

**FARMING SYSTEM FOR NUTRITION:
NEED AND SCOPE IN ANDHRA PRADESH**

**R. Rukmani
G. Anuradha
R. Gopinath
Samyuktha Kannan**

July 2018

M. S. Swaminathan Research Foundation

Chennai

MSSRF / RR / 18 / 49

CONTENTS

Abbreviations

Acknowledgments

- Section 1:** Introduction
- Section 2:** Nutritional Profile of Andhra Pradesh
- Section 3:** Agricultural Profile of Andhra Pradesh
- Section 4:** Biofortification
- Section 5:** Policy Landscape Analysis of Andhra Pradesh
- Section 6:** Recommendations for Promoting Farming System for Nutrition in Andhra Pradesh
- Appendix – A** Review of Policy Agenda: Goals and Visions Recognized by the Andhra Pradesh State Government
- Appendix – B** Review of Policy Adoption: Schemes and Programs Adopted by the Andhra Pradesh State Government

Abbreviations

ADB	Asian Development Bank
APMC	Agriculture Produce Marketing Committee
ATMA	Agriculture Technology Management Agency
AWCs	Anganwadi Centres
BCC	Behaviour Change Communication
BMI	Body Mass Index
CCSAMMN	Climate Change and Sustainable Agriculture Monitoring, Modelling and Networking
CED	Chronic Energy Deficiency
CROPSAP	Crop Pest Surveillance and Advisory Project
CSR	Corporate Social Responsibility
CU	Consumer Unit
FSN	Farming System for Nutrition
FPO	Farmer Producer Organization
GCA	Gross Cropped Area
GDP	Gross Domestic Product
GoAP	Government of Andhra Pradesh
GoI	Government of India
IFS	Integrated Farming Systems
ICAR	Indian Council of Agricultural Research
ICDS	Integrated Child Development Services
ICMR	Indian Council of Medical Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agriculture Development
IMR	Infant Mortality Rate
INM	Integrated Nutrient Management
INSIMP	Initiative for Nutritional Security through Intensive Millets Promotion
IWMP	Integrated Watershed Management Programme
KVK	Krishi Vigyan Kendra
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act

MIDH	Mission for Integrated Development for Horticulture
MIS	Management Information System
MIYCN	Maternal, Infant and Young Child Nutrition
MMR	Maternal Mortality Rate
MPKV	Mahatma Pule Krishi Vidyapeeth
MSSRF	M. S. Swaminathan Research Foundation
NABL	National Accreditation Board for Testing & Calibration Laboratories
NFSM	National Food Security Mission
NIRD &PR	National Institute of Rural Development and Panchayati Raj
NLM	National Livestock Mission
NMAET	National Mission for Agriculture Extension and Technology
NMSA	National Mission for Sustainable Agriculture
NRCs	National Rehabilitation Centres
NSSO	National Sample Survey Organisation
PACS	Primary Agricultural Credit Societies
PKVY	Paramparagat Krishi Vikas Yojana
PPP	Public Private Partnership
RDA	Recommended Dietary Allowance
RDI	Recommended Dietary Intake
RKVY	Rashtriya Krishi Vikas Yojana
SC	Scheduled Caste
SHC	Soil Health Card
SHGs	Self-Help Groups
ST	Scheduled Tribe
UNICEF	United Nations Children's Fund
VDCs	Village Development Councils
WHO	World Health Organisation

Acknowledgements

Our Founder Chairman, Prof. M. S. Swaminathan, who developed the concept of Farming System for Nutrition (FSN), has given us immense support in our current engagement of advocacy for the FSN approach to address the problem of malnutrition in the states of Andhra Pradesh, Bihar, Maharashtra and Odisha. I am extremely grateful to him for the interest he took in our work and for his constant guidance, encouragement and above all the trust he placed in me and my team.

Completing the project requirements across the target States, within a short span of 18 months, has been possible only because of the commitment, sincerity and hard work of my team comprising of G. Anuradha, R. Gopinath, A. Sakthi Velan, Samyuktha Kannan, R. Sanjeev and Varun Kumar Yadav. Conducting orientation and advocacy events on FSN, for different stakeholders, was a key method adopted in this project. In this, R. Gopinath played a pivotal role in building rapport with senior government officers, in networking with concerned institutions and organising the events. G. Anuradha took on the crucial responsibility of preparing a range of background and dissemination material and developing and maintaining the web related communication. Preparation of Reports pertaining to each of the target States, such as the current report, *“Farming System for Nutrition: Need and Scope in Andhra Pradesh”* is an important output of the project. My co-authors- G.Anuradha, R. Gopinath and Samyuktha Kannan- have drafted different sections : the core section , the Policy Landscape Analysis, was conceived and written by Samyuktha Kannan; the Nutritional Profile by G. Anuradha; and Agricultural Profile by R. Gopinath. Information on biofortified crops was compiled by R. Sanjeev; Varun Kumar Yadav compiled and analysed relevant data and documents and provided overall assistance. A. Sakthi Velan has provided meticulous secretarial assistance. I acknowledge with thanks the valuable contribution of each of my teammates.

Dr. Prakash Shetty, CEO, LANSA, has provided guidance and encouragement all through; R. V. Bhavani and L. Vedavalli supported in many different ways; the Executive Director and other colleagues at the MSSRF have provided all necessary support; members of the Technical Advisory Committee of the project have provided guidance; and the Tata Trusts provided financial support without which this work would not have been possible; my sincere thanks to all.

Senior officials from the Government of Andhra Pradesh have been extremely supportive and receptive to the concept of FSN. We are particularly grateful to Shri. B. Rajsekhar, IAS, Special Chief Secretary, Agriculture and co-operation, Government of Andhra Pradesh. Dr. W.R. Reddy, Director General, National Institute of Rural Development and Panchayati Raj (NIRD&PR), Hyderabad, Prof. N.K,R.K. Sarma, Coordinator, Primary Sector Mission, Dept. of Agriculture and colleagues from NIRD & PR and Extension Training Centre, Sri Kalahasthi have been extremely supportive and we are grateful to them.

R. Rukmani
Director, Food Security

Section 1: INTRODUCTION

One of the major issues concerning India is the persistent problem of malnutrition, particularly among children and women. Over the several decades of planned development, many different programmes and schemes have been put in place to tackle the problem of malnutrition across different age groups of population, and focusing on infancy, childhood, adolescence and women in their reproductive years. In spite of various efforts, including rapid advances made in food production, malnutrition persists in India in unacceptable levels. Stunting, wasting and underweight among children, anaemia and chronic energy deficiency among women remain key public health challenges in India. The prevalence of malnutrition in India has accompanied a reduction in diversity of food crop production over the years. There has been a tendency towards cereal-dominant farming systems of rice and wheat, with a decline in production of a variety of millets and pulses over time, in the country.

Malnutrition is caused by multiple factors and any approach to tackle the problem of malnutrition would require a holistic, multidimensional approach. A combination of nutrition specific interventions and nutrition sensitive interventions is required to address malnutrition¹. The United Nations Children's Fund's (UNICEF) conceptual framework identifies household food insecurity as one of the underlying causes of malnutrition (UNICEF, 2017). For much of India's rural population dependent on agriculture and allied activities, household food security and nutrition is closely linked to farm diversity, productivity and profitability.

M. S. Swaminathan Research Foundation (MSSRF) promotes the Farming System for Nutrition (FSN) as a pathway for addressing malnutrition in India. The FSN approach is defined by M. S. Swaminathan as:

“The introduction of agricultural remedies to the nutritional maladies prevailing in an area through mainstreaming nutritional criteria in the selection of the components of a farming system involving crops, farm animals and wherever feasible, fish” (Nagarajan et. al, 2014).

¹ Nutrition-specific interventions address the immediate causes of undernutrition, like inadequate dietary intake and some of the underlying causes like feeding practices and access to food. Nutrition-sensitive interventions address some of the underlying and basic causes of malnutrition by incorporating nutrition goals and actions from a wide range of sectors such as agriculture, education and social welfare (UNICEF, 2017).

The FSN approach comprises a combination of measures including advanced crop production practices, biofortification², promotion of kitchen gardens of fruits and vegetables, livestock and poultry development, and setting up of small-scale fisheries, combined with nutrition awareness. Primarily, the approach calls for the promotion of location-specific farming systems that integrate arable farming, horticulture, backyard farming and animal farming to sustainably improve household availability of nutrition while also mitigating risk and conserving natural resources. In developing a design for the farming system, feasible agricultural interventions to address the nutritional deficiencies of the household/community/location would have to be incorporated. In the words of M. S. Swaminathan, “.....the design of the farming system [can] include specific crop varieties that can address the identified deficiencies. Sweet potato might provide vitamin A, drumstick tree (*moringa olifera*) and *Amaranthus sp.* could address the lack of iron.” (Rao and Swaminathan, 2017) In addition, the approach recognises the need for other direct interventions – to improve production and market linkages of nutritious crops - and indirect interventions – to improve women’s empowerment, nutrition, education, drinking water, sanitation and natural resource management, along the pathway from agriculture to nutrition (Das et al, 2014; Gillespie and Kadiyala, 2012; Shetty, 2015).

