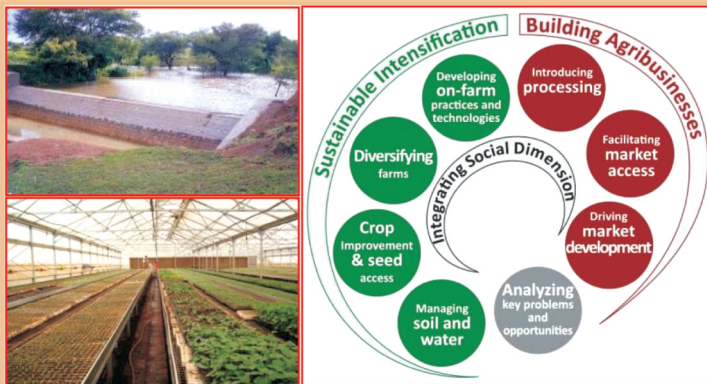




Swarnandhra Vision 2029

A Strategy Paper for Mission on Primary Sector

**Agricultural Transformation in Andhra Pradesh:
Equitable, Scientific, Prosperous and Climate Smart**



Mission Director
Government of Andhra Pradesh



Government of Andhra Pradesh

Hyderabad

Date : 06-10-2014

Website : www.apagri.gov.in



Swarnandhra Vision 2029

A Strategy Paper for Mission on Primary Sector

Agricultural Transformation in Andhra Pradesh:
Equitable, Scientific, Prosperous and Climate Smart

Mission Director
Government of Andhra Pradesh



Government of Andhra Pradesh

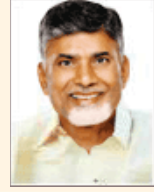
Hyderabad

Date : 06-10-2014

Website : www.apagri.gov.in

Sri Nara Chandrababu Naidu

Hon'ble Chief Minister
Government of Andhra Pradesh



Foreword

Andhra Pradesh State is at a crucial juncture reeling under the adverse impact caused by the state bifurcation which has left number of issues unaddressed. We are confident to convert these challenges into opportunities. We are formulating a broad vision for achieving goals being envisaged through Swarnandhra Vision 2029, which not only guides towards growth, equity and quality of life, but also lays emphasis on happiness of the people. We are planning to utilize the talent available in the Government and also to tap the expertise available outside the Government in our development endeavour.

As a part of our long term vision, we have decided to launch seven missions – Primary sector, Industry sector, Infrastructure sector, Social empowerment sector, Urban Development sector, Knowledge and Skill Development and Service sector Missions. These Missions would help achieve synergy and coherence among related departments for achievement of tangible and critical outcomes in a sustained manner.

As a major deviation from the conventional Business As Usual approach, under the Mission Approach, focus will be on specific inclusive growth promoting large programmes/projects that are in consonance with the Swarnandhra Vision 2029 which require inter-departmental synergy and coordination. A Mission would have a five-year roadmap and investment plan (2014-19) with detailed annual action plans with clearly delineated milestones and outcomes. The performance of the Missions would be monitored through time bound realization of these milestones and outcomes. A Mission would work through and supplement the existing Government departments. The ongoing Government programmes/schemes would continue to be implemented by the concerned line departments under their annual budget provisions.

In the backdrop of a growth performance of 7.32% achieved during the 11th Five Year Plan (2007-12), recording not-too impressive growth rates of 5.58% and 6.08% respectively during these two years. The growth performance looks less impressive, viewed especially in the context of ambitious growth targets set for the 12th Five Year Plan.

Agriculture sector has witnessed greater volatility during the recent past in Andhra Pradesh. The sector which contributed Rs.1,31,019 Crores to the State Domestic Product during 2013-14, is adding nearly Rs.20,000 Crores every year. Despite its falling share in the GSDP, the agriculture sector is employing 62 per cent of its total population. The latest evidence shows that the unorganized sector in India contributes about 45% of the national income and accounts for almost 35% of manufacturing and does a value addition of almost 41% in manufacturing activity. Strategies need to be designed to increase the per person productivity in the agriculture sector and also to effectively utilize the surplus labour through convergence efforts. The Government is keen to address key concerns in this sector to effectively formulate the Mission on Primary sector.

I am indeed happy to learn that the State Government, in particular, Agriculture & departments allied to agriculture are bringing out a document on the Primary Sector Mission in consultation with and utilizing the technical acumen of ICRISAT. The document attempts to design a strategy to transform the agriculture and allied sector, and then to operationalize it in a phased manner. The focus is essentially on (a) increasing productivity of the primary sector; (b) mitigating the impact of droughts through water conservation and micro-irrigation; (c) post-harvest management to reduce wastage; and (d) establishment of processing, value addition capacity and supply chain of identified crops.

I appreciate the efforts put in by the Department of Agriculture and other departments allied to Agriculture and also ICRISAT and congratulate them for bringing out this report in a very short notice, as it not only highlights strategies for key concerned but also underlines the way forward to make agriculture, viable and profitable.

Sri. Nara Chandra Babu Naidu
Hon'ble Chief Minister
Government of Andhra Pradesh

Hyderabad
16-09-2014

Dr. A.P.J.Abdul Kalam
Former President of India



10, Rajaji Marg,
New Delhi-110011



MESSAGE

It is heartening to learn that the newly formed State of Andhra Pradesh has accorded the highest priority to the primary sector and welfare of farmers and the constraints and problems faced by them would be addressed through a Science-led-development .

I appreciate the innovative design envisaged to convert the constraints of the farmers into an opportunity by increasing productivity of crops, mitigating the impact of droughts through water conservation, micro irrigation and post harvest management to reduce the wastage etc.

I am also impressed by the strenuous efforts made by Sri N. Chandra Babu Naidu, Hon`ble Chief Minister of Andhra Pradesh in drafting a bold and dynamic strategy for transforming agriculture and the allied sectors with the technical support of a reputed international agency like ICRISAT as a technical partner.

The action proposed to be taken for soil health mapping through stratified sampling and using GIS would definitely be helpful in a balanced nutrient management at mandal level, while reducing the cost of cultivation. This is a timely step in the right direction.

The vision of Sri N. Chandra Babu Naidu, for bringing about a revolution in pulses and oil seeds production, producing & processing more fruits and vegetables would surely improve rural livelihoods. The focus of the Government on accelerating the pace of farm mechanization would increase efficiency while reducing cost of cultivation. This is a realistic intervention.

I hope this document would frame a vision that would set standard for a new development paradigm in tune with the changed scenarios and Andhra Pradesh will be among the best three States in the country. This is quite laudable.

The Swarnandhra Vision 2029 looks forward to see prosperous and Climate Smart Andhra Pradesh where we would have improved livelihoods.

I have no doubt that under the leadership of Sri N.Chandra Babu Naidu , Hon`ble Chief Minister of Andhra Pradesh, therefore would achieve the goals set for the vision 2029.

My congratulations to him and his team of officers.

A.P.J.Abdul Kalam

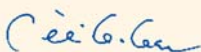


MESSAGE

I am very pleased to note that the new state of Andhra Pradesh has taken a very bold initiative to formulate the primary sector mission for transforming agriculture in Andhra Pradesh through science-led development towards equitable, scientific, prosperous and climate smart agriculture in the state. The visionary leadership of the Honorable Chief Minister Sri Chandra Babu Naidu has enabled the state to blaze a trail to transform the agricultural sector in the state which is supporting the livelihood of 62% of the state population. Andhra Pradesh is a well-known “rice bowl of India”. It is, however, in dire need of help to improve the productivity, production and profitability of the agriculture sector given the vagaries of a climate change regime. To this end, the Swarnandhra Vision 2029, innovative approaches, institutional arrangements to benefit the farmers directly, and the use of new technologies and management techniques are critical success factors. It is gratifying to note that, in addition, the Government of Andhra Pradesh has shown the political will and that the Honorable Chief Minister Sri Naidu has taken the role of a champion of millions of small and marginal farmers in the state to improve their livelihoods. Together, these factors are pushing progress towards reducing vulnerability to the impacts of climate change, transforming agriculture through science-led development, and harnessing the market to benefit small farmholders by adopting an Inclusive Market Oriented Development (IMOD) Strategy.

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), being an international research institute dedicated to help small farmholders in 55 developing countries, is very happy to be associated with this strategy to transform agriculture in Andhra Pradesh through partnership. This strategy paper identifies the critical issues and the key drivers for a strategic development of agriculture in the state. It suggests the essential steps to move towards the development of a robust primary sector in Andhra Pradesh and also clearly indicates how ICRISAT and its various partners can bring in the best scientific knowledge and best practices from around the world. By adopting the consortium approach and bringing together various primary sector players in the state, we are working to achieve this transformation and benefit the farmers more.

The success of this strategy is a small but significant legacy that I shall leave to this land and its people. After all, it has been my home in the last 15 years.

A handwritten signature in blue ink, which appears to read "William D Dar".

William D Dar
Director General

M.S. SWAMINATHAN RESEARCH FOUNDATION



M.S. Swaminathan

Founder Chairman

MESSAGE

Small farmholders in India and across the world are in urgent need of technical help as well as suitable institutional and policy support for improving their livelihoods. I am pleased to note that Government of Andhra Pradesh led by the Hon'ble Chief Minister, Sri. Nara Chandra Babu Naidu has taken-up quick steps and launching a mission for Primary Sector to Transform Agriculture in Andhra Pradesh: Equitable, Scientific, Prosperous and Climate Smart. As Large yield gap exists between the current farmers' yields and the potential achievable yields through science-led development, the existing gap need to be bridged urgently. Subsistence agriculture of small farmholders needs to be transformed into market-oriented profitable agriculture. The primary sector mission which is being launched by the Government of Andhra Pradesh is bringing the convergence amongst the primary sectors like Agriculture, Horticulture, Sericulture, Livestocks, Fisheries, Markets, Agribusiness and Water Resources Sector. The convergence of the primary sectors and various schemes would enhance not only the efficiency of the resource use but also the profitability for the farmers through public private partnerships and value additions. The ICRIAT-led by Dr. Sushas Wani consortium will be providing technical backstopping as well as guidance for effective planning, execution and managing the primary sector mission by the Government of Andhra Pradesh. I am looking forward for the success of this mission as this will be a precursor for transforming agriculture of small farmholders not only in India but in all the developing countries also.

I wish all the success and would extend the guidance as needed for the success of the mission. On this occasion, I congratulate Hon'ble Chief Minister, Sri Chandra Babu Naidu, Senior Administrator in the state as well as the ICRIAT who have put together the strategy paper for the mission.

A handwritten signature in blue ink, appearing to read 'M.S. Swaminathan'.

M.S. Swaminathan

Founder Chairman

MSSRF

Contents

1. Why	1
2. Context	2
3. Critical Issues.....	4
4. Key Drivers	10
4.1 Grow More Food grains in Sustainable Manner	12
4.2 Produce and Process More Fruits and Vegetables.....	16
4.3 Organize Organic Farming Clusters	18
4.4 Support Silk	19
4.5 Harvest Rain Water	21
4.6 Promote Integrated Water Resource Management (IWRM)	21
4.6.1 Groundwater Management	23
4.7 Produce More Meat and Eggs.....	24
4.8 Catch More Fish	28
4.9 Strengthen Agricultural Markets.....	29
4.10 Integrate and Modernize Agromet Advisory Services.....	31
4.11 Rejuvenate Extension System	32
5. Essential Proactive Steps.....	33
5.1 Compulsory Convergence	33
5.2 Towards Digital Green	35
5.3 A Million Jobs to Generate in Primary Sector: Provide Certified Skills ..	36
5.4 Priority for Agri-business	38
5.5 Design Drought Proofing.....	39
5.6 Effective Governance: Policy and Legal Frame	40
5.7 Mobilize Funds	43
6. Role of ICRISAT.....	44
7. Summary	46
References	47

A Strategy for Transforming Agriculture in Andhra Pradesh (2014-2019)¹

1. Why?

The agriculture sector in the newly formed Andhra Pradesh State, popularly known as the “rice bowl of India” is in crisis. Andhra Pradesh has a total cultivation area of 63.54 lakh ha covering rice, oilseeds, pulses, cotton, maize, tobacco, vegetables, fruits, oil palm and others. The productivity of major crops is stagnant in recent years. The cost of cultivation has increased over the last decade, while farmer’s income is not in tune with it. Increased labour cost, out-migration to nearby urban areas and inflationary pressures have added to the miseries of farmers’ livelihoods². Another evidence of emerging crisis is the “Crop holiday” practiced by the farmers of East Godavari district in an area of 85,050 acres during *kharif* (rainy season) of 2011 (GOAP, 2014a). Even cloud seeding in some districts (of united Andhra Pradesh) during 2004-09 by incurring expenditure Rs 127 crores could not yield any tangible results. Further, distress sale of commodities, absence of adequate storage and processing facilities and non-remunerative prices added to miseries of farmers over the years.

To convert this crisis into an opportunity, the Honorable Chief Minister, Government of Andhra Pradesh (GOAP), Sri Nara Chandrababu Naidu has committed to transform the primary sector. As part of the Vision 2029, announced during the District Collectors’ Conference held on 7 August 2014 in Vijayawada, the Chief Minister stressed on: (a) increasing productivity of the primary sector; (b) mitigating the impact of droughts through water conservation and micro-irrigation; (c) post-harvest management to reduce the wastage; and (d) establishment of processing, value addition capacity and supply chain of the identified crops.

Hence, GOAP has decided, first to design a strategy to transform the agriculture and allied sectors, and then to operationalize it in a phased manner.

¹ This Draft was prepared for the Department of Agriculture, Government of Andhra Pradesh (GOAP), by Dr KV Raju, Principal Scientist and Dr SP Wani, Director, both from ICRISAT Development Center, International Crops Research Institute for the Semi-Arid Tropics, Patancheru. The authors are thankful to GOAP and its senior officers for all help and suggestions.

