estimated that not less than 25 per cent of mandals in the state are registering high status of phosphorous offering vast opportunity not only for curtailing its use but also for maximization of yields of crops, if other fertilizers’ use is optimized. But, in many cases farmers are applying very high doses of fertilizers. Balanced nutrition through soil testing will enhance the fertilizer useefficiency of crops and help in achieving sustainable economic farming. The results of permanent manurial trail of 26 years at Agricultural Research Stations revealed the buildup of phosphorus due to the continuous application of phosphatic fertilizers to rice, groundnut crops. Adoption of soil test based fertilizer application, is the only solution to reverse the trend. Thus, there is an urgent need to re-orient and optimize the fertilizer usage pattern in different crops duly considering the native soil fertility to enhance the productivity of crops. Popularize and demonstrate the optimal fertilizer usage under different soil fertility regimes for yield maximization of different crops and importance of soil test based
With the introduction of high yielding varieties and intensive agricultural management practices, fertility of the soil, physical structure of the soil is reducing affecting the soil health there by reducing the factor productivity.

Solid waste management (SWM) has become a major environmental issue because of serious environmental implications like global warming (through green house gases emission) and contamination of toxic pollutants (like heavy metals) in surface and groundwater bodies. There has been a significant increase in municipal solid waste generation in India in the last few decades. This is largely due to rapid population growth and economic development in the country. Indian cities generate huge amount of solid waste amounting to more than 42 million MT every year.

Composting of Municipal Solid Waste is seen as viable option in urban solid waste management for better utilization of organic waste materials as this process helps in creating a product, at a selectively low cost that is suitable for agricultural purposes. In most cities, solid wastes are dumped and burnt causing considerable environmental pollution. Presently, a very small fraction (8-9%) of the municipal solid waste generated is used for compost production by various public or private enterprises.

In Andhra Pradesh, rice alone occupies 31.7% of the total cultivated area. It is estimated that the production of this vital food grains is 14.24 million tonnes from the cultivated area of 4.39 m ha. Application of fertilizers under rice cultivation is increasing now a days for increased yields. Use of chemical fertilizers alone may not keep pace with time in maintenance of soil health for sustaining the productivity. There is no specific package / under these circumstances it is necessary to standardize the fertilizer recommendations for rice crop in Andhra Pradesh. Present method of rice cultivation is input and labour intensive resulted in increased cost of cultivation with delayed plantings.

In view of the above the following projects were proposed

- Site specific nutrient management for yield Maximization and cost reduction for Important crops of Andhra Pradesh
- Refinement and Popularization of enriched composting and vermicomposting in rice based cropping system
- Production and popularization of Vermi compost
- Training and awareness programmes on importance of soil testing and interpretation of soil test data for input cost reduction by adopting STBF to the farmers and Agricultural Extension Officers
- Environmental Hazard Assessment Of Atrazine Through Residue Surveys in Soil and water
• Development of nano materials based micronutrient formulation for enhanced crop productivity in groundnut and paddy

• Technologies for conversion and use of urban solid waste (compost) as manure in agriculture

• Impact of Musi waste water irrigation on soil quality, crop performance and management in Musi River basin

**Budget for 2013-14:** Rs 115.53 lakhs

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**Budget for 2013-16:** Rs 358.24 lakhs
Expected output

- Efficient recycling of Locally available organic materials thus reducing the expenditure on nutrition and increasing the quality of economic product thereby better market price
- Site specific Nutrient recommendations for major crops
- Technology generated for solid waste management will answer some of the alarming problems like disposal of the huge quantities of municipality waste, besides being beneficial to the farmers
- Increase in the productivity with the use of nano material based micronutrients

VI. Promoting production of organic and bio-fertilizers, organic pesticides etc.

- Biofertilizer production
- Mass production of Biocontrol agents

Budget for 2013-14: Rs 15.00 lakhs
Budget for 2013-16: Rs 42.25 lakhs

Expected output

- Supply of low-cost bio-fertilizer, bio agents in sufficient quantities to meet the demand

VII. Promoting extension services like skill development and training to the farming community and organizing study tours of farmers to places of interest to them, especially to research institutions etc.