In the Indian context where malnutrition levels are closely linked to inadequacy in food intake as well as lack of balanced diet among the rural population, the FSN approach that promotes on-farm production diversity has the potential to enhance consumption diversity. However, given the magnitude of the problem of malnutrition the FSN approach has to become a state initiative to contribute towards enhancing food security and nutrition for large sections. There is thus a pressing need to reorient agricultural policies towards achieving nutritional goals. Agricultural policies can affect nutrition through different pathways, such as through food production, or agricultural income or women’s empowerment. Agricultural policymaking across the different domains should become more nutrition-sensitive and aim to unite the twin goals of agricultural growth and nutritional improvements (Gillespie & Kadiyala, 2012).

² Biofortification is a process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding or modern biotechnology (WHO, 2016).

The Farming System for Nutrition approach can be seen as encompassing 8 distinct domains. At its core, the approach calls for improving agricultural production diversity by incorporating an integrated farming system involving crops, livestock and aquaculture in the field or in the homestead. Other core domains that can directly improve the local availability of deficient nutrients include agricultural production, biofortification and agricultural value chains. Indirect or non-core domains that supplement the food related processes, include nutrition-education, women’s empowerment, sanitation, hygiene and safe drinking water and natural resource management (**Fig 1.1**).

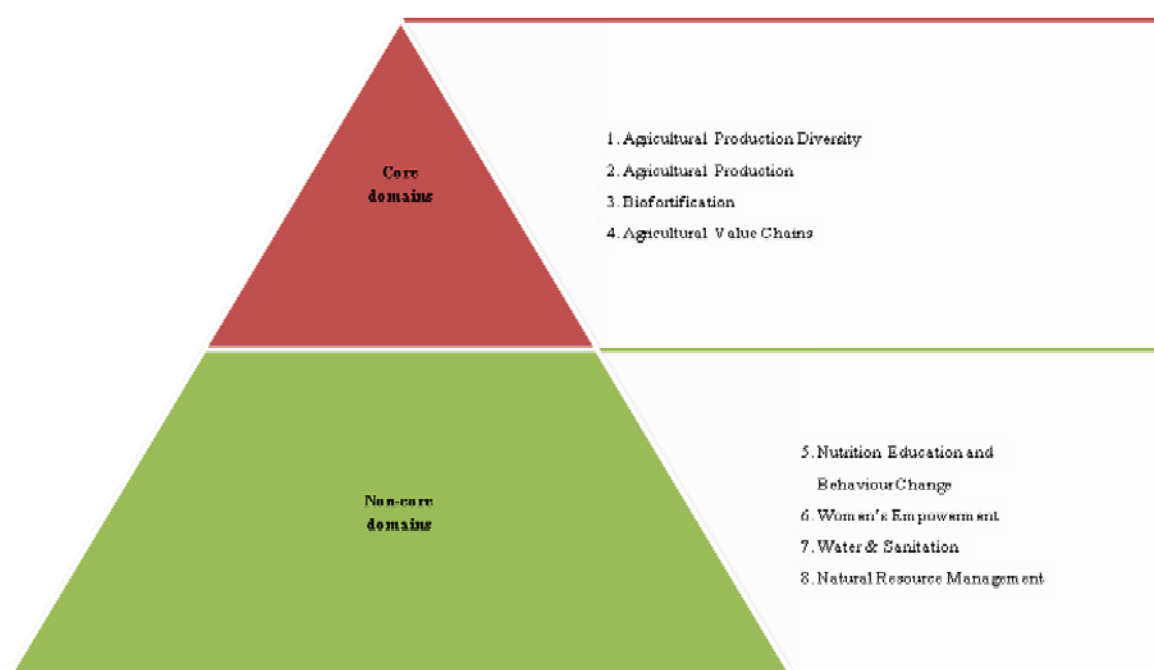


Fig 1.1. Domains of Farming System for Nutrition

MSSRF has been engaged in advocacy for a FSN approach in four selected states-Andhra Pradesh, Bihar, Maharashtra, Odisha- and has undertaken a policy landscape analysis to explore the scope for FSN in these states (For details see <http://mssrf-fs-fsn.com/>).

The current Report discusses the need and scope for a FSN approach in the state of Andhra Pradesh. Andhra Pradesh, despite undergoing reorganization in 2014 is one of the largest and fastest growing states in India. The economy grew at 10.99 percent in 2015-16 buoyed by the services and agriculture sectors. In recent years, the state government has taken efforts to overcome the challenge posed by reorganization and increased climatic variability, and has

adopted several resolutions envisioning an inclusive growth path for the state. However, the state's economic growth is restrained by persistent malnutrition, especially in children and women. Other socio economic indicators of development, such as, literacy rates are relatively lower in the state compared to all India. Further, the state also has a relatively larger proportion of marginalised communities - Scheduled Tribes account for 17% of total population in the State while Scheduled Castes account for another 17% (as against 8% and 16% respectively, in the country as a whole). Close to 60% of total main workers (in 2011) are supported by agriculture in Andhra Pradesh, though the share of agriculture to gross state domestic product is just 24% (in 2014-15), indicating relatively low levels of agricultural productivity and income (GoAP, 2017a). Moreover, 86% of households own and operate small or marginal holdings in Andhra Pradesh. The state could undertake new approaches, such as, nutrition sensitive agriculture to address the problems of malnutrition

The Report is organised in six sections: Section 1, the current section, discusses the context and perspective on FSN; Sections 2 and 3 discuss aspects relating to the nutritional and agriculture status of Andhra Pradesh; Section 4 provides details on biofortified crops suitable for adoption in Andhra Pradesh; Section 5 provides a desk review of government policies (central and state) that foster nutrition-sensitive agriculture in the state of Andhra Pradesh; and Section 6 provides the policy recommendations for promoting farming system for nutrition approach in Andhra Pradesh.

Section 2: NUTRITIONAL PROFILE

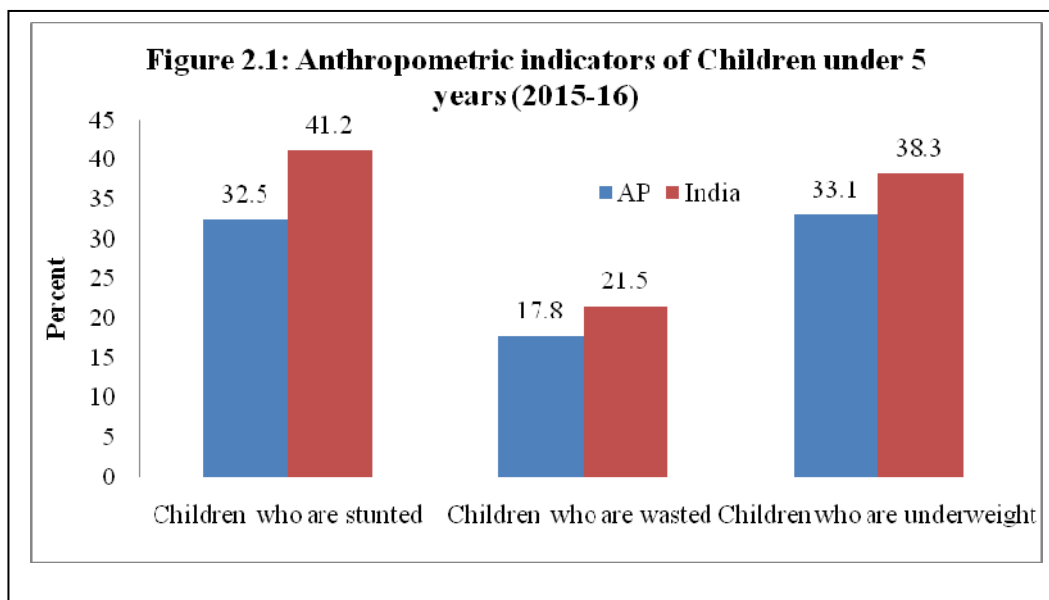
2.1 Nutritional Status of Children and Women

Andhra Pradesh has registered impressive economic growth in the recent decades but has had limited success in reducing malnutrition or in improving other socio economic indicators of development. Government of Andhra Pradesh has recognised nutrition as a development priority and initiated the State Mission for Nutrition in 2016, for a period of 10 years ending 2026. The Mission will be implemented through the Women and Child Welfare Department in coordination with concerned Departments.