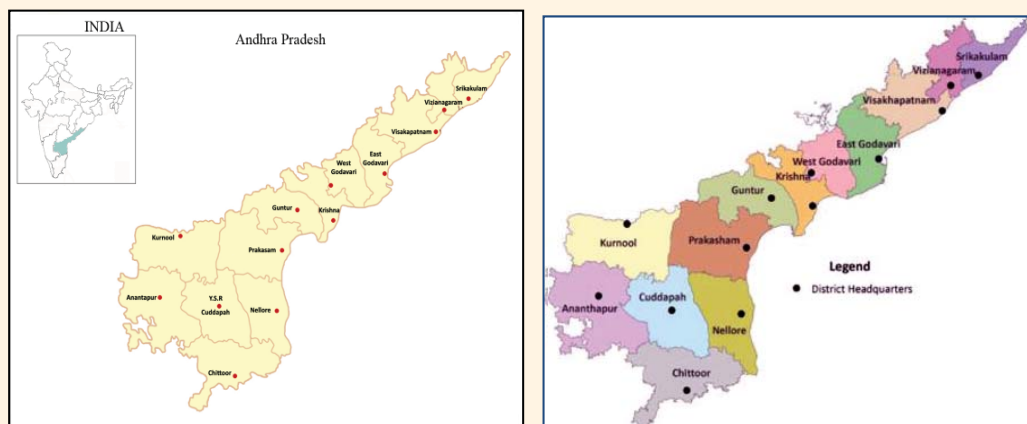
² GOAP (2014a), Agricultural Budget Speech (p. 2) reports that farmer suicides increased from 310 persons during 1994-2003 to 1943 persons during 2004-14.

For this, GOAP, through its Agriculture Department had requested the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to prepare the Draft Strategy Paper for Transforming Agriculture in Andhra Pradesh during the next five years (2014-2019). As a follow-up, the Department of Agriculture had organized a brainstorming session with all the concerned Principal Secretaries, Commissioners, Directors and other senior officers from the State Agricultural Universities and Research institutions on 25 August 2014. The deliberations of this meeting and fruitful discussions with the Special Chief Secretary, Planning Department and Principal Secretary of the Agricultural Department have led to develop this draft paper on the primary sector.

This strategy paper is part of the proposed Vision 2029 of Andhra Pradesh. The government has decided to redraft the Vision 2020 document to frame a vision that will set the standards for a new development paradigm in tune with the changed scenarios to enable Andhra Pradesh among the best three performing states in India by 2022 i.e., 75 years after independence. Determined to move on this vision 2029, the government has constituted seven missions in important sectors of economy, growth and infrastructure. This draft paper with focus on the primary sector is one of the seven missions³.

2. Context

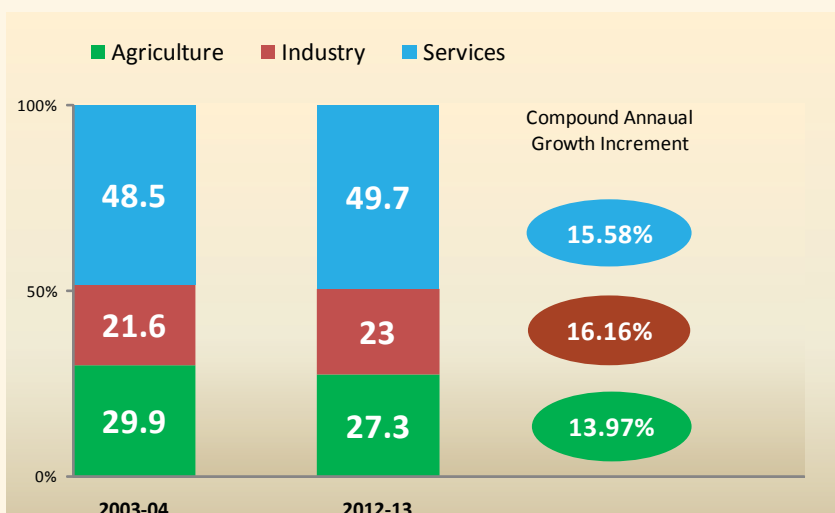
The State of Andhra Pradesh, formed in 2014, was earlier part of united Andhra Pradesh, now divided into two states; the other state is Telangana. Andhra Pradesh, with a total geographical area of 1,60,200 sq km has 13 districts, spread over six agroclimatic zones and broadly five different soil types



³ These missions are: 1) Primary Sector, 2) Social Empowerment, 3) Knowledge and Skill Development, 4) Urban Development, 5) Industry/manufacturing, 6) Infrastructure, 7) Service sector.

to cultivate a wide range of crops. The State has a total population of 49.83 million (Census 2011), with density of 308 per sq km and literacy level of 67.41 percent. It is bestowed with a long coastal line (974 km).

The Gross State Domestic Product (GSDP) of Andhra Pradesh at constant prices for the year 2013-14 is estimated at Rs.2,50,282 crores as against Rs.2,35,930 crores in 2012-13 indicating a growth of 6.08 per cent. The agriculture sector has achieved higher growth at 6.94 per cent⁴ in 2013-14 (all India 4.7 per cent). However, the primary sector in Andhra Pradesh (AP) contributes 17 per cent to GSDP (all India 13.9 per cent), though it employs 62 per cent of its total population (all India 54.6 percent as per Census 2011). The per capita income for the year 2013-14 has increased to Rs.44,481 (estimated at constant prices) from Rs.42,186 in 2012-13, with a growth of 5.4 per cent (GOAP 2014b)⁵.



Indeed, the united state of Andhra Pradesh has been a revenue surplus state as far as non-plan revenue is concerned. But, new state of Andhra Pradesh has become a huge revenue deficit state on non-plan account. There is a huge impact of state bifurcation on state finances. Overall revenue share of Andhra Pradesh state from tax and non-tax is estimated to be around 47 per cent of the united state of Andhra Pradesh, while the expenditure is 58 per

⁴ This is much better than industry sector at 2.16 percent and slightly less than the services sector at 7.2 percent in the same year in Andhra Pradesh.

⁵ GOAP (2014b). Budget Speech 2014-15, presented by Yanamala Ramakrishnudu, Minister for Finance, Government of Andhra Pradesh on 20 August 2014 in Assembly Session held in Hyderabad (p. 12).

cent. In addition to skewed distribution of revenue, most of the critical infrastructure in social and economic sectors have gone to Telangana State. The Andhra Pradesh state, being an agrarian state has tax to GSDP ratio of only 6.8 per cent while it is higher (9.7 percent) for Telangana which is more urbanized. This also has influenced the enormity of the challenge on all sectors including primary sector of Andhra Pradesh state.

3. Critical Issues

The newly formed Andhra Pradesh has inherited several of its erstwhile problems that existed in the united Andhra Pradesh. Indeed, this new state is deprived of its earlier advantage like large number of seed industries, which are now located in Telangana state; while large part of areas affected by natural calamities have remained in Andhra Pradesh. The White paper⁶ on primary sector of Andhra Pradesh has summarized some of the constraints, based on critical review of issues over the last ten years (2004-14) (GOAP, 2014c). In addition, from the long- term perspective, the state has to resolve related but equally important issues, as listed below.

- a) **High population dependency on agriculture and allied sector.** More than 62 percent (all India 54.6 percent) of the population, across all 13 districts, fall back on agriculture for their livelihood. Thereby, the sector covers major part of population, but contributes less (17 percent) to GSDP.
- b) **Per capita productivity and per acre productivity are low.** Capacity building and skill upgradation of farmers and farm labourers have not taken place adequately. Also suitable high yielding and stress tolerant cultivars have not been introduced over the years.
- c) **Non-remunerative prices.** Farmer producers are not getting remunerative prices, while the cost of cultivation is increasing every year. Cost of Labour, inputs, transport and others is increasing, while net returns are not commensurate with the growing costs. In the process, middleman, commission agents and traders make money, while farmers suffer losses.

⁶ GOAP (2014c). White Paper on Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries and Agricultural Marketing, 23 July 2014.

- d) Inadequate agri-infrastructure, agri-logistic parks and poor supply chain links.** Storage, processing and quality management and marketing facilities are inadequate across the state. Over the years, these logistic supports are not developed in accordance with the requirement. Inadequate market infrastructure and lack of pricing terminals link with leading markets of the country has also affected prospects of farmers. Adequate storage facilities were not available for the farmers to store the produce in times of distress sale. Processing facilities for agriculture commodities were not given any impetus and value addition was not created.
- e) Value addition is lower than the actual potential.** Major part of the produce gets sold at the farm gate and at low prices. Lack of access and availability of value addition facilities across the state is serious lacuna. There is also lack of post-harvest technology.
- f) Lack of farm machinery and inputs.** Lack of access to and timely availability of good quality and efficient farm machineries on rental basis across the state. There is need to ensure availability of good quality and adequate quantity of seeds, fertilizers, organic manure and pesticides.
- g) Inadequate extension services.** Extension services reach 7.6 million farmers in the state need to step up. Capacity building of extension staff is not in tune with the emerging demands in the field and modern technology.
- h) Urbanization process and pull factors of urban areas.** Farmers are losing interest in agriculture. Increasingly they are turning out to be part-time or absentee farmers. On the other hand, insecure conditions and increasing uncertainty and unsuitability in agriculture is pushing out the younger generation from the agriculture sector. Even graduates in agricultural and allied sciences hesitate to opt for full-time career in agriculture.

- i) **Absence of skilled manpower.** Adequate certified skilled manpower to operate new technology, innovative methods and agri-processing is very much limited. There is lack of good training centers to provide certified skills across the state.

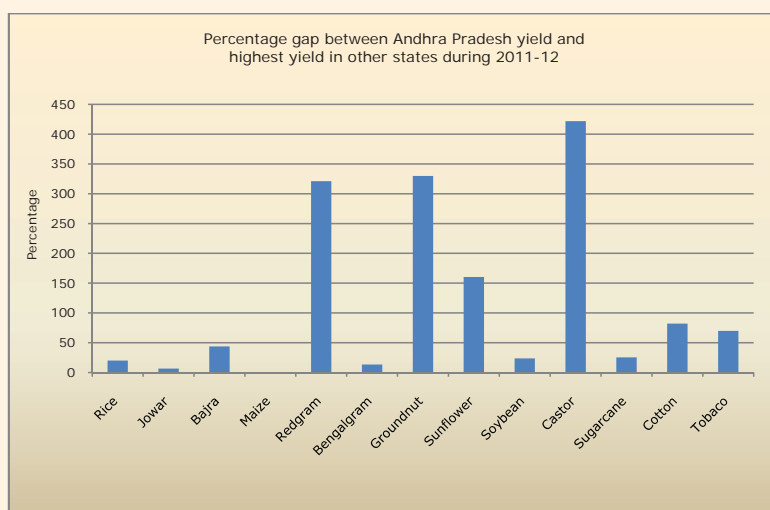
- j) **Increased cost of cultivation.** Over the last ten years the minimum support price for major crops has not kept pace with the cost of cultivation. Besides, the real income of the farmer has declined drastically due to increase in labour cost and inflationary pressures (4.43 percent in 2005-06, 9.56 percent in 2010-11 and 5.98 percent in 2013-14) on prices of inputs and other consumer items. This has affected farmers' livelihood and pushed him to debt-trap and adversity. Even in areas like Krishna delta, high cost of cultivation and lower net returns are common features even though the yields are substantially high, compared to other zones of the states. Whenever, crops are lost due to natural calamities like cyclones or prolonged drought spells the farmers collapse due to severe financial losses and inability to repay the debt.

- k) **Low and stagnant productivity.** During the last decade (2004-14), the area and productivity of crops like paddy and pulses remained stagnant while there was a decline, in oilseeds. The yield levels on comparison with other states (Table 1) showed gaps in all crops except in maize. In crops like rice, redgram (pigeon pea), groundnut, sunflower and castor the gap between the yield of the state and highest yielding state in the country is very high. It indicates the possible potential for enhancement of productivity in the state and also highlights the need to redesign the government initiated programs and also the research initiatives, to bridge this gap.

Table 1. Yield gap (kg/ha) in different crops across different states (TE 2011-12).

Crop	Andhra Pradesh	Highest	Second Best	Percentage gap
Rice	3116	3918 (TN)	3741 (PUN)	20.0
Jowar	1887	2011 (MP)	-	6.6
Bajra	1704	2452 (TN)	2040 (HAR)	43.9
Maize	7012	7012 (AP)	6042 (TN)	-
Redgram	402	1693 (KER)	1514 (BIH)	321.0
Bengal gram	1142	1295 (BIH)	-	13.4
Groundnut	640	2751 (TN)	1938 (WB)	329.8
Sunflower	713	1857 (PUN)	1809 (TN)	160.4
Soybean	1615	2000 (KER)	1694 (MEG)	23.8
Castor	381	1988 (GUJ)	1530 (RAJ)	421.7
Sugarcane	82000	102837 (TN)	90251 (KAR)	25.4
Cotton	386	703 (HAR)	698 (PUN)	82.1
Tobacco	1805	3069 (UP)	1899 (GUJ)	70.0

Source: DES, Gov. of AP



In major crops like paddy, groundnut and pulses, the farmers have been using varieties which are more than 10 to 20 years old. The paddy varieties such as *Swarna* and *Samba masuri* are evolved more than 25 years ago. The variety *Swarna* was susceptible to lodging and the *Krishna* and *Godavari delta* is prone to frequent floods and cyclones. The newly developed varieties like *Swarna sub* is yet to gain farmers' acceptance. The variety *Samba masuri* is susceptible to bacterial leaf blight. The hybrid paddy varieties developed are also poor in cooking and milling quality and the market prices are low. Owing to low level of seed upgradation, productivity of paddy remained stagnant during the last decade.

Rice: The average productivity of rice is 30.09 q/ha; highest in Nellore (38.11 q/ha) and low in Visakhapatnam (16.04 q/ha) followed by Srikakulam districts (19.90 q/ha). The low yields are due to light soils, low carbon content, planting of aged seedlings due to delayed monsoon and crop lodging due to floods in north coastal districts.

Pulses: The maximum area under pulses is under Bengal gram (chick pea) (4.96 lakh ha) followed by black gram (3.81 lakh ha). The area of *rabi* (post rainy season) pulses is affected due to diseases – caused by yellow mosaic virus and powdery mildew caused by fungus.

Millets: Area and production of millets like *jowar*, *bajra*, *ragi*, etc., have declined over the last decade.