The University is developing varieties and technologies every year which are to be popularized among the farming community to increase the productivity and reduce the cost of cultivation besides optimum use of resources. The extension and farmers are to be trained on these technologies. Hence the following projects are proposed

- Training master trainers for extension personnel in agriculture
- Training the farmers

Budget for 2013-14: Rs 39.23 lakhs

Expected output

- Updated knowledge to department of agriculture officials and farmers
VIII. Pest surveillance and for promoting integrated pest management which may include training of farmers through FFS etc., on pest management practices, printing of literature / other awareness programmes

Andhra Pradesh (10.95 per cent) is the fourth largest producer of redgram in the country. In traditional growing areas of the districts, the productivity levels are very low and main reasons is due to water scarcity and pest infestation particularly of spotted pod boerr and *Helicoverpa armigera*. Moisture stress and sudden drop in temperature coupled with frost and foggy weather during the pod development stage, and terminal drought leads to yield reduction and instability in production. Limitation to the increasing productivity of pigeonpea is also due to biotic stresses prevalent across the pulse growing regions. Among biotic stresses diseases viz., wilt, sterility mosaic and foliar diseases and insect pests feeding on pods lead to significant yield losses. Climate change is expected to trigger changes in diversity and abundance of arthropods, geographical and temporal distribution of insect pests, insect biotypes, herbivore plant interactions, activity and abundance of natural enemies, and efficacy of crop protection technologies. By the Pest surveillance programmes, the population dynamics and the key natural mortality factors operating under field conditions can be known which in turn helps in devising the appropriate management strategy. Further, mapping of hot spots of pest populations by using GIS technology, we know where they are and we can work more efficiently and achieve enhanced control with reduced effort.

Timely and efficient monitoring of pests is the fundamental tool and foundation of sound IPM programme for proper pest management. Poor decisions can lead to the overuse of pesticides to control potential pests. It deals with changes in insect distribution and abundance and lead to build up of several biotic and abiotic factors. New tools and techniques for pest diagnostics and monitoring are now available to assist in making appropriate pest management decisions. The decision on whether and when to follow control measures is based on the information available on the pest population at a particular time.

Storage of the seed particularly pulses is the major challenge to farmers as the pulses seed prone to storage pests affecting the germination. Dessicant bead technology using zeolites and storing the seed in airtight containers maintains low moisture content and protects the seed from damage by stored insect pests by restricting their multiplication and can maintain the viability of seed for longer times. Dessicant bead technology is a simple, relatively inexpensive since the beads can be reused indefinitely and much work has not been done on the use of zeolite beads to control stored insects. Standardization of this technology is essential for effective control of storage pests.
PGPR used for the beneficial of agriculture is gaining world wide acceptance and viewed as a novel potential tool for providing sustainable benefits to the agriculture. These beneficial, free-living bacteria enhance emergence, colonize roots, stimulates growth and enhances yield. Fluorescent pseudomonads are often considered as predominant bacteria in rhizospheric and have received particular attention as potent biofertilizing and biocontrol agents. These bacteria possess diverse metabolic abilities that enable them to utilize a wide range of organic compounds while occupying different ecological niches. Biocontrol through antagonistic microorganisms is a potential alternative to chemical compounds for crop protection against phytopathogens.

The scope of developing biopesticides for commercial pesticides as an alternative to chemical fungicides is gaining importance due to increased concerns on environmental pollution, pathogen resistance and high plant protection costs. So there is an urgent need to identify and select the well characterized microbial strains with antagonistic activities against a wide range of phytopathogenic fungi. The metabolites of which may represent precious biological alternative for harmful pesticides and chemical fertilizers application in agriculture fields due to crucial role of PGPR to plant health maintenance and soil fertility. Biological pesticides have the potential to replace or augment conventional plant disease (wilt) management which makes use of synthetic pesticides.

*Trichogramma chilonis* belongs to the category of egg parasitoid of biological agents. This parasitoid is effective in suppression of lepidopterous pests, attack on egg stage of the pest and lance damage done by larvae is avoided. Utilization of *Trichogramma* is environmentally safe, ecologically feasible, low cost technology and fits in IPM for shoot borers in sugarcane as an important component, as they are target specific & no harmful residues compared with chemical pesticides. Release of *Trichogramma chilonis* is an important component in sugarcane IPM against shoot borers. Field release of *Trichogramma chilonis* @ 50,000 populations / ha for four times at an interval of 7-10 days commencing from 30th day after planting reduce the incidence of shoot borers in sugarcane. This parasitoid has diverse habitats and amenable for mass production and field release for pest control once these bio-agents are introduced in the field to build their population, they are capable of bringing down the targeted pest population below economic threshold level (ETL). However, the crue lies in their mass production and application (field release) at the appropriate time and avoid the use of pesticides in the field *Trichogramma* are released.