The mission intends to contribute towards the following attributes:

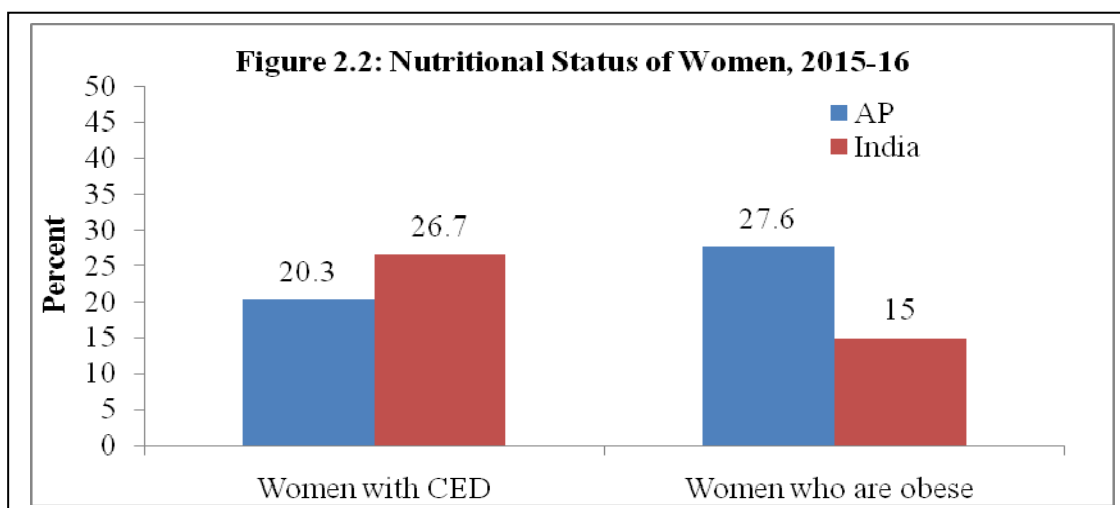
- a) Increase breastfeeding in children within one hour of birth, by 25% points, in reference to the baseline figure of 40.1% in 2015-16, by 2026.
- b) Increase exclusive breastfeeding rates by 20%, in reference to the baseline figure of 70.2% in 2015-16, by 2026.
- c) Increase in the number of children receiving solid and semi-solid foods and breast milk by 20% points, in reference to the baseline figure of 56.1% in 2015-16, by 2026.
- d) Increase in the number of infants 6-23 months receiving adequate diet (four food groups), by 25% points, in reference to the baseline figure of 7.6% in 2015-16, by 2026.
- e) Reduce the prevalence of stunting by 15% points, in reference to the baseline figure of 31.9% in 2015-16, by 2026.
- f) Reduce the prevalence of anaemia among women of reproductive age by 20% points, in reference to the baseline figure of 60.2% in 2015-16, by 2026.
- g) Reduce the prevalence of low birth weight by 10% points in reference to the baseline figure of 19% in 2005-06, by 2026.

Figures 2.1 to 2.4 highlights the nutritional status of women and children in rural Andhra Pradesh and India. As is clear from **Figure 2.1**, Andhra Pradesh performance is better than the national average with respect to all the three indicators of child malnutrition (stunting or low height for age, wasting or low weight for height and underweight or low weight for age). However, the status of malnutrition continues to remain a challenge with nearly one-third of children in 2015-16 stunted and underweight. Women's malnutrition is measured by the level of Chronic Energy Deficiency (CED) or Body Mass Index $< 18.5 \text{ kg/m}^2$.

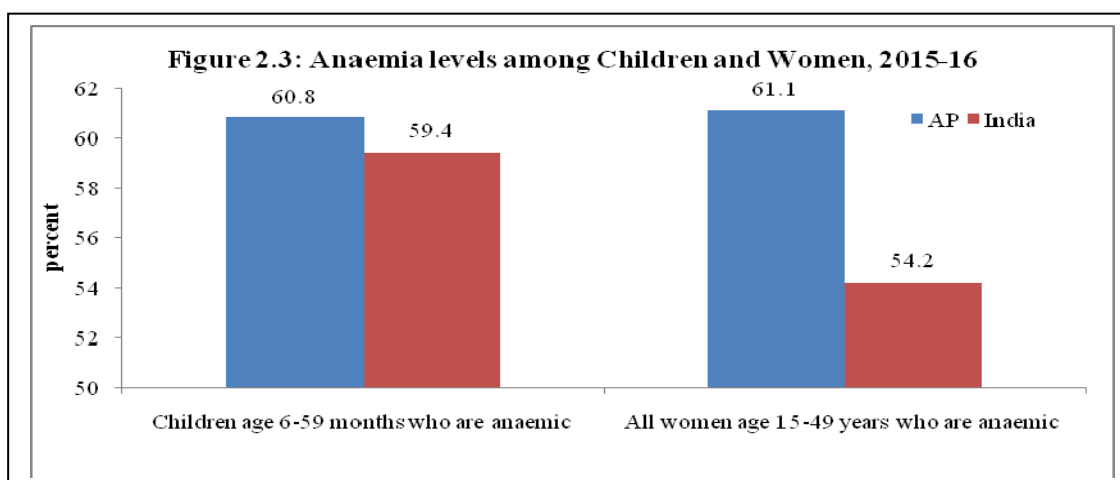


Source: IIPS-ICF, 2017

Figure 2.2 indicates that obesity is emerging as a nutritional problem even in rural Andhra Pradesh. **Figure 2.3** indicates that around three-fifth of women and children are still anaemic in rural Andhra Pradesh.

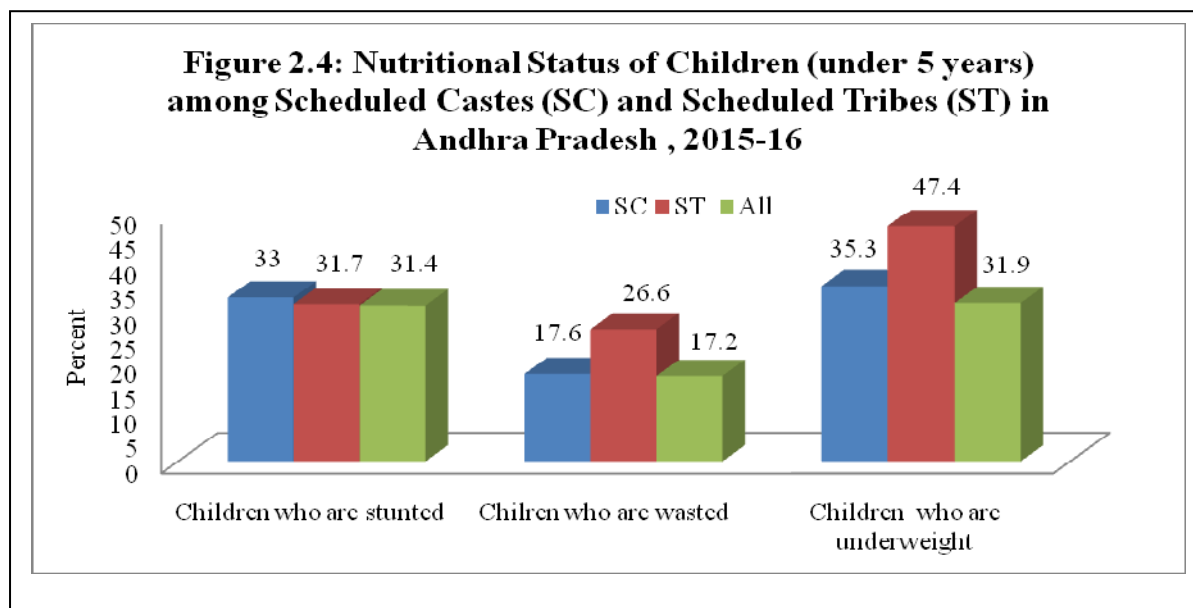


Source: IIPS-ICF, 2017



Source: IIPS-ICF, 2017

The nutrition status of women and children vary across social groups. **Figure 2.4** shows that the problem of wasting and underweight of children is most severe among ST category.