Oilseeds: Groundnut is grown during *kharif* as rainfed crop on a large scale in Rayalaseema region with low rainfall. The productivity of groundnut is only 6.40 q/ha during *kharif* and 22.42 q/ha during *rabi*.

l) Failure of Adarsha Rythu system. In 2007, to provide an interface between farmers and extension staff of agriculture and allied departments, Adarsha Rythu (Ideal farmers) scheme was introduced. Annually around Rs. 20 Crores was spent to focus on dissemination of technology and other activities. But even after several years, farmers are not benefitted from this scheme. This is due to the fact that most of the selected persons were neither qualified nor had adequate knowledge to sensitize the farmers and some of them were non practicing farmers.

m) Soil health management. Over the years, inadequate soil health management has led to land degradation and excessive and indiscriminate use of chemical fertilizers. This has disturbed the balance of nutrients and crop growth; and saline, alkali soils with low crop productivity were not reclaimed. The chemical fertilizer consumption has increased from 21.08 lakh tons in 1994-95 to 38.12 lakh tons in 2013-14; the decadal increase was 15% (1994-2003) and shot up to 57% (2003-13). The price of DAP (diammonium phosphate) increased from Rs.485 in 2009 to Rs.1386 in 2013; the trend was similar for the other complex fertilizers too (Rs.362 in 2008 to Rs.1323 in 2013). This was another reason for increased cost of cultivation.

n) Crop holiday. The crisis in agriculture sector is evidenced by the “Crop holiday” observed by the farmers of East Godavari district in 85,050 acres during *kharif* crop season of 2011. Agricultural operations were not carried out

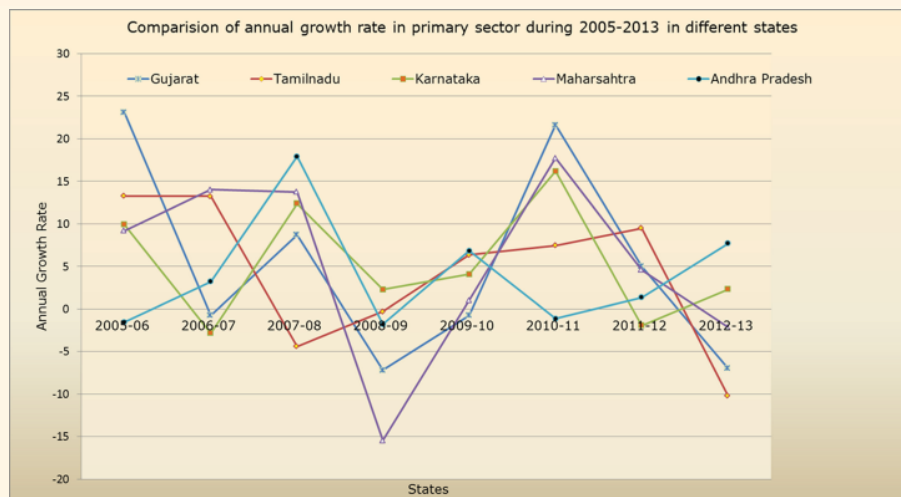
owing to late release of canal water, high cost of cultivation, nonavailability of labor in peak season of agriculture operations due to National Rural Employment Guarantee Scheme.

o) Farmer suicides. Farmer suicides are a key concern in agriculture sector. The farmers were in deep distress due to failure of cotton crop and heavy indebtedness as the farmers were more dependent on private money lenders with higher rates of interest. The number of farmer suicides increased from 310 persons (during 1994-2003) to 1,943 persons (during 2004 to 2014).

p) Unsustained growth in primary sector. Andhra Pradesh has shown negative growth rate in primary sector during the past few years (-1.78 to -1.14 per cent at constant prices) and good growth rate in some years (1.36 to 17.92 percent). Annual growth rates in comparison with other states are shown below in Table 2.

Table 2. Annual growth rate (%) in primary sector in different states.

State	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Gujarat	23.10	-0.73	8.73	-7.17	-0.74	21.64	5.02	-6.96
Tamilnadu	13.26	13.24	-4.41	-0.29	6.35	7.47	9.51	-10.22
Karnataka	9.92	-2.84	12.37	2.27	4.07	16.17	-1.95	2.30
Maharsashtra	9.20	14.03	13.76	-15.45	1.02	17.75	4.58	-2.14
Andhra Pradesh	-1.54	3.22	17.92	-1.78	6.84	-1.14	1.36	7.69



q) Agricultural education, research and extension. The new state is deprived from adequate number of agriculture and allied sectors-based universities, colleges and training centers, and research organizations. The state is not

sufficiently equipped to meet the demand for certified skilled workers at various levels in primary sector.

r) Damages from natural calamities. The extent of damages caused by natural calamities has increased over the years. During the last six years (2008-09 to 2013-14), 20.18 lakh ha was affected in united Andhra Pradesh; of which, 75 percent (15.16 lakh ha) is spread out in Andhra Pradesh. While the damage control assistance (for united Andhra Pradesh) sought from Government of India was for Rs.47,838 crores (during 2004-05 to 2014-15), actual funds released was only 17 percent of the total. This has further aggravated the situation to undertake permanent measures to control damages in natural calamity affected areas.

4. Key Drivers

The goal of the new initiative of the Government is to make the farmers prosperous by increasing productivity, profitability while minimizing degradation of the land resources. The state will be food and nutritionally secure through scientific water conservation, efficient management and enhancement of water-use efficiency to overcome the water scarcity, adopt scientific soil health management for minimizing land degradation and by making agriculture more resilient to climate change impacts through innovative scientific interventions, knowledge sharing and climate smart risk-minimizing insurance products.

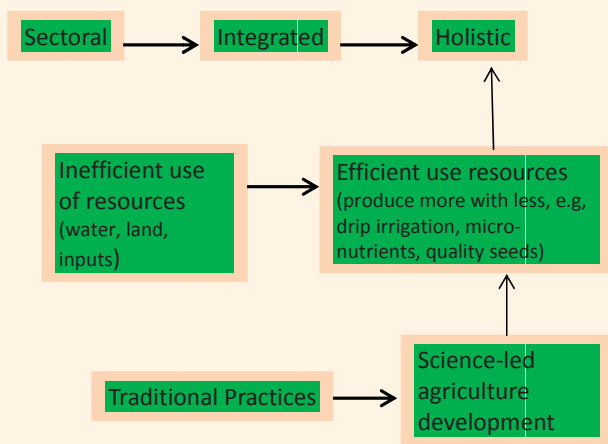
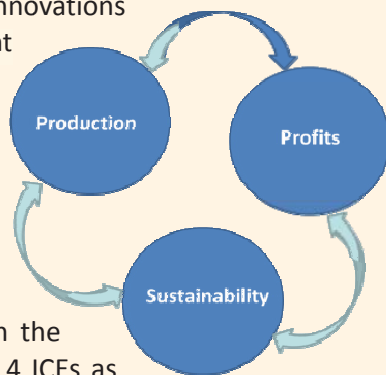
A Way Forward

Agriculture Transformation

Shifting from sectoral approach to holistic approach

In order to transform the primary sector in the state to kick start the growth, quick and large transformation in the business strategy has to be brought in. Business as usual will not benefit the state economy and a paradigm shift is must. The first and foremost strategy is to adopt science-led development approach and ensure that the sector benefits from the scientific developments not only in the state but by bringing national and international expertise and experiences to benefit the state and the farmers. Secondly, in order to achieve the efficiency, the principle of synergy through integration of primary sector actors need to be harnessed by discarding the traditional sectoral/compartmental approach and bring in the holistic and integrated approach.

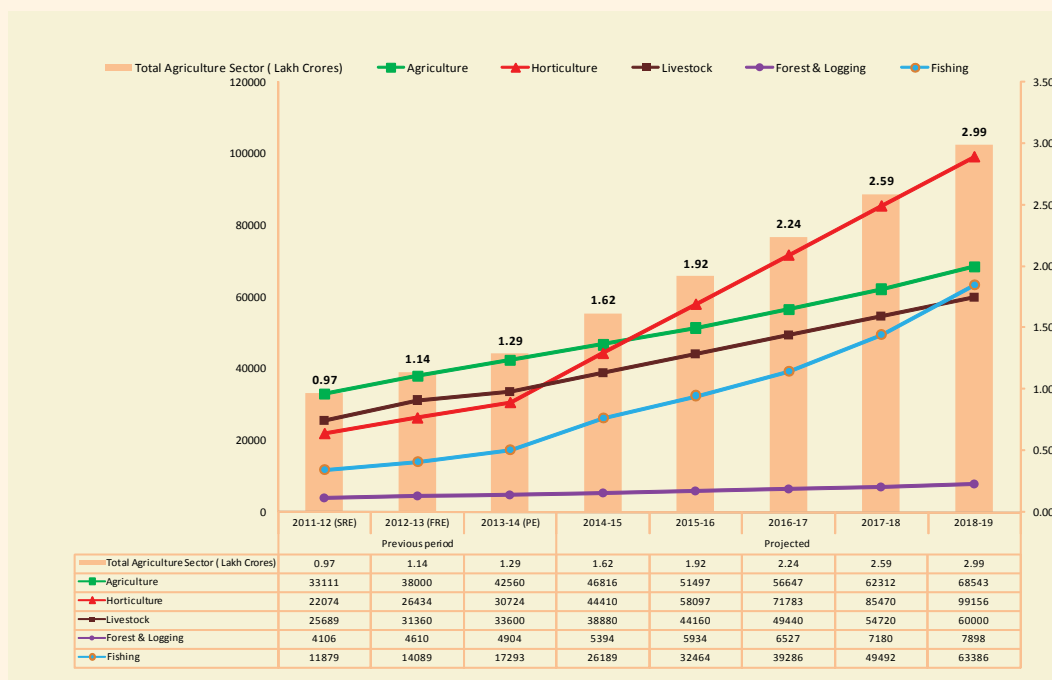
Another major change has to be in the strategy is bringing in participation of the stakeholders by giving away the top down hierarchical strategy. New innovations through enabling policies and institutions as well as building the partnerships including public private partnerships which will benefit the farmers are needed for harnessing the full potential of this important sector in the state. Most importantly, science need to be brought to the door step of the farmers through capacity building as well as new innovations through Participatory Research For Development (PRFD). Such science-led holistic participatory partnership-based approach would address the issues of efficiency through convergence and collective action. For this the state proposes to adopt the Consortium approach for achieving the economic gain as well as for protecting the environment while sustainably intensifying the sector to achieve the sustainable development in the state. Through adoption of innovative strategy of 4 ICEs as indicated below the primary sector will be transformed through scientific development to increase production, productivity as well as profitability for the farmers as well as the state through sustainable intensification.



Strategy: Mission Mode: Four ICEs

I	C	Es
Innovate	Convergence	Efficiency
Inclusive	Collective	Equity
Intensive	Consortium	Environment Protection
Integrated	Capacity building	Economic gain

Primary Sector Potential in Andhra Pradesh for next five years (2014-2019)

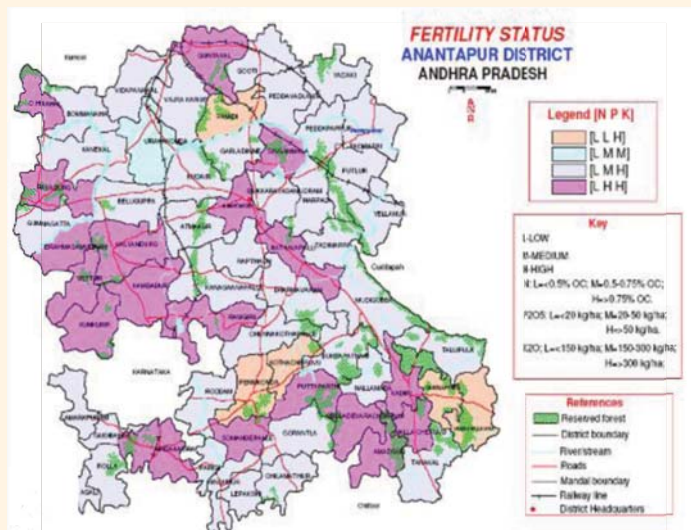


Source: Planning Department, GoAP, 2014.

4.1 Grow More Food grains in Sustainable Manner

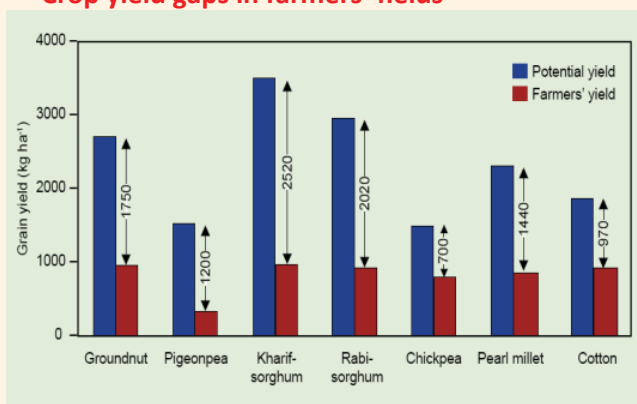
Soil health mapping. Soil health mapping of the state through stratified sampling and using GIS (geographical information systems) would enable to devise soil health-based balanced nutrient recommendations at mandal level. Currently the fertilizer recommendations are state- and zone-based for different crops. The new soil test based mandal wise fertility management regime will not only result in increased crop productivity by 10 to 50 per cent depending on levels of nutrient deficiencies and profitability for the farmers but also in reducing unproductive use of urea (nitrogen), potash, and phosphatic fertilizers and improving the soil health. This intervention will benefit farmers as well as the state in short term with quick results during the following seasons. Soil health cards will be given to six million farmers in 18,000 villages in the state. Considering the inadequacy of quality soil analysis labs in the state we propose to adopt two-pronged strategy of strengthening the existing soil labs as well as adopting the PPP (Public Private Partnership)

mode to benefit all the farmers in a phased manner. This program will be undertaken in a mission mode in a phased manner.



Bridge crop yield gaps. We propose to undertake science-led development of both rainfed and irrigated areas through bringing together the international research institutes like ICRISAT along with the national and state research organizations and agricultural universities in a coordinated manner through convergence of agriculture and related sectors like integrated watershed management, horticulture, sericulture, animal husbandry, irrigation and rural development. Emphasis will be on enhancing the efficiency of resources for production to increase not only the productivity, production and profitability for the farmers in the state.