The study on sustainability of *Trichogramma chilonis* at field level for the management of shoot borers in sugarcane agroecosystem, identifying abiotic stress tolerance in field populations , developing strains of *Trichogramma chilonis* adoptable to adverse weather conditions and enhancing the production attributes to meet the demand for large scale production of trichocards is needed.
Spodoptera litura is the major problem in groundnut affecting the yields. Suitable control strategy for managing resistant Spodoptera litura population in groundnut is essential so that the consumption of pesticides will be reduced by the farmers.

To address the above problems the following projects are proposed

- Survey and surveillance of pests and diseases of redgram and advisory system
- Mass multiplication of egg parasitoid, Trichogramma chilonis, for control of early shoot borer in sugarcane
- Development of plant growth promoting rhizobacterial formulations for the management of plant diseases
- Integrated management of stem rot and dry root rot diseases of groundnut (Arachis hypogaea L.)
- Development and Demonstration of Integrated Management of Insecticide resistant larval populations of tobacco caterpillar, Spodoptera litura in Groundnut
- Biological management of pulse beetle in chickpea during storage
- Enhancing the production attributes of Egg parasitoid Trichogramma chilonis
- Development of management strategies for Rhesus

**Budget for 2013-14:** Rs. 39.68 lakhs

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**Budget for 2013-14 to 2015-16:** Rs. 304.54 lakhs

**Expected output**

- Awareness and knowledge about the pest surveillance, forewarning
- Plant growth promoting rhizobacterial formulations with increased shelf life and broad spectrum of action with consistent performance under field conditions for commercialization
IX. Standardization of the environment friendly crop protection technologies for reducing the cost of production, increasing the profitability

The cost of production of many of the crops is escalating due to increased cost on human labour, pesticides, fertilizers etc., making the cultivation unremunerative with negative returns. The following projects are aimed at reducing the cost of production through development and popularization of integrated pest management strategies besides mass production and supply of potential bio-agents.

Forecast and forewarning of the pests and disease infestation will reduce the pesticide usage besides increasing the productivity. Hence the following projects are proposed.

- Weather based forewarning systems
- Development and popularization of integrated pest management for cotton, rice and pulses
- Development of blast resistant high yielding finger millet varieties using molecular markers

Budget for 2013-14: Rs.22.16 lakhs

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Expected output
- Weather based forewarning systems
- Cost reduction through IPM
- Markers for blast resistance in finger millet

Budget for 2013-14: Rs.69.50 lakhs
X. Water Management

Although water is a renewable resource, its availability in appropriate quality and quantity is under severe stress due to increasing demand from various sectors. Agriculture is the largest user of water, which consumes more than 80% of the country’s exploitable water resources. The overall development of the agriculture sectors and the intended growth rate in GDP is largely dependent on the judicious use of the available water resources. The availability of water for agriculture sector may reduce to about 10-15% due to increase in use by other sectors such as industries, power and domestic use. Advanced methods of irrigation applying water and nutrients to crops, controls or minimizes the water losses due to deep percolation and evaporation leading to the high water use efficiency. The following projects are proposed for standardizing the technologies for efficient water management and popularizing the technologies. Hence the following projects are proposed.

- Development and demonstration of efficient designs of drip fertigation systems and micro irrigation systems for different crops
- Sub surface drip irrigation & fertigation management in sugarcane

**Budget for 2013-14:** Rs. 5.75 lakhs

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**Budget for 2013-14:** Rs. 19.00 lakhs

**Expected output**

- Standardized drip and micro irrigation schedules for different crops
- Awareness among the farmers on drip irrigation for different crops
- Enhanced water use efficiency

XI. Farm mechanization

An appropriate agricultural mechanization targets for increasing production, productivity and profitability in agriculture by through timely farm operations, brings
precision in agricultural operations, increases utilisation efficiency of inputs and reduces the drudgery in operation.

Several improved agricultural implements/machinery are available commercially in India. Suitability of commercial agricultural machines/implements needs to be evaluated before popularizing in a particular region. Selection of a machine/implement is governed by the crop properties and soil physical characteristics that are changeable during crop growth and weather conditions.