Source: IIPS-ICF, 2017

Table 2.1: Nutritional Status of Children and Women across districts, Rural Andhra Pradesh, 2015-16

Sl. No:	Districts	Children under 5 years who are stunted (%)	Children under 5 years who are wasted (%)	Children under 5 years who are underweight (%)	Children age 6-59 months who are anaemic (%)	Women with Chronic Energy Deficiency (CED) (%)	Non – Pregnant women age 15-19 years who are anaemic (%)
1.	Anantapur	38.7	16.3	38.7	51.0	24.5	49.7
2.	Chittoor	31.7	16.3	33.6	46.4	23.6	48.1
3.	East Godavari	29.7	16.9	28.2	65.7	18.2	69.1
4.	Guntur	23.4	19.5	33.7	78.9	12.6	60.5
5.	Cuddapah	37.4	18.0	34.8	57.7	22.0	59.2
6.	Krishna	23.8	27.1	34.2	64.0	14.9	60.0
7.	Kurnool	44.7	18.2	35.6	54.9	23.7	53.3
8.	Prakasam	27.8	16.8	29.1	57.8	17.9	59.4
9.	Nellore	32.0	18.2	31.5	49.8	18.8	59.3
10.	Srikakulam	28.1	15.0	29.8	73.0	22.7	71.8
11.	Vishakhapatnam	36.8	15.0	38.7	68.5	27.6	69.9
12.	Vizianagaram	42.0	19.4	37.8	80.9	29.7	77.1
13.	West Godavari	26.8	14.3	29.1	55.5	16.3	61.5
	Andhra Pradesh	32.5	17.8	33.1	60.8	20.3	61.1

Note: CED – Body Mass Index < 18.5 kg/m²; Child Anaemia - Haemoglobin level < 11.0 grams/decilitre and Non-pregnant women anaemia – Haemoglobin level <12 gm/dl

Source: IIPS-ICF, 2017

Table 2.1 reflects the large variation in the intensity of nutritional problems across districts. In order to understand if there are spatial patterns to the nutritional problems, an exercise at grouping the districts based on their nutritional performance was attempted. In grouping the districts, the values for each indicator (stunting, wasting, underweight, anaemia and CED) was classified into three categories using equal interval classes based on the level of the problem, namely, low, moderate and high. Districts with lower value had relatively lower problems while districts with higher values reflect relatively higher extent of the problem. In the maps, the darker shaded districts indicate relatively higher intensity of the nutritional problem than the lighter shaded districts. (Tables 2.2 to 2.7 and Figures 2.5 to 2.9)

Table 2.2: Categorisation of districts, by Level of Insecurity w.r.to Stunting, Rural Andhra Pradesh, 2015-16

Level of Insecurity	Names of Districts
Low	Guntur, Krishna, West Godavari, Prakasam, Srikakulam, East Godavari
Moderate	Chittoor, Nellore, Vishakhapatnam, Cuddapah
High	Anantapur, Vizianagaram, Kurnool

Note: Percentage of children stunted in different categories is as follows: 23-31% in low; 32-38% in moderate and 39-45% in high.

Source: Table 2.1

Fig 2.5 Percentage of Children Stunted

Percentage of stunted children varies widely across the districts of rural Andhra Pradesh with a minimum of 23 in Guntur to a maximum of 45 in Kurnool in 2015-16. Six districts fall in the low intensity of problem category as the percentage of children stunted is less than 30%. On the contrary, in 5 out of 13 districts the problem is much higher than the state average of 32.5 per cent. More than two-fifth of the children are stunted in these districts and they are categorised as districts with ‘high’ intensity of the problem.

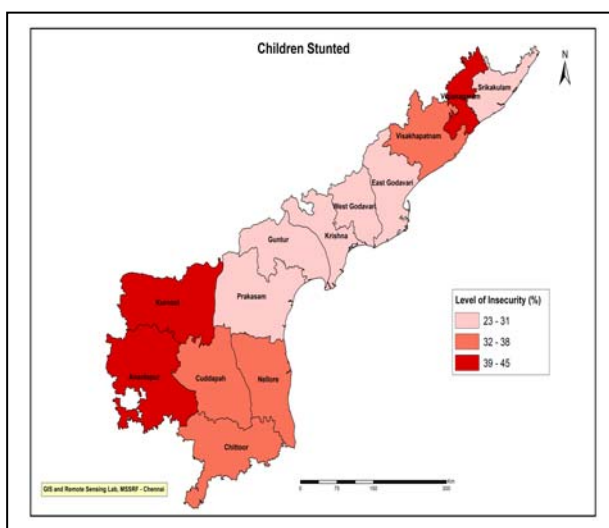


Table 2.3: Categorisation of districts, Level of Insecurity w.t.to Wasting, Rural Andhra Pradesh, 2015-16

Level of Insecurity	Names of Districts
Low	West Godavari, Srikakulam, Vishakhapatnam, Anantapur, Chittoor, Prakasam, East Godavari
Moderate	Cuddapah, Kurnool, Nellore, Vizianagaram, Guntur
High	Krishna

Note: Percentage of children wasted in different categories are as follows: 14-17% in low; 18-20% in moderate and 21-27% in high.

Source: Table 2.1

Percentage of children who are wasted varies widely across the districts of rural Andhra Pradesh with a minimum of 14% in West Godavari to a maximum of 27% in Krishna in 2015-16. 7 out of 13 districts fall in the low insecurity category as the percentage of children wasted is lower than one-fifth in these districts. On the contrary Krishna district have 27% of children who are wasted and fall in the high insecurity category. The average percentage of wasted children in rural Andhra Pradesh is 17.8 and it is clear that

in 6 districts in the moderate and high insecurity categories the problem is worse than the state average.

Fig 2.6 Percentage of Children Wasted

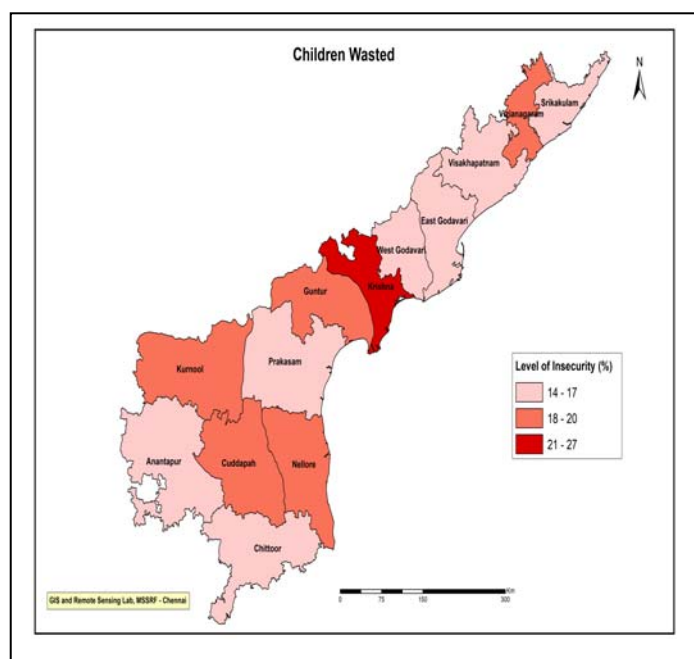


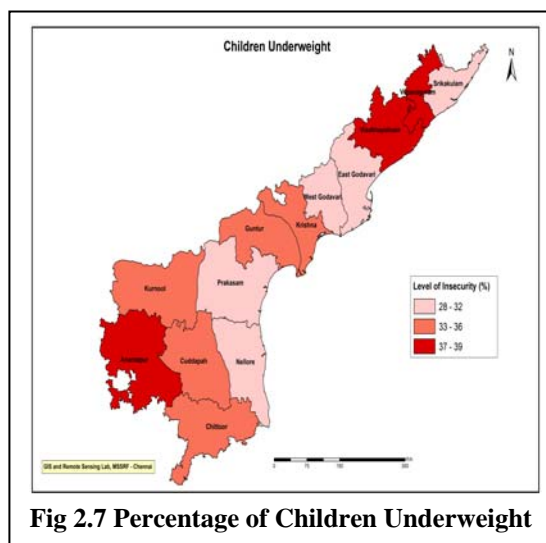
Table 2.4: Categorisation of districts, Level of Insecurity w.r.to Underweight, Rural Andhra Pradesh, 2015-16

Level of Insecurity	Names of Districts
Low	East Godavari, Prakasam, West Godavari, Srikakulam, Nellore
Moderate	Chittoor, Guntur, Krishna, Cuddapah, Kurnool
High	Vizianagaram, Anantapur, Vishakhapatnam

Note: Percentage of children underweight in different categories is as follows: 28-32% in low; 33-36% in moderate and 37-39% in high.

Source: Table 2.1

Percentage of underweight children varies widely across the districts of rural Andhra Pradesh with a minimum of 28% in East Godavari to a maximum of 39% in Vishakhapatnam with the state average of 33.1% in 2015-16. East Godavari, Prakasam, West Godavari, Srikakulam and Nellore districts fall in the low insecurity category as the percentage of underweight children are relatively lower in these districts. On the contrary Vizianagaram, Anantapur and Vishakhapatnam districts have more than 38% of children who are underweight. The percentage of underweight children in 8 out of 13 districts is above the state average and mostly falls in the moderate and high insecurity categories.



Anaemia is a major health problem in Andhra Pradesh, particularly among women and children³.