Crop yield gaps in farmers' fields



Improve soil organic matter content. Soil health is directly associated with soil organic matter content, which is the driver for biological activity for ensuring nutrient availability as well as for protecting plant health and all our soils are very low in organic matter content. There is an urgent need to enhance the soil organic matter status through in-situ generation of organic matter on farm bunds by growing nitrogen-fixing plants like *Glyricidia*, *Cassia*, etc. to generate N-rich organic matter for application in addition to green manuring. Growing these plants on two sides of farm bunds can add 30 to 50 kg Nitrogen per ha along with 2-3 tons organic matter which will improve not only soil health but also water holding capacity and store more rainwater as well as provide carbon and other nutrients along with N. We need to take this initiative on war footing with the help of forestry department as well as watershed development department in the state. We propose to make this a farmers' movement. A lot of work has been done by ICRISAT, CRIDA and agricultural universities but has not yet reached the farmers. Recycling of farm residues through composting and vermicomposting will be emphasized.

Popularizing composting and vermicomposting amongst the farmers through enabling policies and training programs will promote recycling the nutrients as well as overcome the problems of garbage disposal in rural areas. Two pronged strategy for recycling organic wastes in rural areas by adopting decentralized waste to compost through microenterprises by the women SHGs and in cities through centralized PPP business model to ensure nutrient return to the rural areas.

Pulses and oil seeds revolution. Good scope exists for enhancing the pulses and oilseeds production in the state using multipronged and coordinated strategies. Crop and area-specific programs need to be undertaken as the problems of different crops vary; for example, in groundnut the main issue is managing the seed availability as generally it is not produced by the private seed companies. Along with seeds of improved cultivars we propose to adopt the holistic approach through value chain and through special efforts ensure that small and marginal farmers are included in the value chain to get the market benefits. The following crop-based initiatives are planned. Pulses production through intensification would also benefit from the biological sources of nitrogen fixation and organic matter addition to the soil.

Enhance groundnut production. Andhra Pradesh is known for the largest groundnut growing district. Anantapur in the world with a total cultivation of 8,00,000 ha in a single district. The farmers are still growing old varieties which are more than 25 years old. We propose to change scenario through introduction of improved high-yielding varieties of groundnut along with a village-based seed system through women self-help groups (SHGs) and by providing seed godown storage capacity. This will promote timely availability of seed. We propose to use the new extension system to support the farmers to adopt holistic soil health management, rainwater management as well as good integrated pest management practices to minimize proharvest losses and improve seed quality. Groundnut seed is affected by aflatoxin contamination which not only reduces the quality but also is carcinogenic. In a phased manner we propose to enhance the productivity of groundnut in the state by 30 to 100 per cent. The common interventions of soil health mapping, soil test-based fertilizer recommendations and strengthened extension systems will be undertaken to make this initiative successful. Collective action through cooperation and scaling-up will benefit the farmers.

Increase pigeonpea production. Pigeonpea is grown in the state on 2 lakh ha and the current productivity is 600 kg/ha. For the first time in the history, ICRISAT developed pigeonpea hybrids using male sterile lines. Now, several private companies have started production of hybrid pigeonpea seeds. There is huge potential to transform 1.2 lakh ha in the state using hybrid cultivars of pigeonpea and increase the productivity in these areas by 30 to 40 percent. Further incremental growth can be achieved through new technologies of fertility management, irrigation and pest management which can benefit the farmers immensely. We will also need to adopt the holistic approach ensuring fertility, seed quality, seed supply systems, rainwater management, pest management, marketing and value chain for processing and linking the farmers' cooperatives to markets.

Increase chickpea production. Andhra Pradesh is known for the highest chickpea productivity in the country over the last decade largely through achieving the revolution through short-duration cultivars released and adopted by the farmers along with mechanization and improved management practices. We have scope to further enhance the production and productivity through appropriate value chain, storage infrastructure and marketing arrangements. Along with these measures research institutes like ICRISAT are working on developing new varieties which can be mechanically harvested and threshed and can be integrated soon in

the system. Establishing machine hiring centers to benefit small farmers will enhance the crop area as well as productivity. Soil mapping, irrigation equipment and strengthened extension systems should be integral parts of the plan.

Enhance utility of rice-fallows. In coastal Andhra Pradesh with scarcity of water as well as in rainfed paddy areas, farmers earlier grew green gram (mung bean) and black gram after paddy and then shifted to maize. However, less water requiring crops like sorghum as well as other suitable crops like safflower and sunflower also need to be integrated into the system. There is a need to popularize minimum tillage and seed priming technologies for improving crop establishment as well as efficient use of stored soil moisture in these areas.

Promote integrated farming system. Owing to rise in cost of cultivation in food grains and decline in net profit to farmer, integrated farming system should be promoted. This would ensure alternative sources of income to the farmer and also as part of drought proofing system. Best practices elsewhere indicate integrate farming systems enables the farmer to sustain his livelihood. Different schemes from the departments of agriculture, horticulture, livestock, and fisheries can be converged for this purpose, particularly in dryland areas.

4.2 Produce and Process More Fruits and Vegetables

Over the years horticulture has emerged as a good enterprise by offering a wide range of crop diversification options to farmers. Table 3 indicates this diversity both in area (16.26 lakh ha) and production (255.69 lakh tons by end of 2013-14). In recent years, horticulture sector has generated huge number of jobs, both skilled and semi-skilled, in agro-industries. This sector has increasingly moved from production enhancement to value addition. At state level, horticulture share in GSDP is at 5.16 percent (2014-15).

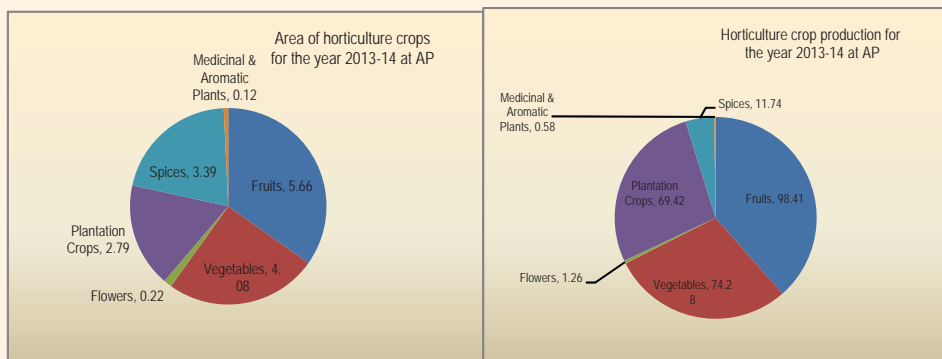


Table 3. Area and Production Details of Horticulture crops for the year 2013-14 in A.P.

Crop Category	Area (Lakh ha.)	Production (Lakh Tons)
Fruits	5.66	98.41
Vegetables	4.08	74.28
Flowers	0.22	1.26
Plantation Crops	2.79	69.42
Spices	3.39	11.74
Medicinal & Aromatic Plants	0.12	0.58
Total	16.26	255.69

Strategy

- Based on soil mapping and agroclimatic parameters identify crop specific clusters and promote high value crops including fruits, vegetables and flowers.
- Enhance rainwater management, harvesting and its efficient use for increasing horticulture production as well as with increased water availability, crop diversification using vegetables and fruits in the state will be promoted.
- Converge MGNREGS and other programs with the Horticulture Department for better utilization of labour, funds and empowerment of backward communities.
- Promote agri-logistics and processing parks across the state. It would enable postharvest management practices through establishment of cold storage and ripening chambers and support horticulture exports. Incentivize both domestic and global firms to play pivotal role in this activity and spread across the entire state in a hub and spoke model.
- The above facilities should be linked to *Rythu bazaars*, vegetable markets, collection centers and reefer vans so that the farmers get remunerative

prices for their produce. Distribute more farm fresh vegetable vending vans to farmer groups for direct marketing of their produce.

- Aggressively promote: (a) precision farming through micro-irrigation, fertigation, greenhouse cultivation (single layer and multi-layer), mulching for better water conservation and quality production; (b) encourage use of modern farm machinery and tools to save time and labour. For both these initiatives farmer buyers should be incentivized. Also establish Center of Excellence in collaboration with globally leading technology firms to demonstrate and scale up in a phased manner.
- By adopting the above indicated steps, it is possible to enhance the horticulture crop area to 21 lakh ha (from 16.26 lakh ha), production to 330 lakh tons (from 255.69 lakh tons), area under micro-irrigation to 9.76 lakh ha (from 5.63 lakh ha), reduction of postharvest losses to 10 percent (from present 35 percent) by 2018-19.
- Design a time-bound activity plan to execute all of the above with Result Framework Document for the entire horticulture sector.

4.3 Organize Organic Farming Clusters

Over a period of time the farmers have neglected the usage of organic manure and there is a paradigm shift from usage of organic manure to inorganic fertilizer. The main aim of the mission is to reduce the cost of cultivation, increase the productivity of land and raise income levels of the farming community. The mad clamour for inorganic fertilizer usage by the farming community has adversely affected the soil health and grossly neglected the micronutrients. The main reason can be attributed to non-education farming community. Organic farming has its own advantages and limitations and we propose to harness the benefits of organic farming for small farmholders by identifying the key areas for popularizing organic farming along with crop production through the principle of value chain application. We propose to link the farmers collectively in the organic clusters areas through markets as well as institutes for certification so that the farmers get higher benefits. We propose to encourage organic farming through capacity building as well as new methods to produce organic matter on the farms and to popularize vermicomposting and other composting measures along with use of biofertilizers and biological agricultural norms of the departments like SERP, Watershed Department, Horticultural Department and Department of Agriculture will try to converge and enhance the benefits through scaling-up operations for small farmholders.

Ensure Food Security by increasing crop area, production and productivity. To enhance crop productivity the following interventions are proposed:

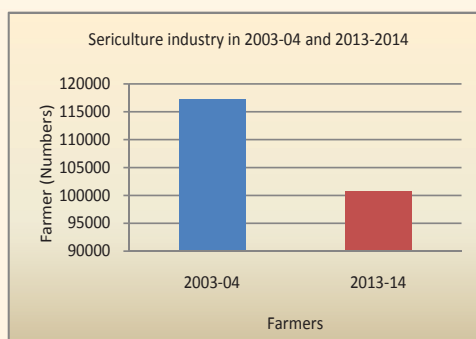
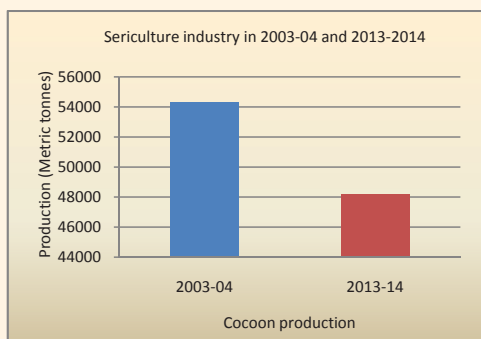
- Ensuring timely supply of quality seeds of high-yielding varieties and fertilizers by coordinating with different agencies and effective quality control, Seed Village Program and seed rolling plan.
- Strengthening research and development facilities to develop new pest and disease resistant, flood and drought tolerant varieties with good quality and effective farmer sensitization.
- Village action plans are prepared in each mandal in each year by converging the ongoing schemes in the department to achieve synergy and enhance production and productivity.
- Farm mechanization accelerates the pace of the growth in agriculture sector. The focus of action will be to make available the best machinery for farming operations like land preparation, sowing, intercultivation, harvesting and post-harvesting. Establishing Custom Hiring Centers and Implement service stations which facilitate the availability of high cost machinery to small and marginal farmers on hire basis will be a priority item.
- Due to lack of proper linkages between buyers and most farmers, the farmers are not getting fair price. Price fluctuations also affect the farmers adversely. So market interventions will be initiated in every season at appropriate time.
- There will be special focus on post harvest technology and food processing and value addition units.
- Use of multimedia/electronic media for disseminating the technology/information to farmers.
- To strengthen the Extension at field level by appointing Multi-Purpose Extension Officers (MPEO) in place of *Adarsha Rythus*.
- E-farming – Delivering expert advice and training utilizing information technology through MPEOs/MAOs.

4.4 Support Silk

Andhra Pradesh is the 2nd largest producer of silk in India. It has high proportion of women workers (60%) in silkworm rearing and cocoon reeling, which are critical operations in silk production. Over the decades it has become a sustainable farm-based economic enterprise benefitting the rural poor with higher returns at frequent intervals. Owing to price fluctuation and global competition in recent years, sericulture sector share is declining in terms of area under mulberry cultivation, cocoon production and employment (see Table 4).

Table 4. Growth of sericulture industry from 1993 to 2013.

Sector	Units	1993-94	2003-04	2013-14	Growth in % (2003-2013)	
Mulberry cultivation	Acres	75,000	1,43,076	109329	-23.50	
Cocoon production	Crossbreed	Tons	22541.00	53693.00	45717.00	-14.85
	Bivoltine	Tons	56.60	611.28	2472.00	304.12
Farmers	Nos.	85,000	1,17,221	1,00,785	-14.02	
Employed	Nos. (lakhs)	3.75	7.15	5.46	-23.63	



Strategy

- At the outset, based on ground realities, a realistic assessment has to be prepared on the status of sericulture sector in Andhra Pradesh. This assessment should also consider the emerging global competition both in terms of price and quality of silk. Also review the impact of tax concessions given to silk import by the government of India.
- Large-scale efforts are needed to mount the quality, market and price of bivoltin silk, which is providing better returns to farmers. Problems involving middlemen need to be curtailed in this process.
- Based on soil health mapping and with improved crop varieties, promote cluster development projects on leaf to cloth model. Adequate emphasis should be laid on both backward and forward linkages.
- Incentivize to modernize and adopt modern and appropriate technologies in crop production, cocoon rearing, silk reeling and value addition activities. This would enable to boost up the silk exports.
- Enable convergence with other departments/agencies like horticulture department for micro-irrigation, NABARD, RKVY, ATMA, MGNREGS and others.
- Design a time-bound activity plan to execute all of the above with result framework document for the entire sericulture sector.