The following projects are proposed with an objective of identifying suitable improved machinery for different operations and popularization.

- Standardization and popularization of System of Sugarcane Intensification
- Development and evaluation of tractor PTO operated farm yard manure pulverizer cum distributor
- Demonstration of equipment and training of farmers in complete mechanization of groundnut

**Budget for 2013-14:** Rs.13.80 lakhs

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Rs in lakhs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurring</td>
<td></td>
</tr>
<tr>
<td>Cost of inputs etc.</td>
<td>: 8.00</td>
</tr>
<tr>
<td>Cultivation expenses towards labour wages, technical assistance etc.</td>
<td>: 5.80</td>
</tr>
</tbody>
</table>

**Budget for 2013-14:** Rs.113.80 lakhs

**Expected output**

Popularization of farm machinery in rice, groundnut, sugarcane

**XII. Home Science**

**ICT mediated extension services for dissemination of quality life technologies**

ICT is a mass communication approach. Hence it has the capability of bridging the gap in technology dissemination systems. Any ICT intervention that improves the livelihoods of poor rural families is likely to have significant impact both direct and indirect, on enhancing agricultural production, marketing and post-harvest activities – which, in turn, can contribute further to poverty reduction.

Interactive video, digital signage, blogs, mobile messaging – SMS & MMS, E-mail, talking books etc. are some of the tools of ICT approach. All these tools
facilitate self learning do have personalized interaction, to draw the attention of the targeted audience to message in visual and audio form. Though interactive CDs are limited to formal teaching, SMS, MMs, blogs, e-mails are being widely used to send messages. Some NGOs are sending market prices of horticultural products soon after auction early in the morning. SHG members are receiving messages about some special meetings or VIP visits or directions from concerned organizations. The feedback evidently shows their impact.

Messages of quality life, like water safety, fuel safety, ergonomics, health and nutritional security etc., through SMS and MMS, blogs may also have valuable impact. Many such quality life technologies are developed by the Home Scientists through student as well as ad-hoc research to empower the knowledge and skills of farm families especially farm women and children. But their dissemination is limited only through KVKs, that too in respective adopted villages. In spite of knowledge and service availability, the demographic and geographic coverage is negligible. Hence there is an immediate need to disseminate messages of quality life technologies at mass level through ICT system.

**Budget : Rs 4.25 lakhs**

<table>
<thead>
<tr>
<th>Particulars</th>
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</thead>
<tbody>
<tr>
<td>Recurring</td>
<td></td>
</tr>
<tr>
<td>Cost Towards multimedia development and communication etc.</td>
<td>2.25</td>
</tr>
<tr>
<td>Technical assistance etc.</td>
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</tbody>
</table>

**Expected output:**

- ICT tools and technology dissemination system
- Quality life standards
- Income generation through custom hiring
Up scaling of value added products of millets through development of enterprises and establishing market linkages

Justification

Growing awareness of nutritional value of the coarse cereals such as Jowar, bajra and ragi etc has made these grains more popular among the prosperous Indians, driving prices higher. These grains are rich sources of many nutrients and some important compounds beyond nutrients offer many health benefits and hence can be used to boost the dietary value. The value addition to millets can range from simple roti to more prestigious pasta and noodles. With growing demand for ready-to-eat, ready-to-cook and ready to serve products, due changing demographics and life styles there is an urgent need to convert millets also into these forms so as to enable the food industry and food entrepreneurs to include millet products in their product mix.

Similarly awareness about the natural dye use in textiles, handicrafts and eco holi colours and paints warrants the large scale production and supply of natural dye besides strengthening the market linkages.

Specific objectives

- To upscale the production of already developed products such as resistant starch rich Jowar rawa, shelf-stable multi grain roti, vermicelli, pasta, flakes and biscuits of various tastes
- Development of ready to eat break-fast cereals using jowar, ragi and foxtail millet
- Fine tuning the bread making technology using jowar and foxtail millets
- Establishing ragi, jowar and foxtail millet processing units in selected locations of Andhra Pradesh

Knowledge and technology available: Millets is an ancient grain and it has been accepted well as a healthy food. Due to its gluten free nature it can be safely consumed by gluten intolerance people.