Table 2.5: Categorisation of districts, Level of Insecurity w.r.to children anaemia, Rural Andhra Pradesh, 2015-16

Level of Insecurity	Name of Districts
Low	Chittoor, Nellore, Anantapur
Moderate	Kurnool, West Godavari, Cuddapah, Prakasam, Krishna, East Godavari
High	Vizianagaram, Anantapur, Vishakhapatnam

Note: Percentage of children anaemic in different categories is as follows: 46-51% in low; 52-66% in moderate and 67-81% in high.

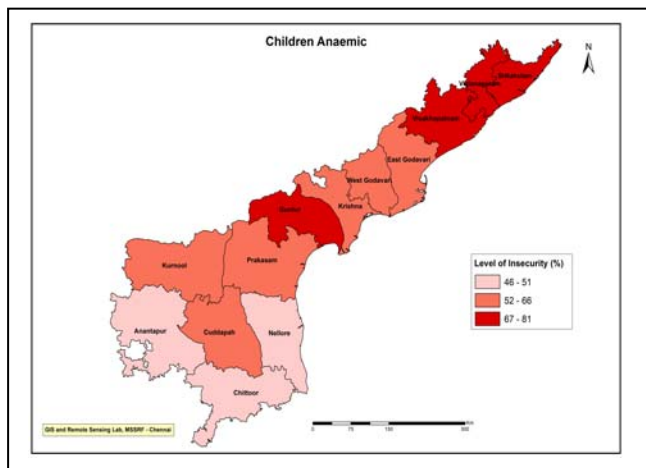
Source: Table 2.1

Percentage of children who are anaemic in rural Andhra Pradesh varies widely across the districts with a minimum of 46% in Chittoor and a maximum of 81% in Vizianagaram. On an average 61% of children are anaemic in rural Andhra Pradesh. 6 districts that largely fall in the high insecurity categories have higher percentages of children who are anaemic than the state average. Chittoor, Nellore and Anantapur districts have relatively lower percentage of

³ Anaemia is a condition that is marked by low levels of haemoglobin in the blood. Iron deficiency is the major cause for anaemia with malaria, hookworms, other nutritional deficiencies, chronic infections, and genetic conditions being other contributors. Anaemia can result in weakness, diminished physical and mental capacity, and increased morbidity from infection, etc among children and women (IIPS-ICF, 2017).

children with anaemia while Vizianagaram, Anantapur and Vishakhapatnam districts have more than 67% of children who are anaemic.

Fig 2.8 Percentage of Children with Anaemia



It is clear from the above analysis that in West Godavari, East Godavari, Prakasam and Srikakulam districts the intensity of nutritional problems among children with respect to at least three indicators of child malnutrition is relatively lower. On the other hand, Vizianagaram and Anantapur are the districts where the problem is relatively severe with respect to at least

three of the child malnutrition indicators.

Table 2.6: Categorisation of districts, Level of Insecurity w.r.to Women Chronic Energy Deficiency (CED), Rural Andhra Pradesh, 2015-16

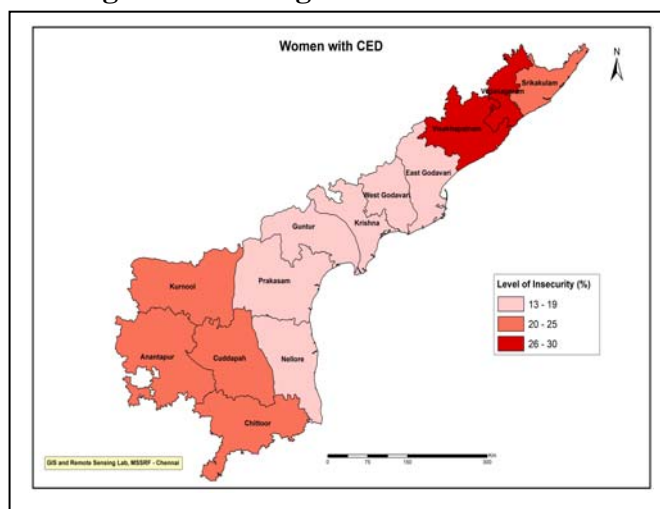
Level of Insecurity	Name of Districts
Low	Guntur, Krishna, West Godavari, Prakasam, East Godavari, Nellore
Moderate	Cuddapah, Srikakulam, Chittoor, Kurnool, Anantapur
High	Vishakhapatnam, Vizianagaram

Note: Percentage of women with CED in different categories is as follows: 13-19% in low; 20-25% in moderate and 26-30% in high.

Source: Table 2.1

As regards nutritional problems among women, the percentage of women with CED was lowest in Guntur district at 13% and highest in Vizianagaram district at 30%, in 2015-16. On an average 20% of women were suffering from CED in rural Andhra Pradesh and 7 districts recorded a higher percentage of women with CED than the state average. Guntur, Krishna, West Godavari, Prakasam, East Godavari and

Fig 2.9 Percentage of Women with CED



Nellore are the districts with relatively lower percentage of women with CED while Vishakhapatnam and Vizianagaram districts were in the high insecurity levels.

Table 2.7: Categorisation of districts, Level of Insecurity w.r.to Women Anaemia, Rural Andhra Pradesh, 2015-16

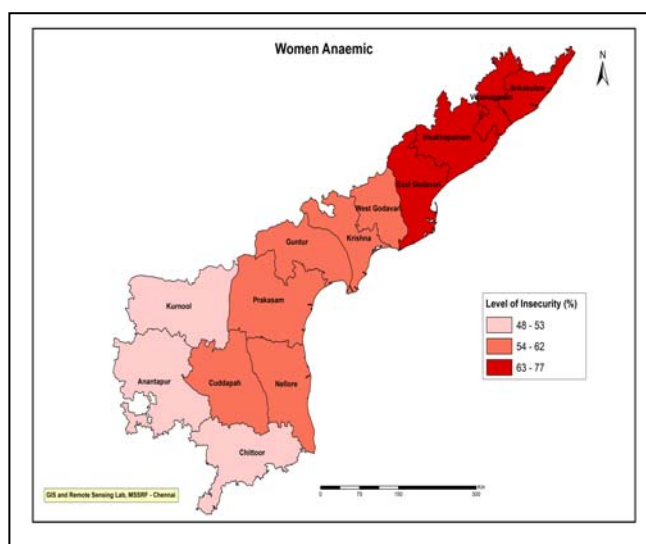
Level of Insecurity	Name of Districts
Low	Chittoor, Anantapur, Kurnool
Moderate	Cuddapah, Nellore, Prakasam, Krishna, Guntur, West Godavari
High	East Godavari, Vishakhapatnam, Srikakulam, Vizianagaram

Note: Percentage of anaemic women in different categories is as follows: 48-53% in low; 54-62% in moderate and 63-77% in high.

Source: Table 2.1

Fig 2.10 Percentage of Women with Anaemia

On an average 61% of women in the reproductive age group in rural Andhra Pradesh suffer from any form of anaemia. The intensity of the problem varies widely across the districts. Chittoor district recorded the minimum with 48% of women anaemic while Vizianagaram had the maximum with 77% of women anaemic. Five districts that largely fall in the high insecurity categories have higher percentage of women with CED than the state average.



Vizianagaram and Vishakhapatnam are the two districts that have relatively higher problems with respect to the two indicators of women malnutrition, whereas the status of districts is mixed in the lower intensity areas.

On the whole, in rural Andhra Pradesh, East Godavari, West Godavari and Prakasam are the districts which have very low intensity of nutritional problems with respect to children and

women whereas Vizianagaram and Vishakhapatnam are the two districts which have very high intensity of nutritional problems with respect to children and women⁴.

2.2 Average Consumption Levels

Some of the immediate factors influencing the malnutrition levels of women and children are related to the quantity and quality of food intake. To lead a healthy life human beings need to consume a well balanced diet which includes various nutrients in proper proportions: cereals, roots and tubers (that provide energy and fibre to the body); protein rich foods like pulses, meat, fish, eggs and milk and milk products (that help to build muscles); sugars and oil (that give instant energy); and fruits and vegetables (that provide the vitamins and minerals required for many metabolic functions in the body).

Using, available secondary data on quantity of food intake it is seen that the per capita average monthly intake of cereals in rural Andhra Pradesh is 11.77 kg, is equal to the recommended dietary intake (RDI) norm of 12kg/month/person. Rice is the major cereal consumed in rural Andhra Pradesh. Average per capita consumption of pulses and milk in rural Andhra Pradesh and rural India is much lower than the daily recommended intake (**Table 2.8**). **Table 2.9** indicates that with respect to all nutrients the average consumption levels are lower than the RDA⁵.