4.5 Harvest Rainwater

By improving rainwater use efficiency in agriculture by one-third of its potential and through intensive rainwater harvesting measures with proper utilization techniques, rainfed areas can be transformed into climate resilient agriculture. In a mission mode through integration and convergence of all the efforts of the government we propose to harvest maximum water without affecting the environmental flows. A detailed report and strategy needs to be undertaken with proper enabling institutional and policy mechanisms to benefit the farmers. Government of India's "Neelanchal" watershed program will be used as a stepping stone for making districts like Anantapur drought proof using high science tools for effective and efficient development of watersheds. The planning has to be undertaken by adopting the integrated farmer-centric watershed approach, rejuvenating the existing tanks, revitalizing the open wells, and most importantly increasing the awareness amongst the farmers for efficient use of the scarce and valuable life resource. In rural areas the waste water is proposed to be treated for its safe use in agriculture to increase the water availability as well as address the sanitation

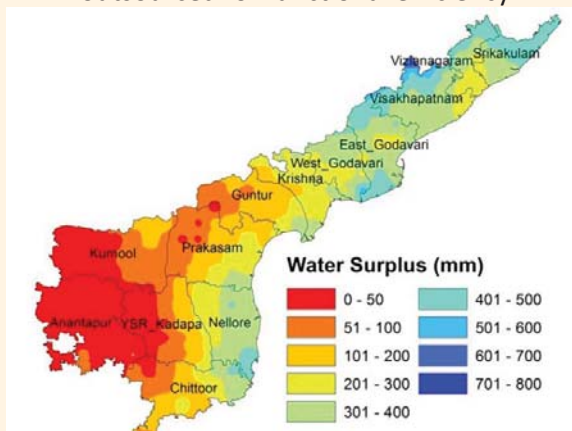
issues in rural areas in a decentralized business model In periurban areas safe use of treated wastewater for growing fodder will ensure dairy intensification in periurban areas increasing milk availability as well as increasing incomes of rural people in the periurban areas. We propose to harness full potential of in-situ rainwater conservation and then making the farms as secure as possible and then harvesting into smaller tanks to ensure that all farmers get the benefits. Diversification of crops with high-value vegetables and fruits in a cooperative manner with value-added processing and marketing will be the gateway for the farmers to become prosperous and climate smart.

4.6 Promote Integrated Water Resource Management (IWRM)

There is good scope to improve the water use efficiency by adopting and popularizing the concept of IWRM in the irrigated areas. Work has been initiated by the irrigation department but lot more need to be done and better results can be achieved through IWRM in an integrated manner.

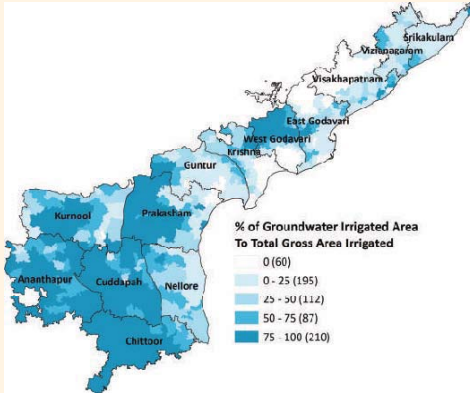
- The state needs to bring the following technologies closer to the farmers for adoption: sprinklers for efficient irrigation; drip irrigation systems; deficit irrigation concept; use of water impact calculator for scheduling irrigation and applying measured quantities of water; integrating domestic wastewater treatment and safe use in agriculture as a business model; and direct seeded rice. Machine hiring centers as well as in puts delivery systems in cluster of villages need to be established through PPP.
- In Andhra Pradesh, micro irrigation has a potential to cover 12.5 lakh ha. During the next five years (2014-15 to 2018-19) through a special action plan the state may cover some 9.5 lakh ha. As part of this, mobile sprinkler irrigation units (@ Rs.70,000 / ha per mobil unit) plan to provide life saving critical irrigation to groundnut crop area in 7 lakh ha in Ananthapur district. Government need to bring in the convergence of relevant departments and related schemes (of both central and state government) to streamline a provision of subsidy to the needy farmers.
- Other activities that need to be undertaken are: create river basin, sub-basin plan and river basin organizations; rejuvenate all water bodies (tanks/ponds/others); establish water quality database and refine regularly; desilt and protect all reservoirs; promote designed crop pattern in wetlands; recycle and reuse of wastewater in all urban and industrial areas; promote user management and accountability; and adopt outcome based and GIS based monitoring.

- Making improvements in saline (e.g., 2.5 lakh has in irrigated command areas) and alkaline soils would enhance production levels in the state. Provision of drainage and cultivation of upland crops instead of lowland rice will prevent conversion of soils into saline patches.
- Soil and water quality analysis centers should be set up and operated at mandal level with the support of agriculture universities, ICRISAT and other leading organizations. If needed, these services may be outsourced for functional efficiency.



4.6.1 Groundwater Management

The new Andhra Pradesh is bestowed with both high rainfall (in coastal area) and low rainfall in Rayalaseema region. Indiscriminate use of ground water has resulted in over exploitation from deeper depths (around 1100 feet) across the state. The irrigated crops in dry belts in Rayalaseema region largely depend on groundwater (see Figure below). By 2013-14, the number of irrigation pump sets fixed to groundwater extraction (open well and bore well) has gone up to 14.54 lakh. The government has allocated for the year 2014-15, Rs 3188 crores for free power supply to these pump sets.



Strategy

- On priority basis, subject to feasibility, all irrigation pump sets, required to be equipped with solar pumps. Around 36,000 non-ISI pump sets can be replaced with solar pumps in the first phase. Even all river based pump sets (up to 5-10 hp) can be replaced with solar pumps. It would help to save huge electricity supplied at free cost.
- Licencing of borewells should be made compulsory. Regularising the permission and thereby groundwater extraction should be scientifically analysed before any approval. Over extraction areas may be declared as no-zones for groundwater extraction.
- Over utilisation of ground water has led to serious depletion of groundwater in Chittoor (73%), Cuddapah (91%), Prakasham (75%) and Ananthapuram (83%) districts. In first phase, these districts should be focused to regulate groundwater extraction and licence them for any future drilling of new wells.
- Some coastal areas are faced with salinity ingress ion caused by sea water and over exploitation of groundwater in these areas. Urgent and scientific efforts are required to arrest this problem.
- Most of the pump sets perform efficiency is below 50%. A separate technical group should be set up to review the deficiencies to upgrade the pump efficiency of groundwater pumps.

- Both in dry and irrigated belts, groundwater recharge structures should be constructed on mission mode across the state. The proven example of ICRIASAT's Kothapally area may be adopted to scale up this approach across Andhra Pradesh.
- The lessons learnt from FAO supported Community Groundwater Development Project in Andhra Pradesh should be adopted for better governance and development of groundwater.
- Also need to relook at the experience over the last 12 years regarding the implementation of the Andhra Pradesh Water, Land and Trees Act-2002 to promote water conservation, tree cover and regulate the exploitation and use of ground and surface water for protection and conservation of water sources, land and environment in the entire state.

4.7 Produce More Meat and Eggs

More than 36 percent of 126.65 lakh households in Andhra Pradesh support livestock activities. The state ranks 1st in egg production, 4th in meat production and 6th in milk production in India (2012-13 estimates of GOI). The state is proud to have world renowned livestock breeds like Ongole and Punganur in cattle, Godavari buffaloes, Nellore in sheep and Aseel in poultry. All this has contributed Rs.33,600 crores to GSDP of Andhra Pradesh with a share of 6.74 percent (2013-14). However, the state expenditure plan for 2014-15 is pegged at Rs 196 crores.

Strategy

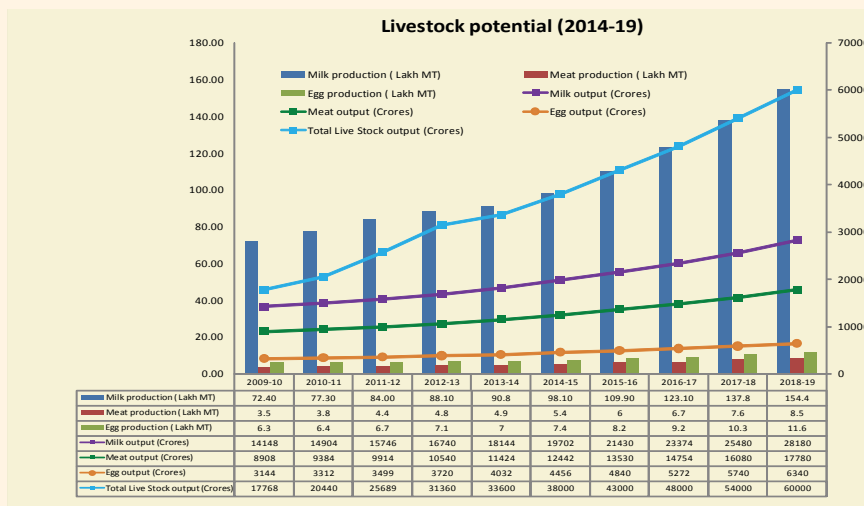
- State Livestock Mission needs to be launched immediately. Similarly, at district level, District Livestock Mission may be launched.
- To meet growing fodder demand: enable provision and support allocation of 10% of cultivable land for fodder cultivation; enrich crop residues with supplements; preserve green fodder through conservation methods; address mineral deficiencies through soil mapping; and carry out testing of fodder samples for pesticide residues.
- Create a feed and fodder development program which includes encouraging research on high yield fodder seeds and ways of upgrading crop residue (Total Mixed Ration – TMR); develop wastelands as fodder grounds through corporate/gram panchayat participation; work with agricultural extension and education officers to encourage fodder cropping;

high yield fodder seed should be available in rural areas; and set quality standards for feed concentrates and mixes.

- Encourage fodder cultivation through drip irrigation. Adopt ratio balancing with the available feed and fodder resources with the farmers.
- Fodder banks may be established in four Rayalseema districts (drought prone areas) under cooperative/ppp/joint venture mode. Establish 5-10 fodder block making units in fodder surplus areas (like Guntur, Krishna) through unemployed youth entrepreneurs- and to supply fodder blocks to deficit areas of Rayalseema.
- Ensure transport of surplus fodder within district from surplus to deficit areas to reduce transport cost.
- Livestock requires adequate quantity of quality water for direct consumption and also for cleaning. Community-based natural water ponds and ground level water tanks in each village for animal drinking, need to be constructed across the state. Roof water harvesting in rural households and rainwater harvesting should be prioritized for this purpose.
- Encourage soil fertility through organic farming by the use of farmyard manure and cow urine. This should be combined with organic farming scheme of the state. Also link up with biogas production at household level or at community level.
- Encourage culling of unproductive animals and promote high productive animals through breed improvement using well established breeds as well as through artificial insemination in a decentralized manner in villages using mobile AI centres.
- Collaborate with specialized private/corporate agencies to provide specific animal husbandry services such as artificial insemination and fodder development that can be run on a commercial basis and where individual interest is greater than the public interest.
- Comprehensive livestock health care activities including disease surveillance program for quick response and control of diseases like vaccination in campaign mode, large number of animal health camps, etc.,
- Establish a large-scale vaccine production center at the Centre for Advance Research on Livestock (CARL) at Pulivendula, Kadapa district.
- To take care of more grievances on timely non-availability of veterinary doctors and policy decision to be made to ensure, they attend the hospital on a regular basis (8 am to 12 noon). Also need to prevent VAS (Veterinary

Assistant Surgeons) to work on deputation to work in other departments which are non-technical in nature.

- On PPP mode, set up across the state modern markets and processing centers for animal by-products (like wool, skin, bone, hoof, horn, tallow and others).



Source: Planning Department, GOAP, 2014.

Milk Production

- Breed improvement through large-scale cross breeding, upgradation of local buffaloes with Murrah and selective breeding in indigenous cattle like Ongole.
- Importantly through nutrition improvement and improved fodder availability and ample drinking water for livestock would enable substantial increase in milk production.
- Ensure increased availability of feed or total mixed ratio through establishment of feed mixing plants in PPP or cooperative sector.
- Ensure provision of massive frozen semen dose production and establishing Embryo Transfer (ET) technology facilities for faster breed improvement.
- Take up pilot project to import and introduce sexed semen of very superior bulls in selected farms to increase production.
- Promote commercial dairy farming in the surrounding areas of Vijayawada, Guntur, Visakhapatnam, Rajahmundry, Kakinada, Tirupati, Kurnool and in North Coastal and Rayalaseema districts of Andhra Pradesh.
- Overall potential (including milk, meat, egg and by-products) of livestock sector and total value (estimated Rs.60,000 crores by 2018-19) is shown in the Figure above.

Egg Sector

- To continue to enjoy the top position in India, for egg production, Andhra Pradesh government should support large-scale private investments on provision of egg production and value addition facilities across the state. Ensure all supporting facilities and infrastructure for this purpose.
- Increase the availability of poultry feed ingredients like maize and soya etc
- Simplify the procedures and fast-track the approvals required for setting up poultry farms, value addition of egg production and exports. Incentivize the producers and farmers for this activity.
- Promote backyard poultry for the benefit of rural/tribal farmers.
- Enabling policy environment for the development of livestock sector.

Meat Production

- On a mission mode undertake introduction of new meat breeds through R&D, mass vaccination of sheep and goat with PPR entero-toxaemia and sheep pox and de-worm to increase weight gain.
- Focus on meat breeds – promote exchange of breeding rams among farmers to avoid inbreeding which is a common problem now.
- Quality and hygienic meat production—promote large scale and mechanized slaughter houses in peri-urban areas to cater to urban demand and train the butchers (2,000 poultry birds or 1,000 sheep or goat can be slaughtered per hour, skinned and cut into pieces as per the requirement).
- For milk, meat, egg processing and value addition infrastructure will be created on PPP/JV/Private Sector investment. Market development will be taken up both in the country and outside.
- As a supportive mechanism price stabilization fund will be created.
- Overall, there is a need to design a time-bound activity plan to execute all of the above with result framework document for the entire livestock sector.