- The usage of this grain in gluten free products does not require any additional certification for the absence of gluten
- The high dietary fibre, phytochemical content makes it suitable for many life style diseases such as diabetes, cardiovascular Diseases, cancer and hypertension etc thus works like a dietary tool for risk reduction and prevention of these diseases
- The complex carbohydrates present in these grains are slow releasing in nature hence provides more satiety value
• Some coloured varieties of jowar are rich in phytochemicals which can be exploited for novel product production
• Technology for biscuit making, pasta, vermicelli and extruded snacks and roti with extended shelf life are available
• Dye extraction process technology and its application to various products is available in the University

Budget : Rs 6.25 lakhs

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<td>Cost Towards Raw material, chemicals etc.</td>
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<tr>
<td>Labour wages, technical assistance etc.</td>
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</table>

Expected output

• Increased consumption of millets helps the farmer in realizing the remunerative price and production and contributes to risk reduction of lifestyle diseases

INFRASTRUCTURE AND ASSETS

I. Soil nutrient management

Soil Nutrient Management – Primary, Secondary and Plant Analysis Laboratory

ANGRAU requires good infrastructural facilities for soil and plant analysis both for capacity building of students and for farmers and such regional laboratories with the available expertise cater the needs of the farmers in that region

Budget for 2013-14: Rs.24.45 lakhs

<table>
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<th>Particulars</th>
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</thead>
<tbody>
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<td>Non Recurring</td>
<td></td>
</tr>
<tr>
<td>Equipment for soil and plant analysis etc.</td>
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</tbody>
</table>
Expected output

The establishment of this agricultural infrastructure would help in carrying out the advance research in soil science, physiology, agronomy that have bearing in delivering new / refined technologies in crop production, fertilizer use and soil health to farming community and students of the region.

II. Pest management pesticide laboratories

Bio control laboratories

Sugarcane is the major commercial crop of Andhra Pradesh which is prone to many pests and diseases. The university has developed technology for mass production of bio control agents. The proposed laboratories helps in enhanced production of these bio control agents which is in high demand both from farming community and sugar factories which enables in improving the quality of Juice, Jaggery

Budget for 2013-14: Rs.34.82 lakhs

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<tr>
<td>Recurring</td>
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</tr>
<tr>
<td>Cost of inputs etc.</td>
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</table>

Establishment of incubator facility for bio agents & bio pesticides

Over reliance on the use of chemical pesticides and fungicides in crop protection programmes in our country has resulted in contamination of environment, pest resurgence, pest resistance to pesticides and lethal and sub lethal effects on non – targeted organisms including human beings. These harmful effects have raised public concern about indiscriminate use of pesticides and safety of plant protection chemicals. The benefits of implementing bio-controls can include reduced chemical input costs, reduced on-farm and off farm environmental impacts and more effective sustainable nutrient, pest and disease management. An effective bio-control programme has potential of decreasing inputs of chemicals along with environment impact.

Bio-control agents are now being recognized as growing components in the field of crop protection. Getting greater acceptance of the bio pesticides and fungicides by the farmers may follow to adopt organic farming in food and agricultural and horticultural crops.
Use of these naturally occurring living organisms is one of the safest methods of pests and disease management for long term beneficial effects. But the concept of biological control has been adopted to the desired extent due to non-availability of bioagents in adequate quantities when needed for crop protection. To augment the supply of these materials at affordable prices to the farmers, establishment of Incubator Facility for Bio Agents & Bio Pesticides with its activity extendable to biocontrol labs in different places is necessary.

**Budget for 2013-14:** Rs. 26.00 Lakhs

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<tr>
<td>Recurring</td>
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<tr>
<td>Cost of inputs etc.</td>
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</tbody>
</table>

**III. Seeds**

**Development of Infrastructure Facilities for Enhancing Seed Production and Rapid Spread of Newly Released Varieties in Andhra Pradesh**

Seed is the most important input for enhancing productivity of different crops. Timely availability of quality seed is the primary requirement of the farmers in order to raise the net returns. Acharya N G Ranga Agricultural University has been producing and supplying the quality Breeder seed and to a limited extent, Foundation seed meet the Breeder seed requirements of National and the State (AP) indents in about eighteen field crops. The University has been supplying about 28% of the total paddy Breeder indents at National level. Similarly huge breeder seed indents are being received for the University released Groundnut, Chickpea, Redgram, Soybean and Castor varieties and hybrids which are high volume crops.