⁴ It is beyond the scope of this Report to examine the factors underlying the observed spatial patterns of nutritional problems in rural Andhra Pradesh.

⁵ Recommended Dietary Allowances are estimates of intakes of nutrients which individuals in a population group need to consume to ensure that the physiological needs of all subjects in that population are met.

Table 2.8: Monthly per capita average consumption of selected commodities in rural areas, 2011-12

Commodities	Monthly Per capita average consumption of food items in rural areas	
	Andhra Pradesh	India
Rice (kg)	10.83	6.03
Wheat (kg)	0.27	4.29
Total cereals	11.77 (98%)	11.22 (94%)
Arhar (Tur) –kg	0.46	0.21
Moong (green gram) -kg	0.10	0.09
Masur (red lentil)-Kg	0.02	0.11
Urd (black gram) kg	0.15	0.08
Gram split (kg)	0.06	0.08
Total pulses	0.86 (36%)	0.78 (33%)
Milk (litre)	3.56 (40%)	4.33 (48%)
Eggs (no.)	4.71 (31.4%)	1.94 (12.9%)
Fish (kg)	0.15	0.27
Goat meat /mutton (kg)	0.12	0.05

Note: 1) Recommended Dietary Intake (RDI) as per the norms of Indian Council of Medical Research (ICMR): Cereals = 12kg/capita/month; Pulses =2.4kg/capita/month; Milk =9kg/capita/month; Egg = 15 nos/capita/month

2) Figures in brackets provide the percentages with respect to RDI norms.

Source: GoI, 2014a; ICMR, 2011.

Table 2.9: Average Consumption of Nutrients (CU/Day) in Rural Andhra Pradesh, 2011-12

Items	Consumption of nutrients (CU/day)	Consumption as a % of RDA
Protein (g)	45.6	76
Energy (Kcal)	1925	71
Calcium (mg)	388	65
Iron (mg)	8.5	50
Vit. A (µg)	218	36
Thiamin (mg)	0.8	47
Riboflavin (mg)	0.8	47
Niacin (mg)	10.6	59
Vit. C (mg)	35	88
Dietary Folate (µg)	107	54

Note: One consumption unit represents Recommended Dietary Allowance of energy for a sedentary man.

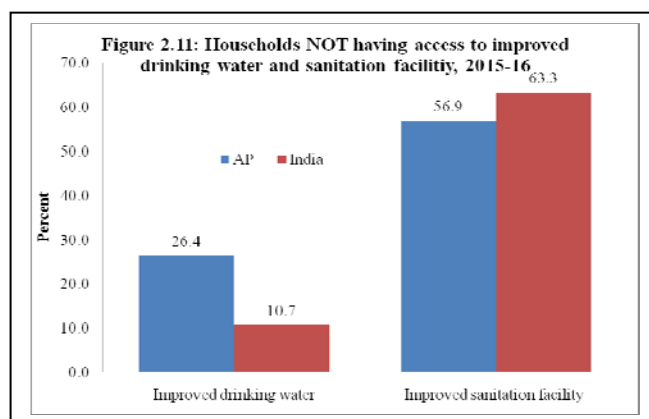
Source: NIN, 2012

2.3. Access to Water and Sanitation

Access to safe drinking water, clean and hygienic environment have a positive influence on nutrition status. **Figure 2.11** shows that Andhra Pradesh performed better than the national average; but the position is unenviable with more than half the households in rural areas not having access to proper sanitation facilities.

Considering the importance of non-food factors such as safe drinking water, sanitation and hygienic environment in the absorption of food in human system and therefore in the nutrition status, it is necessary that attention is paid to improve the access of these crucial household amenities in rural Andhra Pradesh.

Source: IIPS-ICF, 2017



To sum up, despite improvements in nutritional status over the last decade, the extent of malnutrition among children and women continue to remain huge in rural Andhra Pradesh; the average consumption of calorie, protein and number of micro nutrients are below the recommended daily allowance; and the consumption of pulses by an average adult is just a little over one third of the recommended dietary intake. It is in this context, the promotion of Farming System for Nutrition approach becomes important as a method of enhancing household production of a diversified basket of nutritious food leading to diversified diet of farm families. The observed spatial pattern in nutritional problems can help in prioritising interventions aimed at addressing the problem of malnutrition.

Section 3:

AGRICULTURAL PROFILE OF ANDHRA PRADESH

Andhra Pradesh is divided into five agro-climatic zones, namely, Krishna-Godavari Zone, North Coastal Zone, Southern Zone, Scarce Rainfall Zone, High Altitude and Tribal areas. One third of the geographical area of Andhra Pradesh is reported to be the net sown area, in 1999-2000. Over a 15-year period from 1999-00 to 2013-14, area under current fallows and other fallows have increased, bringing about a decline in the net sown area and the gross cropped area (GCA) (**Table 3.1**). The decline in gross cropped area is large, to the tune of 2 lakh hectares. However, gross irrigated area as a percentage of gross cropped area has increased steadily and by 2013-14 nearly half the gross cropped area is irrigated with a cropping intensity of 1.2. Irrigation intensity in Andhra Pradesh is marginally higher than the national average.

Table 3.1: Distribution of Land Use Pattern in Andhra Pradesh, 1998-99 to 2013-14

(Area in ha)

Triennium average Centred around the Year	Net Area Sown	Current Fallows	Other Fallows	Gross Cropped Area	Gross Irrigated Area
1999-00	6588418.7	837022.3	693006.0	8302467.3	3728720.3
2004-05	6408772.7	870292.3	782334.3	8016464.0	3331857.3
2009-10	6453955.7	1066294.0	742829.0	8246925.0	3935519.0
2013-14	6490703.3	1086082.7	781074.0	8048388.0	3909045.0

Source: GoAP, 2015a & 2017a

Table 3.2: Distribution of Area under Major Crops in Andhra Pradesh, 1960-61 to 2013-14 (in '00 Ha)

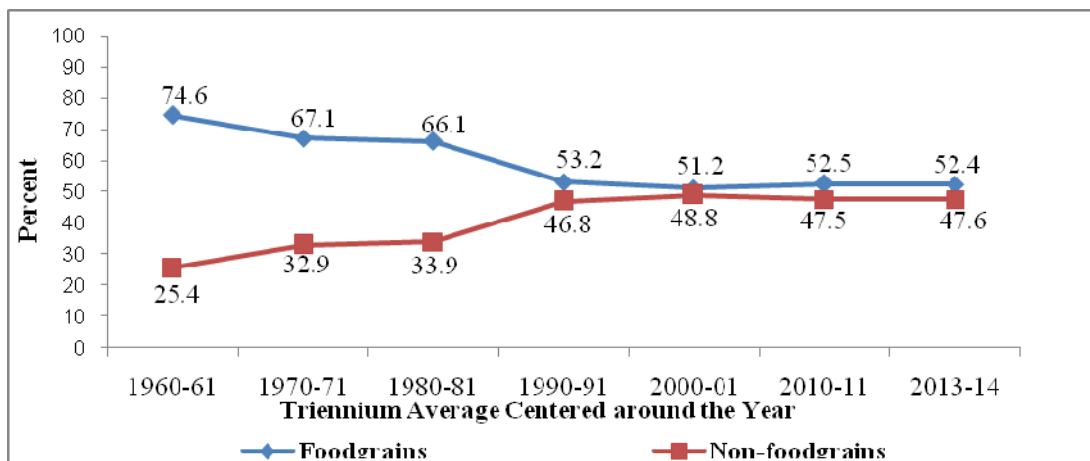
Triennium average centered around the year	Paddy	Jowar	Maize	Total Millets	Total Pulses	Total Foodgrains	Cotton	Groundnut	Total Non-foodgrains	Gross Cropped Area
1960-61	2210843	11754180	9642	2776616	606279	5597440	240944	672727	1904863	7502303
	29.5	15.7	0.1	37.0	8.1	74.6	3.2	9.0	25.4	100
1970-71	2449742	944398	9164	2150582	621350	5224635	221814	1126017	2566178	7790813
	31.4	12.1	0.1	27.6	8.0	67.1	2.8	15.5	32.9	100
1980-81	2542913	769181	15237	1801014	628478	4975756	287568	1064124	2553740	7529496
	33.8	10.2	0.2	23.9	8.3	66.1	3.8	14.1	33.9	100
1990-91	2668155	313198	30587	771510	914122	4354828	320189	1905433	3831621	8186449
	32.6	3.8	0.4	9.4	11.2	53.2	3.9	23.3	46.8	100
2000-01	2614780	151618	65069	426252	1120420	4162958	371807	1523130	3974393	8137351
	32.1	1.9	0.8	5.2	13.8	51.2	4.6	18.7	48.8	100
2010-11	2481469	132294	239716	476795	1302061	4260945	392672	1216516	3860224	8121169
	30.6	1.6	3.0	5.9	16.0	52.5	4.8	15.0	47.5	100
2013-14	2396339	141197	330619	597405	1223327	4217469	632857	1166931	3826359	8043828
	29.8	1.8	4.1	7.4	15.2	52.4	7.9	14.5	47.6	100