4.8 Catch More Fish

The new state of Andhra Pradesh has vast potential for fisheries from both marine and inland resources. Fisheries is contributing Rs 11,000 crores (5.42% to GSDP at constant price of 2004-05), Rs. 17,295 crores at current price, as well as generating income and employment. The sector aims at exploitation of water resources under capture and culture fishery for increasing fish production and productivity through sustainable development. The sector is

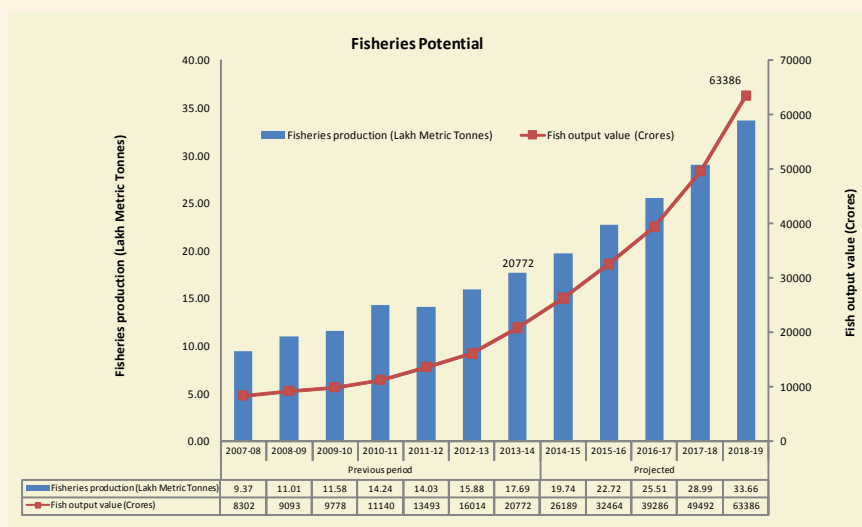
contributing considerably to the food security, nutrition, health and livelihood security of rural population and the welfare of fishers besides earning from exports. Recognizing the importance of fisheries sector, it has been identified as a growth engine for economic development based on an evaluation of the potential of this sector to build upon accumulated strength, to make significant impact on the Gross State Domestic Product, and to exploit opportunities created by global trends.

During 1994-2004, the Government has taken many initiatives in aquaculture which paved the way for expansion of aquaculture and also caused increase in production and productivity of fish and prawn in the state. Owing to all these efforts, Andhra Pradesh is ranked first in India in total fish and prawn production for three years from 2011-12 to 2013-14.

Strategy

- Promote “Blue Revolution” through a multipronged approach including introduction of alternate species of fish.
- Develop a policy framework for allotment of marine areas and large reservoirs for cage culture through fishermen cooperatives/private participation or by consortium.
- Design a policy framework to promote fish processing and fish feed industry by private agencies. Provide guidelines for transparent process.
- Establish SPF brood stock for freshwater aquaculture and brackish water aquaculture and import of SPF seed for shrimp farming to provide quality seed to shrimp farmers.
- Examine opportunities for reduction of cost of production of fish in areas of power, feed and others.
- Through PPP mode, establish and manage more fishing harbours in Juvvaladinne (Nellore district), Uppada (East Godavari district), Vadarevu (Prakasam district) and Nizampatnam Phase-II (Guntur district).
- Build better skills for women for more productive role in fisheries sector through Matsya Mitra Groups in fish marketing and fish processing.
- Owing to great potential for the development of the fisheries sector, the above steps may ensure to realization of value up to Rs.63,000 crores and enhance production quantity up to 33 lakh tons by 2018-19, as shown in Figure below.

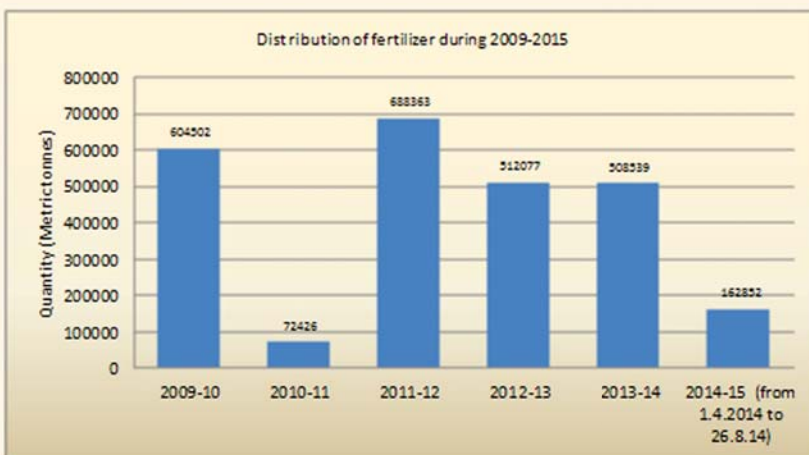
- Create an enabling policy environment bringing about necessary legislations and policy guidelines.
- To realize this huge potential there is a need to design a time-bound activity plan to execute all of the above with a Result Framework Document for the entire fisheries sector.



Source: Planning Department, GOAP, 2014.

4.9 Strengthen Agricultural Markets

The state of Andhra Pradesh has 190 Agricultural Market Committees including 10 for commercial crops, 19 for fruit markets, 22 for vegetable markets and 29 for cattle markets. In total, 170 market yards have infrastructure facilities for various training programs and other activities, which may be used by agriculture and allied departments for farmer-centric activities. Though, 29 market yards have soil testing labs, some of them are non-functional owing to staff crunch. Distribution of chemical fertilizers (through agricultural markets) in Andhra Pradesh shows declining trend over the last five years (see graph below).



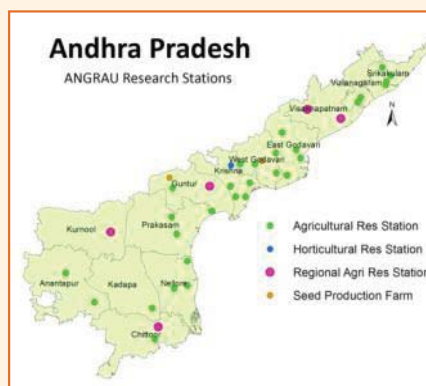
Strategy

- With support of NCDEX (National Commodity and Derivatives Exchange, an agency of Government of India), develop a strategic and operational plan for Andhra Pradesh for the next five years. Then, establish NCDEX terminals in all mandals, districts and major markets. This would enable e-governance of Agricultural Market Committees to facilitate e-trading and online issue of e-permits to enable traders to transport produce to processing place without hassle. It will also help to develop modern communication technologies for market information services to improve information delivery through SMS, voice mails and FM radio channels.
- Strengthen the existing *Rythu bazaars* and establish new *Rythu bazaars* wherever feasible with cold storage facility, to be managed by Farmers Producers Processors Organisations (FPPO). Utilize funds from the Government of India scheme to construct warehouses and tie up with Rythu bazaars and /or agricultural marketing yards.
- *Rythu Bandhu Pathakam* – pledge loan to increase loan amount from Rs.1 Lakh to Rs.2 Lakhs, free of interest up to 180 days.
- Shape Agricultural Market Committees into integrated supply chain centers to minimize post harvest losses, provide scientific storage facility and also provide post harvest credit through warehousing receipt financing.
- Modernize soil testing labs in Agricultural Market Committees with technical support from agricultural universities, ICRISAT and agriculture department. Enable soil sample collection from the farmer's field, test and deliver the results by SMS and mail.

- Set up Terminal Markets to stimulate trade in agricultural commodities at Guntur, Kurnool and Ananthapuram and other places. This would help in gaining the advantages of the locations and lead to better connectivity.

4.10 Integrate and Modernize Agromet Advisory Services and Climate smart crop insurance

Agricultural productivity largely depends upon weather. Aberrations in weather have drastic impacts on various sectors like agriculture, horticulture, livestock, fisheries and markets. Agromet advisories can make a great difference to these sectors by taking the advantage of benevolent weather and minimize the adverse impacts of malevolent weather. Weather forecasts for six parameters, viz., rainfall, cloud cover, wind direction and speed, and minimum and maximum temperature are being issued by



the India Meteorological Department twice weekly for all the thirteen districts in Andhra Pradesh. These forecasts are converted into farm-level advisories by the Agro Advisory Service Units under the Agricultural University (ANGRAU) and are disseminated to the farmers in Telugu through mass media and to selected farmers by SMS.

Climate smart crop insurance where farmers adopting climate resilient agriculture can pay lower premiums and the crop advisories as well as met station network can be effectively used for efficient implementation of crop insurance scheme.

Strategy

- Integrated Agrometeorological Advisory Services (IAAS) will help the farming community to take advantage of prognosticated weather conditions and thereby form a response strategy. The coast of Andhra Pradesh is most prone to storm surges impacting the fisheries sector. Loss of livestock and fisheries is compounded by the loss of agricultural/horticultural crops. Severity of the cyclone and storm surge is expected to increase as a consequence of climate change. Mid-season and end-of-season droughts are also common in the state impacting the crop yields.
- From a farmers' perspective, the forecast value increases if the weather and climate forecasts are capable of influencing their decisions on key farm management operations. It becomes essential to relate with the requirements of

farmers, understand their needs and give the forecast and advisory specific to their situation and needs.

- In each of the thirteen districts, there is a need to establish at least ten Agrometeorological Field Units (AMFUs) for monitoring weather in real-time and collecting the crop situation. Using the ICT (Information and Communication Technologies) and mobile-based application, these AMFUs will provide weather-based agro advisories, technical advice and information on market prices to farmers, fishermen and poultry operators. IAAS will help in choosing the best time of harvesting crops and various management options for storing, transporting and marketing. On a pilot-scale, in the first year, 10,000 farmers from various sectors in each district will be registered for the IAAS and two-way communication channels will be established between the AMFUs and farmers for receiving the IAAS by the farmers and feedback from the farmers by the AMFUs.
- The IAAS setup needs to be strengthened through multi-institutional support and participation to bring in multidisciplinary synergy to render operational services to various sectors including markets.

4.11 Rejuvenate Extension System

Strengthen extension system at the agriculture and allied department level to reach out to the farmers extensively in the state reach to the farmers in the state and take the science of agriculture to the doorstep of the farmer.

- At present large yield gaps between the farmer's yields and achievable potential yields is two to three folds which is largely due to knowledge gap. At present the extension system in the state is in stress and farmers will benefit largely through innovative knowledge delivery systems using the new Information Communication Technologies (ICT), mobile-based voice messaging systems, radios as well as farmer to farmer video using battery operated Pico projectors.
- The state should use ICT-based technologies such as tablet-based extension system using the Farmer Facilitators (FFs), Farmers Field Schools as well as farmer to farmer short videos using battery operated Pico projectors along with mobile-based voice messages to help the farmers to get increased access to new knowledge and technologies.
- Other elements include: empowered farmers as para extension workers and lead farmers (LFs); for every 500 ha one FF and 2-3 LFs will be appointed. Training and empowering FFs and LFs will be done by master trainers trained by ICRIASAT, and provide certified and quality assurance.

- Further, this knowledge delivery system would be enhanced through PPP business model where effective input as well as knowledge delivery systems can be developed to benefit the farmers.



Promote process re-engineering and service based payments. Over the years, agri and allied departments have been left with lot of unfilled positions for extension services. Of those who are in place, many are roped in to participate in meetings and services assigned by the higher officers. Consequently, the extension staff is less focused and unable to regularly update their knowledge skills. Lack of effective monitoring and performance measurement has deepened the problem. In view of these realities, the state should re-engineer its process of providing extension services. There is a need to design, based on digital Andhra Pradesh, better and more focused ways of providing extension services across the primary sector. Wherever possible, rope in specialized organizations (universities, expert groups, private agencies) and make them accountable on activity basis. A strong set of outcome-based budget allocations should be made for this purpose. In addition the state should explore and adopt the PPP business model for strengthening the departmental extension system. At Gram Panchayat level, an improved farmer service center should be established as one stop shop for all primary sector needs on PPP model. Service based payments may be made by farmers and if needed, the government may provide viable gap funding.

5. Essential Proactive Steps

5.1 Compulsory Convergence

The prime step towards primary sector development in Andhra Pradesh is moving towards convergence of all schemes, programs and funding pattern, both for central and state level schemes. Convergence is a multipronged development

strategy, which is essential for sustainable development and to enable better rural livelihoods.

- A few rounds of skimming sessions, first within the department and then, across the departments, would enable to identify current constraints, needs and scope for convergence. A continuous refinement process and approvals should be built into the loop. It would be a win-win situation for all. A clear-cut, result framework document, exclusively on convergence, with clarity on what to measure and how to measure should be in place.
- Good governance necessitates the convergence. It can achieve multiple goals like maximization of returns, promotion of public-private-community partnerships, sustainable development and meeting the community needs. The instruments include pooling of resources, both human and capital, transfer of productive and eco-friendly technologies and value addition through provision of backward and forward linkages.
- Guidelines should be developed to bring uniformity in planning, sanctioning, release of funds, implementation, monitoring and evaluation of the programs. Interestingly, all guidelines should stipulate inter-program coordination and convergence. The broad procedures and processes would be similar in many ways in these programs. However, the approval system and implementing agencies would be different.
- Through a series of consultative workshops, at state, district, and mandal level, an activity mapping and timeline for a combined effort should be prepared, two months before the plan starts. At every level, progress measurement criteria and success indicators should be clearly indicated.
- The funding allocation, release and approvals for expenditure should be in tune with the convergence plan. All of them should focus on outcome-based budget and accordingly, fund flow from the financing department should be approved. To begin with, if some flexibility is allowed for convergence and innovations, the problem may be solved to some extent.
- The lessons learnt from the convergence strategy adopted (from 2009) in the united Andhra Pradesh need to be reviewed and the modified version should be adopted for the new state of Andhra Pradesh. For example, the line departments/schemes that are working in convergence with the rural development department in implementation of the MGNREG scheme are; Integrated Watershed Management Programme, State Level Nodal Agency of RD Department, NABARD funded RIDF projects of RD Department, Forest

Department, Panchayat Raj Engineering Department, Tribal Welfare Engineering Department and Society for Elimination of Rural Poverty

- For example, in India, around 133 Centrally Sponsored Schemes are being implemented by different ministries and 70 percent funds are allocated to flagship programs, which are handled by the Panchayati Raj Institutions. Even for a sericulture activity, getting convergence among NABARD, RKVY, ATMA, MG-NREGS and APMIP need enormous efforts.
- Another example is to enable convergence of all subsidy related schemes to standardize across all departments and simplifying them. For validation and fast tracking the process adoption of GIS-based verification of the asset location and utilization, online application and online direct cash transfer would be useful steps.