The recently released maize hybrids DHM 117, specialty corns like priya and madhuri are in great demand and large quantities of breeder seed indents are coming. The university has taken an initiative to enhance the breeder seed production of maize varieties / hybrids which requires infrastructure for storage and processing.
**Budget for 2013-14:** Rs. 25.00 lakhs

<table>
<thead>
<tr>
<th>Particulars</th>
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<tbody>
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</tr>
<tr>
<td>Seed storage and processing facility etc.</td>
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</tbody>
</table>

**Expected output**

- Strengthening of infrastructure facilities especially storage facilities, processing equipment and seed testing laboratory facilities will help in meeting the total requirements of breeder seed production of the released varieties of maize from ANGRAU

**IV. Strengthening of Electronic Wing and information centre**

**Budget for 2013-14:** Rs 17.00 lakhs

The Electronic wing of University is involved in printing of publications in vernacular language with good photographs for easy understanding of farmers and mass communication through electronic and print media. Many visitors from other states and within the state are visiting the information Centre of ANGRAU for updating the knowledge. Strengthening of these two centres will help in effective and quality communication to the farming community.

<table>
<thead>
<tr>
<th>Particulars</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Non Recurring</td>
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<tr>
<td>Exhibits, media equipment Etc.,</td>
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### Abstract

(Rs. in lakhs)

<table>
<thead>
<tr>
<th>Contents</th>
<th>2013-14</th>
<th>2013-16</th>
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<tbody>
<tr>
<td><strong>PRODUCTION GROWTH PROJECTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Production and productivity growth in major food crops such as paddy, coarse cereals, minor millets, pulses, oilseeds, cotton, sugarcane etc.,</td>
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<tr>
<td>II Enhancing the productivity of major crops by developing crop varieties for biotic and abiotic stresses through biotechnological approach and associated crop management technologies</td>
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<td>72.00</td>
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<tr>
<td>III Standardization of the crop production technologies for reducing the cost of production and increasing the profitability</td>
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<td>60.00</td>
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<tr>
<td>IV Seed Production and storage technology</td>
<td>21.50</td>
<td>58.50</td>
</tr>
<tr>
<td>V Improvement of soil health like efficient quality control of inputs, soil testing and distribution of soil health cards, micro nutrient demonstration, training of farmers for promotion of organic farming including printing of publicity literature or for amelioration of soils affected with conditions such as alkalinity and acidity</td>
<td>115.53</td>
<td>358.24</td>
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<tr>
<td>VI Promoting production of organic and bio-fertilizers, organic pesticides etc.</td>
<td>15.00</td>
<td>42.25</td>
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<tr>
<td>VII Promoting extension services like skill development and training to the farming community and organizing study tours of farmers to places of interest to them, especially to research institutions etc.,</td>
<td>39.23</td>
<td></td>
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<tr>
<td>VIII Pest surveillance and for promoting integrated pest management which may include training of farmers through ffs etc., on pest management practices, printing of literature / other awareness programmes</td>
<td>39.68</td>
<td>304.54</td>
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<tr>
<td>IX Standardization of the environment friendly crop protection technologies for reducing the cost of production increasing the profitability.</td>
<td>22.16</td>
<td>69.50</td>
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<tr>
<td>X Water Management</td>
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<tr>
<td>XI Farm mechanization</td>
<td>13.80</td>
<td>113.80</td>
</tr>
<tr>
<td>XII Home Science</td>
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<td>25.00</td>
</tr>
</tbody>
</table>

**Sub Total for production growth projects:** 583.80 2367.09
## INFRASTRUCTURE AND ASSETS

<table>
<thead>
<tr>
<th>I</th>
<th>Soil nutrient management - Primary, Secondary and Plant Analysis Laboratory</th>
<th>24.45</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Labs for production of pest control organisms &amp; pesticide residue testing lab</td>
<td>60.82</td>
</tr>
<tr>
<td>III</td>
<td>Seeds - Storage and processing facilities</td>
<td>25.00</td>
</tr>
<tr>
<td>IV</td>
<td>Strengthening of Electronic Wing</td>
<td>17.00</td>
</tr>
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</table>

**Sub Total for infrastructure:** 127.27 2367.09

**Total** 711.07 2367.09