Note: Figures in shaded cells are percentage to gross cropped area

Source: GoAP, 2015a & 2017a

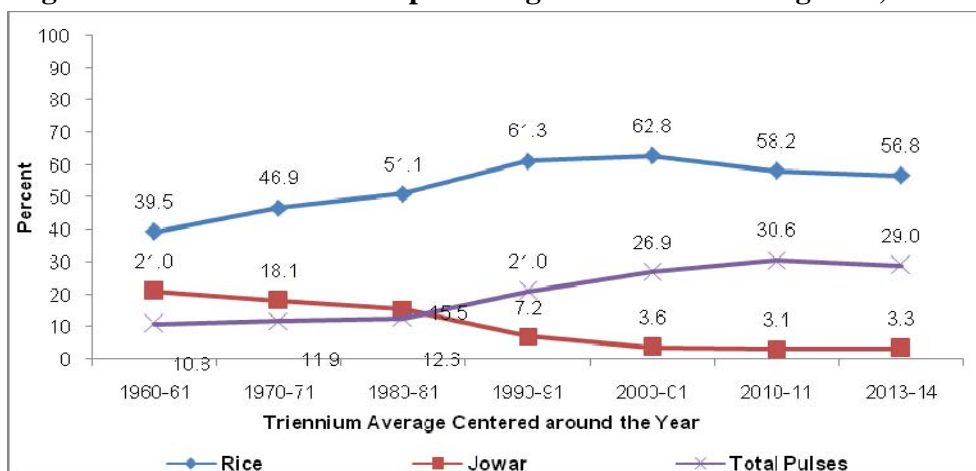
An analysis of the cropping pattern in Andhra Pradesh, over 1960-61 to 2013-14, indicates that paddy is the single most important crop all through, accounting for about 30% of the gross cropped area; there has been a sharp fall in area cultivated with millets (jowar, bajra, ragi) with the exception of maize that has registered a marginal increase; area under pulses has doubled over the five decades under consideration, from 8 percent of GCA to 15 percent; and area under groundnut has increased from 9% to 15% of GCA. Over the years, area under foodgrains declined from 75% of GCA in 1960-61 to 52% of GCA in 2013-14 and area under non-foodgrains increased from 25% to 48% of GCA over the same period. (Table 3.2, Figure 3.1 and 3.2)

Figure 3.1: Area under Foodgrains and Non-foodgrains to Gross Cropped Area, Andhra Pradesh



Source: GoAP, 2015a & 2017a

Figure 3.2: Area under Principal Foodgrains to Total Foodgrains, Andhra Pradesh



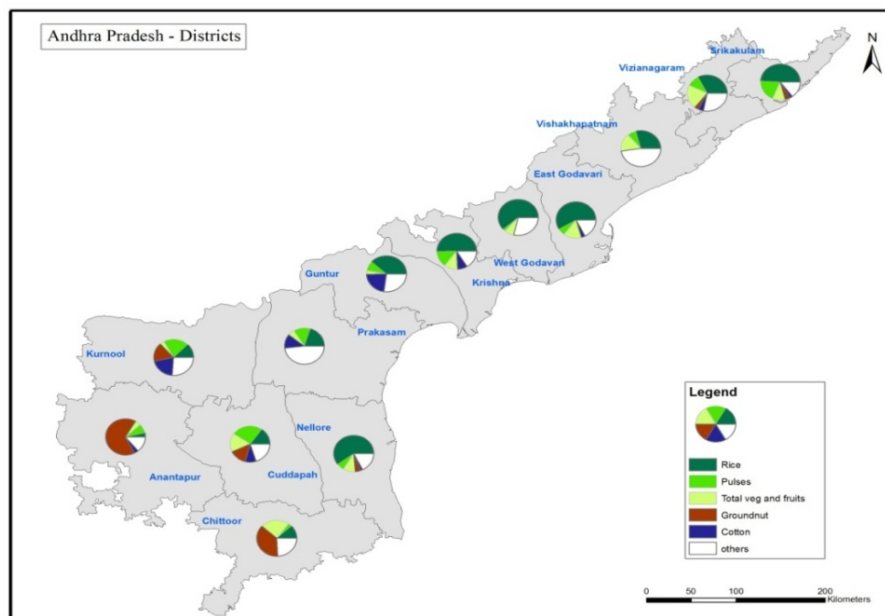
Source: GoAP, 2015a & 2017a

Area under non-foodgrains had increased from 1904.9 lakh hectares (25% of GCA) in 1960-61 to 3826.4 lakh hectares (48% of GCA) in 2013-14. The increase was mainly reported in groundnut and cotton which together accounted for two-thirds of the total non-foodgrain area in Andhra Pradesh.

District-wise area distribution reveals that paddy is the major crop for nine out of the 14 districts in 2013-14. Paddy is the major crop in *kharif* season. In rabi season, pulses are the major crop in Andhra Pradesh (GoAP, 2017a). Pulses are the major crops in Kurnool and Cuddappa districts. Considerable area under vegetables and fruits is reported in nine districts in Andhra Pradesh. Groundnut is the major crop in Ananthpur and Chittoor districts. Cotton, another major non-foodgrain, is important in nine districts in Andhra Pradesh.

Andhra Pradesh is one of the leading paddy producing states in India, with 11985 thousand tonnes of paddy production in 2014-15, accounting for 10% of all India paddy production.

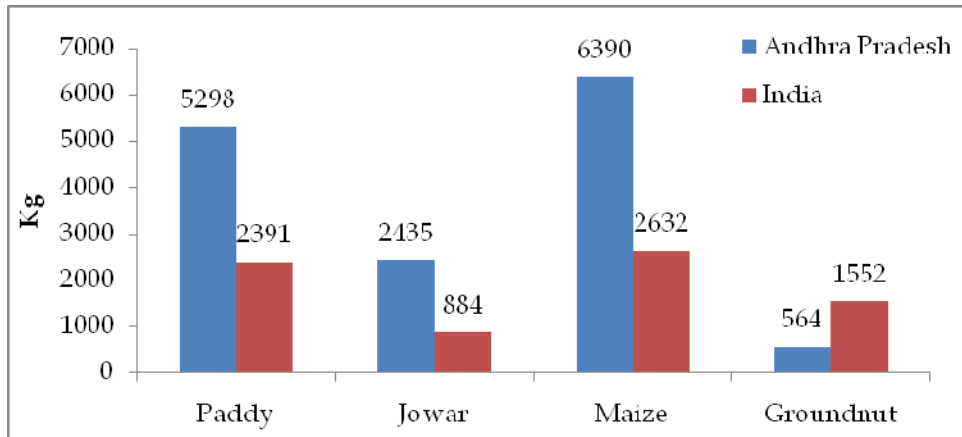
Figure 3.3: District-wise distribution of Area under Major Crops in Andhra Pradesh, 2013-14



Source: GoAP, 2017a

Average yield of paddy in Andhra Pradesh is more than double the yield rate of India (**Figure 3.4**). Likewise, jowar and maize yields are relatively higher too.

Figure 3.4: Yield of Major Crops (kg/ha)



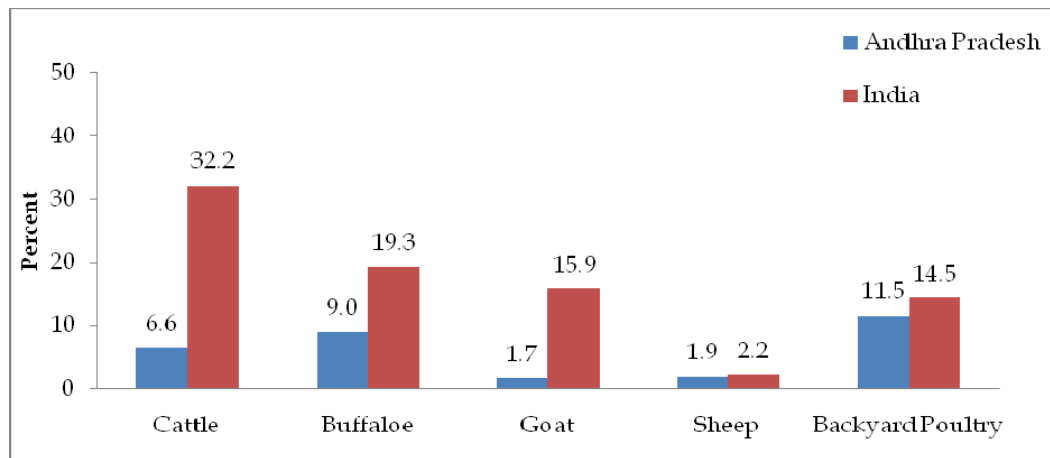
Source: GoAP, 2017a

However, the yield rate of groundnut, the second major crop of the state, is very low at 564kg per hectare whereas the all India average is 1552 kg per hectare in 2014-15.