5.2 Towards Digital Green

On a priority basis, launch Digital Andhra Pradesh program to empower rural people. The state is bestowed with huge and specialized IT companies and related institutions. By collaborating with the expert group, and based on India Digital Policy 2014, design Digital Andhra Pradesh policy and operational plan to start in 2014 itself. Small investments with GOI support can go a long way to link all farmers, markets, traders and agro-processing industries in the state for a seamless connectivity. Their continuous information needs (e.g., commodities price, weather information, government schemes, subsidies, availability of inputs and locations, simplified formats to fill up and submit, extension services), update on regular basis and free/small payment to access would enormously support rural activities. A program needs to be designed to transform Andhra Pradesh into a digitally empowered society and knowledge economy.

- **GIS based certified land titles.** Indeed, 55 percent of the civil disputes in the state are related to land disputes in rural areas. A large number of farmers are affected owing to poor land records and lack of access to right information and enormous delays in getting right approvals. Consequently, farmers spend lot of money and time (hence, nonavailability in the village) in nearby urban area based offices and courts. A statewide digital program would help to reduce this burden fast and at a low cost. This would low investments and high returns to the state and its citizens.

A time-bound GIS-based land survey and certification across the

state would be possible on PPP mode. The GOI scheme funding may also be utilized for this purpose.

- **Use of satellite imagery and use of other technologies.** The Department of Agriculture proposes to use geographical positioning systems (GPS), GIS, satellite imageries and ICT for the benefit of the farmers through various interventions for soil health mapping, yield estimation as well as for strengthening the extension system in partnership with international e.g., ICRISAT and national (ICAR institutes) and research organizations and state agricultural universities (SAUs). We propose to use crop simulation models for undertaking the yield gap estimations as well as for identifying the suitable domains for new technologies using satellite imageries. We propose to identify the potential land which can be brought under cultivation during *kharif* and *rabi* seasons as well as explore the possibilities for yield estimations along with the use of ICT.

Using satellite imagery and remote sensing, soil and land resources data will be collected. It will be scientifically analyzed, with the help of the apex body in this field, to evaluate relative strength and problems of the soils in different areas. This data will be used for making recommendations to the farmers for selection of crops, changing the cropping pattern, monitoring crop condition and for taking the corrective actions wherever needed. Further, new science tools will also be utilized for more precise estimation of areas under different crops, drought assessment as well as for estimating yields in the state for major crops.

5.3 A Million Jobs to Generate in Primary Sector: Provide Certified Skills

Primary sector as a whole in the state of Andhra Pradesh has huge potential to absorb a million jobs over the period of five years. Any state with availability of skilled manpower and supporting infrastructure facilities (like land, connectivity, power, water) can attract huge investments in primary sector related activities. There is increased demand for certified skilled manpower in agro-processing, poly houses, breeding farms, dairy industry and all value addition based industries, both small and big and others. Building certified skills is one of the most essential aspects in transforming agriculture in Andhra Pradesh. This needs to be done at two levels: one, across all government departments/agencies to enable follow-up of the suggested strategies across all sub-sectors; two, to fulfill the need for skilled manpower in agri and allied sectors across the state.

Strategy

- Since Andhra Pradesh state has surplus labour in primary sector, the per capita productivity in this sector is declining
- On the other hand, there will be a growing demand for certified skilled manpower in horticulture, fisheries, livestock, agri-processing, agri-logistics and supply chain management activities of the primary sector.
- Skilled manpower always attracts more industries in any region. To begin with, during the first year, one lakh persons should be trained in various skills related to agri and allied sectors. This would also help move people from agri to non-agri sector, but preferably retain in the primary sector. Gradually, these numbers may be increased. Thus, in a period of five years, the state can generate one million jobs in the primary sector alone.
- The state can utilize the funds available in GoI supported Modular Employable Skills. In addition, the state can provide supportive budget. This would enable the persons to get some stipend for their maintenance, and reduce the burden on their parents.
- To enable this activity across the state, skill training and job generation may be outsourced to recognized organizations across the state with clear mandate in both quality and numbers on a regular basis.
- The infrastructure available in a large number of engineering colleges and ITI (Industrial Training Institutes), a good number of private companies may be approached for skill training and job generation. All agriculture related universities, colleges and KVKs should be utilized to provide certified skill courses. Thereby, the state need not incur capital expenditure for training the youth.
- The important factor is these skill training programs should be certified skills, approved by the concerned government agencies, both at the state and central level, and related industrial bodies.
- The certified skills may be provided in a period ranging from two months to 24 months. Persons above 14 years, with a minimum qualification of 7th standard, irrespective of age and gender should be encouraged to opt for skill training in any activity/trade related to primary sector.

5.4 Priority for Agri-business

Draft Integrated Agribusiness Development Policy of Andhra Pradesh, 2014. There is a need to develop an integrated policy that focuses on holistic and sustainable growth of agriculture, horticulture, agroforestry, dairying and animal husbandry, fisheries, sericulture, apiculture and food processing related sectors and allied industries in the state of Andhra Pradesh. The policy should cover both agri-infrastructure and agro-based Industry.

The key objectives are:

- Sustainable agricultural activity, enhanced productivity and better realization to farming community
- Development of agri-infrastructure
- Development of agro-based industry including food processing units
- Research, skill development and employment generation
- Boosting agro-exports of the state
- Investments in agriculture and allied sectors
- Investor friendly policies and regulatory framework

This broad-based agribusiness policy should aim to create an enabling environment for addressing the aforesaid thrust areas, facilitate flow of investment, technologies, skill sets and modern/scientific management practices.

The policy should aim to benefit the whole gamut of marginal land owners, farmers, SHGs, fishermen, rural workforce and improve the competitiveness of SMEs leading to better unit value realization, besides facilitating investments and opening avenues for export markets.

To harness the expertise available especially in infrastructure segment, the policy should facilitate a structured, transparent and pragmatic approach for development of agri-infrastructure through PPPs which will lead to greater industrial opportunities in agribusiness. The policy should envisage technology/know-how driven growth in agriculture and allied sector based on skill development, knowledge dissemination and bringing information technology and enhance quality of service through innovative models.

To develop sustainable agricultural development in Andhra Pradesh, efforts should be made to ensure balanced agriculture and food industrialization across the state and enhance revenues to farmers and

employment potential to local population. An Agri-Horti-Animal Husbandry-Fisheries-Food Processing Corridor of excellence may be designed.

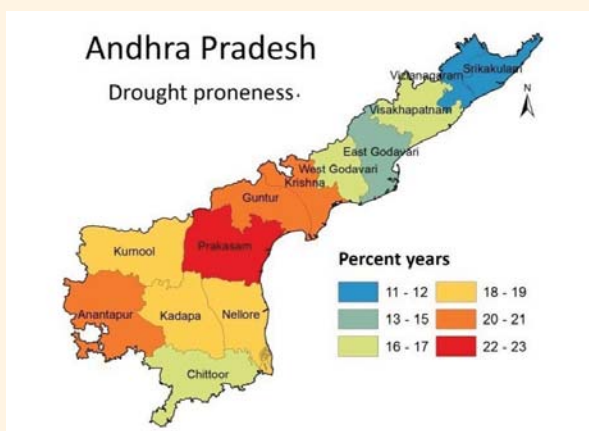
The 'Integrated Agribusiness Development Policy of Andhra Pradesh 2014' should propose to address key concerns affecting the agricultural growth and allied sectors namely improving productivity, minimizing postharvest losses, enhancing postharvest processing and value addition, enhancing value realization through better marketing channels, sustainable practices in production, processing, branding, marketing, etc.

The policy should draw inputs from benchmarking of similar states to ensure level playing field and competitive position of the state. The policy is a much required and would be a timely intervention on the part of GOAP to enhance the income of farmers, increase the state's GDP and more importantly enhance the food security.

Value addition within the state should focus on: (a) Create integrated agri-business development policy, (b) Aggressively promote agribusiness on PPP mode, (c) Reduce raw material movement outside the state, (d) Crop and livestock based products, (e) Set up agri-logistics parks and special agribusiness zones.

5.5 Design Drought Proofing

Rural livelihoods are highly vulnerable drought conditions. Andhra Pradesh has been historically categorised as severe and frequently drought affected area, particularly the Rayalaseema region. The constraints coupled with erratic rainfall (see figure below on decadal rainfall variability in Ananthpur district), land degradation, low water holding capacity and poor soil health, high temperature and high evapo-transpiration have resulted in high vulnerability of livelihoods owing to low crop productivity. Extent of rural



livelihood vulnerability to drought can be traced to its primary reliance on subsistence agriculture; the government efforts for drought proofing have

concentrated on reducing this vulnerability, triggered by an unpredictable monsoon, and is exacerbated by social and economic factors.

Strategy

- Promote precision farming for site specific management. Micro irrigation (drip and sprinkler) has to be provided with subsidies to improve water productivity. Some estimates indicate, some five lakh ha may be covered in the State.
- Based on soil health mapping, encourage with subsidies and effective timely supply of micro-nutrients to enhance crop productivity.
- Encourage tree crops, as they are more drought tolerant and enables better local environment. Link up with commercial organisations for good extension services and buy back arrangement.
- Build fodder and biomass banks. Livestock, being major protector for rural livelihoods, need to be ensured with adequate fodder and biomass. This may be improved through afforestation and common land development.
- The weather data obtained through automated agromet services should be adequately utilised by the agriculture, horticulture, livestock and irrigation and ground water departments to enable better crop planning related activities. Cell phones of all farmers should be linked to these agromet services on pay and use mode.
- All the above and other activities should be converged with NREGS, watershed and other schemes. Skill upgradation of local youth for seasonal non-farm sector jobs should be given a priority.
- The climate change scenario should be the baseline for the State Development Plan and the framework for a new support System. Accordingly, develop a new climate risk management policy.

5.6 Effective Governance: Policy and Legal Frame

Policy shift: For the first time, GOAP has presented a separate Agricultural Budget (2014-15), on 20 August 2014, clearly emphasized focus on primary sector oriented growth in the state⁷. In this budget the government has allocated Rs.6735.44 crores for plan expenditure and Rs.6373.95 crores for non-plan expenditure (GOAP, 2014a). The budget also stressed on enhancing the crop productivity and improving agronomic practices. Overall, the state is

⁷ Most of the States and Government of India, include agricultural budget as part of their annual general budget. But Karnataka was the first state in India to introduce such a separate budget in 2010.

intended to increase its foodgrain production to 127.04 lakh million tons (in 2014-15), from 116.64 lakh million tons (in 2013-14). The state clearly emphasizes on providing food security as well as nutritional security and improved livelihood for rural people (GOAP, 2014a).

Further, as part of long-term strategy, the Annual Budget 2014-15⁸, has pronounced that the government has decided to re-draft the Vision 2020 document (of united Andhra Pradesh) to frame visions that will set standards for a new development paradigm in tune with the changed scenario to place Andhra Pradesh among the top three states of India by 2022. The government is poised to make Andhra Pradesh (Swarnandhra Pradesh) a developed state measured in terms of citizen life satisfaction and happiness index by 2029, coinciding with the next three Finance Commissions of the Government of India.

Draft Andhra Pradesh Right to Services Guarantee Act, 2014.

The role of good governance in promoting all-round development is well recognized. Across the primary sector, on daily basis, millions of rural people (both farmers and non-farmers) would be running around for various kinds of services provided by the government agencies. Complicated procedures, delays in response and delivery further adds up to the misery. Some states have marshalled all their efforts in setting the trend; Bihar is the front-runner followed by Karnataka⁹. The state should prepare a draft Andhra Pradesh Right to Services Guarantee Act, 2014.

Result Framework Approach

- To a large extent, all policy makers and executors agree on “*what gets measured, gets done*”. The state needs to make a paradigm shift from the traditional practice of measuring physical and financial progress to a more rigorous system of evaluating the performance of government departments for their results/outcomes. Indeed, Andhra Pradesh should simply adopt (if need modify) the Results Framework Document (RFD), introduced by the Government of India. It enables departments to articulate a long-term vision and mission; and think through the inter-se priorities among its key objectives, success indicators and action points.

⁸ GOAP (2014b), Budget Speech 2014-15, presented by Yanamala Ramakrishnudu, Minister for Finance, Government of Andhra Pradesh, on 20 August 2014 in Assembly Session held in Hyderabad (p. 6).

⁹ Under the Act, Karnataka government has introduced (in 2012) the Sakala program for time-bound delivery of 478 services in 47 departments.

- The GOAP should constitute sectoral Expert Groups, comprising a mix of administrators, academics, researchers and grassroots workers. The members of the Expert Groups provided a link between past experience with present needs and aspirations, and praxis with policy and programs. The RFD Expert Groups should function as mentors, handholding with departments to ensure that they work towards achieving the RFD outcomes. This handholding process would contribute to creating a growing sense of ownership, critical for converting the document into real action. RFD would reinforce monitoring and accountability for effective and result-oriented delivery.
- RFD provides a summary of the most important results that any government department expects to achieve during the financial year. The RFD document has two main purposes: (a) shift the focus of the department from process-orientation to results-orientation, and (b) provide an objective and fair basis to evaluate department's overall performance at the end of the year. Therefore, RFD should be designed to help government departments define, measure and monitor their progress against specific outcomes and indicators.
- The format of RFD should seek three basic questions: (a) what are the department's main objectives in view of this primary sector strategy? (b) What actions are proposed to achieve these objectives? (c) How would someone know at the end of the year the degree of progress made in implementing these actions? That is, what are the relevant success indicators, their targets and achievements.

Create Resident Data Hub of Andhra Pradesh. One of the prime needs of the state is to create, on a priority basis, a resident data hub of its entire people. This database should align all database of the state, which indicates benefits provided to individuals, households, farm lands, cattle, training, wages, jobs, pensions, loans, subsidies and others. This will enable to target the most needy population of the state for further support. Also it will reduce overlapping and gaining the benefits by a few. As part of the primary sector development, tracking down the needy households is an essential exercise. Existing Aadhar cards, voter IDs, BPL cards, and all such individual based identity cards should be aligned for this purpose. This would enable, at any point of time, for better decision-making to list out persons for benefits and geographical spread on GIS map.

5.7 Mobilize Funds

Two dimensions are critical: (1) internal funding from the budgetary support; and (2) external support from the private agencies, external donors and multi-lateral agencies. Indeed, both may be made complimentary to each other in the interest of the state.

As part of the state budgetary support, the government makes allocations to various departments. This needs to be converged for an outcome based budget. Detailed plans need to be developed so as to understand the possible outcomes and potential convergence options, which may be achieved easily. A phased approach may also be followed to move towards better convergence of related schemes, organizations and manpower and then the budgetary allocations. During 2013-14, the GSDP at current prices in agriculture and allied sectors was Rs. 1,31,019 crores: agriculture Rs.45,132 crores (9.48% share in GSDP); horticulture Rs.30,088 crores (6.32%); livestock Rs.33,600 crores (7.06%); forestry Rs.4,904 crores (1.03%); fisheries Rs 17,295 crores (3.63%). Both horticulture and livestock has huge potential to grow. But they need supporting services from other allied sectors. Similar is the case with fisheries. To bring in the required convergence, during the planning stage itself, an outcome-based budget needs to be designed in consultation with all related departments.

The table 5, indicates the possibilities of funding support from both internal (plan expenditure from the budgetary allocations) and external support through PPP options. It is essential to enable proactive steps in this direction, before getting the funds allocation/mobilization.

Table 5. Funding options in primary sector during 2014-15 to 2018-19 (amount in Rs.crores).

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
1. Govt of Andhra Pradesh Plan expenditure	6,736	16,000	26,000	36,000	50,000
2. PPP potential	10,000	50,000	75,000	100,000	100,000
3. Proactive steps required	a) Announce Integrated Agro-Business Development Policy Refine related policies and legal framework (land, power, agri-infra, tax incentives and others)	a) Release bunch of DPRs b) Organize 1 st Agri Global investors Meet in Oct-2015	Ensure 75% execution of 1 st Agri-GIM projects	a) Release next bunch of DPRs b) Organize 2 nd Agri-GIM in Oct- 2017	Ensure 75% execution of 2 nd Agri-GIM projects by March 2019

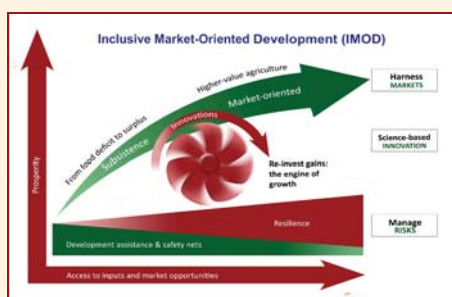
Note: a) Agricultural Budget Speech (2014-15) of Government of Andhra Pradesh has allocated Rs.6,736 crores as plan expenditure.

b) In Primary Sector, PPP based DPRs may be prepared from the support and collaboration with IFC, ADB and others to attract global players.

6.0 Role of ICRISAT

International Crops Research Institute for the Semi Arid Tropics (ICRISAT) has wide experience around the continents as well as learnings through operationalising the holistic scaling-up approach which has benefitted the farmers. ICRISAT can actively support the GoAP for operationalising the mission program as follows:

- Designing and guiding the holistic strategy for effective execution by the departments through facilitating the convergence through participatory research for development. The “Sites of learning” can be established in the districts to operationalise the holistic strategy.
- Provide technical backstopping for execution through advisory role as well as participate in monitoring and evaluation to suggest the mid-course corrections during the strategy implementation.
- Bring in the international expertise from other CGIAR centres such as International Livestock Research Centre (ILRI), International Rice Research Institute (IRRI), International Water Management Institute (IWMI), Asia Vegetable Research and Development Centre (AVRDC), International Centre for Improvement of Maize and Wheat (CIMMYT), World Fish Centre, and International Food Policy Research Institute (IFPRI). Such consortium of international organisations would also bring in the regional and national research institutions through catalysing the academic and research partnerships to benefit the farmers through development research.
- ICRISAT has adopted the Inclusive Market Oriented Development (IMOD) strategy for enhancing the productivity and profitability by ensuring that markets benefit small and marginal farmers. The IMOD strategy moves small farmers through incremental productivity enhancement from subsistence agriculture to marketable surplus. Once the profits and productivity are increased farmers are linked to markets as well as with increased investments in agriculture the farmers move away from dependency on social schemes to self reliance and produce what market need and participate actively in the market operation and derive the benefits.



ICRISAT will assist the GoAP to adopt the IMOD strategy and ensure benefits for small farm holders.

Consortium Approach

One of the major strategic step to execute this strategy for the primary sector development in Andhra Pradesh is adopting a consortium approach. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) will formulate a consortium (see figure below) consisting of all relevant departments of the state government, knowledge institutions, both public and private universities, state and national level research organizations and other relevant organizations. This consortium approach would enable development of primary sector to enhance productivity, profitability through value addition to the farmer community of Andhra Pradesh. This would also enable to bring in the best practices at the global level and relevant scientific knowledge to answer both the existing and the futuristic issues of the primary sector development in the state of Andhra Pradesh.



7. Summary

The government accords the highest priority to primary sector and welfare of farmers. The constraints and problems which have been troubling the farmers over the years will be addressed through science-led development. The efforts are to make primary sector in the state productive, profitable, and sustainable and climate resilient through building the partnerships with research organizations, market players, processors and input supplier through PPPs. Further, efforts will be made to strengthen the agricultural extension system in the state using new technologies like tablets, voice mails for mobile services along with conventional extension methods to benefit the farmers. All plans are to achieve the agricultural growth rate of at least 6 per cent per year through integrated holistic approach to increase productivity, crop diversification to enhance profitability and sustainability. The state should minimize the impact of climate change on small farmholders through convergence of different livelihood activities as well as making agriculture climate resilient through appropriate adaptation strategies in the short term.

Table 13. Strategies for Primary Sector Development in Andhra Pradesh

Sector	Key Strategies
Agriculture	<ol style="list-style-type: none"> 1. Soil health mapping and promote use of micronutrients 2. Bridge crop yield gaps in pigeonpea, chickpea and groundnut 3. Pulses and oilseeds revolution 4. Enhance utility of rice-fallows in coastal Andhra Pradesh 5. Promote rainwater harvesting 6. Integrated water resource management (IWRM) 7. Support organic farming 8. Ensure food security
Horticulture	<ol style="list-style-type: none"> 1. Increase cultivation of vegetables for better quality and higher production. 2. Distribute more farm fresh vegetable vending vans to farmer groups for direct marketing of their produce. 3. Encourage oil palm cultivation in the state. 4. Identify crop specific clusters and promote high value crops (fruits, vegetables and flowers). 5. Converge MGNREGS with Horticulture Department for better utilization of labour and empowerment of backward communities. 6. Promote post harvest management practices through establishment of pack houses, cold storage and ripening chambers, reduce post harvest losses and promote exports. 7. Improve marketing facilities through <i>Rythu bazaars</i>, vegetable markets, collection centers and reefer vans so that the farmers get remunerative prices for their produce. 8. Promote precision farming through micro-irrigation, fertigation, greenhouse cultivation, mulching for better water conservation and quality production.
Sericulture	<ol style="list-style-type: none"> 1. Reorient the strategies for better productivity of bivoltin silk. 2. Increase in mulberry area, production and productivity. 3. Integrate project planning, i.e., leaf to cloth (soil to silk) 4. Cluster approach in pre- and post-cocoon sectors (i.e. mulberry cultivation, silkworm rearing, silk reeling, twisting, weaving sectors).
Animal Husbandry	<ol style="list-style-type: none"> 1. Enhance milk production and productivity/animal; enable all supporting services 2. Promote higher egg production and value addition within the state. 3. Encash huge demand for meat. Provide better breeds and emergency animal health care 4. Establish modern wool harvesting, processing and marketing centers with private entrepreneurs.
Diary	<ol style="list-style-type: none"> 1. Develop dairy value chain in uncovered areas under cooperative ambit. 2. Provide online Milk Monitoring & Payment Gateway (OMM&PG) Milkosoft -aiming direct

	<p>payment to farmers through their bank account to enable timely payment to farmers.</p> <ol style="list-style-type: none"> Increase the share of milk procurement by organized sector to about 70% from the present level of 30% in next five years by 2018-19 by establishing rural cold chain, i.e., Bulk Milk Cooling Units (BMCUs), Milk Chilling Centers (MCC), Dairy Plants under Cooperative, Joint Ventures and PPP modes. Evolve effective coordination between livestock development and dairy development activities to ensure seamless service delivery to farmers.
Fisheries	<ol style="list-style-type: none"> Establish more fishing harbours in Juvvaladinne (Nellore District), Uppada (East Godavari District), Vadarevu (Prakasam District) and Nizampatnam Phase-II (Guntur District) through PPP mode. Establish SPF brood stock for fresh water aquaculture and brackish water aquaculture and import of SPF seed for shrimp farming to make available quality seed to shrimp farmers. Provide a policy framework to promote fish processing and fish feed industry by private players and for allotment of marine areas and areas in large reservoirs for Cage Culture through Fishermen Cooperatives/private participation. Promote large-scale participation of women through Mahila Matsya Mitra Groups (MMGs) in fish marketing and fish processing through upgradation of their skills Promote "Blue Revolution" through a multipronged approach including large-scale Cage Culture in the sea and large reservoirs in coordination with CMFRI, establishment of cold chain, etc., through PPP mode/Government schemes.
Agricultural Marketing	<ol style="list-style-type: none"> Strengthen the existing <i>Rythu bazaars</i> and establish new <i>Rythu bazaars</i> wherever feasible. Link these bazaars to efficient agri-logistics parks (includes storage, cold storage, transportation and others) in hub and spoke model across the state to be established in collaboration with private agencies on Build-Own-Operate model. They may utilize Warehouse Infrastructure Fund of GOI. Establish NCDEX (National Commodity and Derivatives Exchange of GOI) terminals across the state to enable transparent procurement, grading, pricing, e-trading and providing credit. A good bet for low investment and high benefits. This can be done for all major commodity markets across the state. Rythu Bandhu Pathakam – pledge Loan to increase from Rs. 1 Lakh to 2 Lakhs, free of interest up to 180 days.
Common to all sectors	<ol style="list-style-type: none"> The crop yield gaps between the state and the country should be reduced through introduction of high-yielding varieties and better extension facilities. Skill upgradation at all levels of government departments, private agencies and farmers. Enabling single window facilities for availing all kinds of support from the government agencies. Establish on PPP mode, pay and use, technological and knowledge sharing mechanisms for farmers and any other users. Innovative and technologically easy to operate and access extension systems to all farmers in all sectors. Set up a Help Center with three digits (24x7), for agriculture and allied sectors. In all sectors, promote small, medium and big entrepreneurs for all value addition activities with adequate financial incentives and approvals under single window system. Build and operate efficient and tech-savy MIS for all sectors with easy access to all government agencies (at all levels), farmers, traders, processing industries and universities/colleges. Design and implement result framework document in all departments Introduce suitable policies and guidelines to promote value addition at all levels and mobilize funds.

References

GOAP.2014a. Agricultural Budget Speech (2014-15), presented by Prathipati Pulla Rao, Minister of Agriculture, Government of Andhra Pradesh on 20 August 2014 in the Assembly Session held in Hyderabad.

GOAP.2014b. Budget Speech 2014-15, presented by Yanamala Ramakrishnudu, Minister for Finance, Government of Andhra Pradesh, on 20 August 2014 in Assembly Session held in Hyderabad.

GOAP. 2014c. White Paper on Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries and Agricultural Marketing, 23 July 2014. Accessed from website: www.ap.gov.in. on 23 August 2014.

List of Participating Departments and other agencies for Mission on Primary Sector

- ❖ Department of Agriculture
- ❖ Department of Rural Development
- ❖ Department Horticulture
- ❖ Department of Sericulture
- ❖ Department of Animal Husbandry
- ❖ Department of Fisheries
- ❖ Department of Irrigation
- ❖ Department of Ground Water
- ❖ Department of Marketing
- ❖ Department of Forestry
- ❖ Department of Civil Supplies
- ❖ Acharya N G Ranga Agricultural University
- ❖ S.V. Veterinary University
- ❖ Dr. Y.S.R. Horticultural University
- ❖ A.P. Biodiversity Board
- ❖ ICRISAT
- ❖ A.P. Micro Irrigation Project
- ❖ A.P.MARKFED
- ❖ A.P.OILFED
- ❖ A.P.AGROS
- ❖ Society for Elimination of Rural Poverty(SERP)
- ❖ A.P. State Irrigation Development Corporation
- ❖ A.P. Dairy Development Federation
- ❖ A.P. Meat & Poultry Development Corporation
- ❖ A.P. State Civil Supplies Corporation
- ❖ A.P. State Seeds Development Corporation
- ❖ A.P. State Seed Certification Agency
- ❖ A.P. State Remote Sensing Application Center (APSRAC)
- ❖ A.P.State Warehousing Corporation
- ❖ National Research Institutions

About ICRISAT



International Crops Research Institute for the Semi-Arid Tropics

The **International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)** is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, of whom 644 million are the poorest of the poor. ICRISAT innovations help the dryland poor move from poverty to prosperity by harnessing markets while managing risks – a strategy called Inclusive Market-Oriented Development (IMOD).

ICRISAT is headquartered in Patancheru near Hyderabad, Andhra Pradesh, India, with two regional hubs and five country offices in sub-Saharan Africa. It is a member of the CGIAR Consortium. CGIAR is a global research partnership for a food secure future.

About ICRISAT: www.icrisat.org

ICRISAT-Patancheru (Headquarters)

Patancheru 502 324
Telangana, India
Tel +91 40 30713071

ICRISAT-Liaison Office

CG Centers Block, NASC Complex
Dev Prakash Shastri Marg
New Delhi 110 012, India

ICRISAT-Addis Ababa

C/o ILRI Campus
PO Box 5689
Addis Ababa, Ethiopia

ICRISAT-Bamako

(Regional hub WCA)
BP 320, Bamako, Mali

ICRISAT-Bulawayo

Matopos Research Station
PO Box 776, Bulawayo, Zimbabwe

ICRISAT's scientific information: <http://EXPLOREit.icrisat.org>



ICRISAT is a member of the CGIAR Consortium

ICRISAT- Kano

PMB 3491
Sabo Bakin Zuwo Road
Tarauni, Kano, Nigeria

ICRISAT-Lilongwe

Chitedze Agricultural
Research Station
PO Box 1096, Lilongwe, Malawi

ICRISAT-Maputo

C/o IIAM, Av. das FPLM No 2698
Caixa Postal 1906
Maputo, Mozambique

ICRISAT-Nairobi

(Regional hub ESA)
PO Box 39063, Nairobi, Kenya

ICRISAT-Niamey

BP 12404, Niamey
Niger (Via Paris)