Livestock Population and Its Ownership

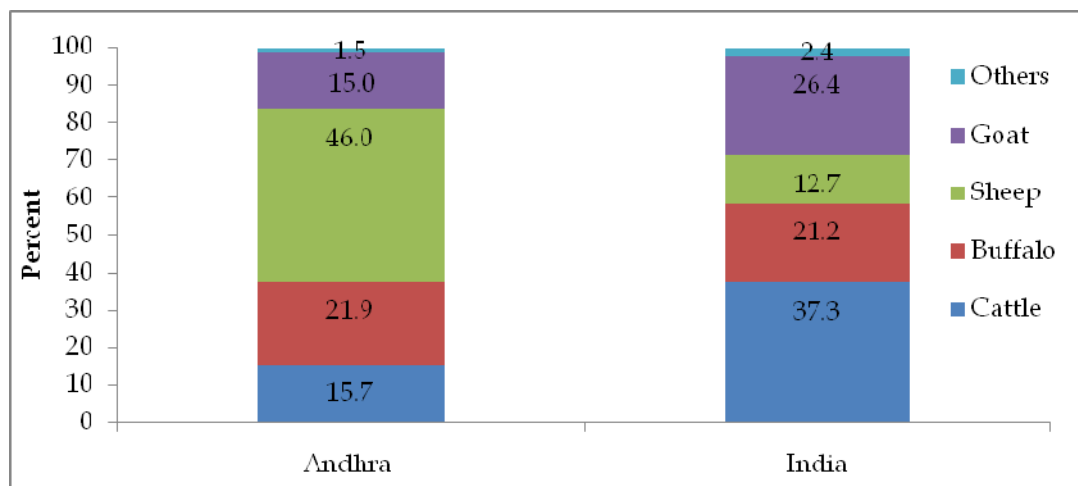
According to the Livestock Census 2012 (GoI, 2014b), the percentage of households owning animals and poultry birds in Andhra Pradesh is lower than the all India average (**Figure 3.5**). Further, not even one tenth of the rural households own any type of livestock, other than backyard poultry in Andhra Pradesh.

Figure 3.5: Percentage of Households Owning Animals/Poultry Birds, 2012



Source: GoI, 2014b

Figure 3.6: Percentage Share of Livestock, 2012



Source: GoI, 2014b

The composition of livestock population in Andhra Pradesh shows that nearly half of the livestock population are sheep and more than one-fifth are buffalo (**Figure 3.6**). Analysing data from the Livestock Census, 2012 further reveals the following: Ananthapur district alone accounted for 29% of sheep population and more than four-fifth of the sheep population are in four districts, such as Ananthpur, Srikakulam, Kadappa and Prakasham. 71% of cattle population are in the districts of Chittur, Srikakulam, Ananthpur and Vishakapatnam and Kurnool. In the case of buffalo, five districts, i.e., Guntur, Prakasam, Krishna, Nellore and East Godawari

accounted for 61% of the total buffalo population in the state. As regards backyard poultry, more than two-thirds are in West Godavari, East Godavari, Chittur and Krishna districts.

The per capita availability of milk and egg for Andhra Pradesh⁶ are higher than the all India average in 2012. Andhra Pradesh, with annual per capita availability of 264 eggs, tops all other states, in the year 2012. All India average for per capita availability is 61 eggs per annum. Similarly, the per capita milk availability in Andhra Pradesh is 413 grams per day whereas the all India average is 307 grams per day.

Fisheries

Andhra Pradesh is the largest fish producing state in the country, according to Basic Animal Husbandry and Fisheries Statistics, 2015 (GoI, 2015a). It is the second largest state in both availability of inland fishery resources and coastal areas in the country. Total fish production of the state is 19,64,434 tonnes, accounting for one-fifth of the all India production, in 2015. The state has 8.11 lakh hectares of inland fisheries resources and 974 km of coastal line.

Consumption from Home Grown Stock

Details of an analysis of the unit level data from National Sample Survey Organisation (NSSO), on consumption by producer households from home grown production are given in **Table 3.3**. Of the total rural households in Andhra Pradesh, 29 percent are classified as self employed in agriculture whose major source of income is own-cultivation of land, in 2011-12 (GoI, 2015b). Of these self employed households, some report using their harvested produce for their home consumption: 46% of households consume rice, 32% of households consume milk, 18% of households consume pulses, 15% of households consume vegetables from their own production. As regards the quantity that is consumed from home grown stock, it is seen that 35 percent of rice that is consumed by producer households is from home grown production; and 46% of the total milk consumed is from home production. While this analysis indicates that farmers do retain a portion of their production for home consumption, it also indicates that there is scope to

⁶The state figures refer to the combined Andhra Pradesh which includes Telangana.

strengthen this tendency. For instance, with regard to vegetables, fruits, pulses and egg there is scope to enhance the importance of home production for home consumption.

Table 3.3: Consumption from Home Grown Stock in Rural Andhra Pradesh, Self-Employed Agricultural Households, 2011-12

Item	Percentage of Consumption from Home Grown Stock	Percentage of Households consuming items from Home Produce
Rice	35.2	45.7
Pulses	12.0	18.7
Vegetables	5.5	14.9
Fruits	12.7	7.8
Milk	45.9	32.24
Eggs	2.3	2.38
Chicken	3.9	1.77

Note: Self employed agricultural households are those whose major source of household income is from own cultivation of land

Source: GoI, 2015b

Agriculture Extension

To promote the FSN approach in rural Andhra Pradesh, it would be necessary to strengthen the agricultural extension system. **Table 3.4** indicates that the vacancies in agriculture extension services in Andhra Pradesh are considerable at 29 % among extension officers and 13 % among agricultural officers. Addressing the issue of vacancies in sanctioned posts would be an important step towards reaching appropriate technical guidance to farmers to adopt a FSN approach.

Table 3.4: Status of Manpower in Department of Agriculture, Andhra Pradesh, February, 2018

Sl. No:	Name of the Post	Number of Posts Sanctioned	Number of Posts filled-in	Number of Vacant Posts	
				Nos.	%
1.	Agricultural Officers	1231	1070	161	13.1
2.	Agriculture Extension Officers	1692	1201	491	29.0

Source: Collected from the Commissionerate of Agriculture, Andhra Pradesh

This brief analysis of the agricultural profile of Andhra Pradesh indicates that there has been a decline in the importance of food grains in the agricultural scenario of Andhra Pradesh over the last five decades, marked by a sharp fall in area under millets. However, pulses have gained importance over time. Paddy continues to be the most important crop, in terms of area under cultivation, occupying 30% of GCA. Paddy provides opportunities for promoting pulses and vegetables in field bunds. Further, promoting intercropping with pulses, in cotton and groundnut growing areas would help in increasing pulse production further. These could be important ways to increase pulse and vegetable production while also diversifying crop production. Moreover, given the scope available in Andhra Pradesh to enhance the importance of home production for home consumption, especially with regard to vegetables, fruits, pulses and egg, it is pertinent that the agricultural extension system is strengthened and farmers receive appropriate technical guidance for initiating and expanding production of food.

Section 4:

BIOFORTIFICATION

“Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding, or modern biotechnology. Biofortification differs from conventional fortification in that biofortification aims to increase nutrient levels in crops during plant growth rather than through manual means during processing of the crops. Biofortification may therefore present a way to reach populations where supplementation and conventional fortification activities may be difficult to implement and/or limited” (WHO, 2016).

Details of biofortified and stress tolerant crops that are developed and are suitable for Andhra Pradesh are listed below.

BIOFORTIFIED / STRESS TOLERANT CROPS SUITABLE FOR ANDHRA PRADESH

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
1.	Rice	DRR Dhan 45	Biofortified variety <ul style="list-style-type: none"> • It is the first high zinc variety 22.6 ppm (14.0 ppm). • Drought tolerant variety • Grain yield: 50.0 q/ha • Duration: 125 - 130 days 	Indian Institute of Rice Research (IIRR), Hyderabad. Released in 2016	Breeder seeds and Truthfully Labelled (TFL) seeds available at IIRR
		Bhavapuri Sannalu (BPT 2270)	Submergence tolerant variety <ul style="list-style-type: none"> • Tolerant to submergence & flash floods • Duration: 160 - 165 days • Average yield : 6.0 - 6.5 t/ha • Recommended for cultivation in single-cropped areas. 	Rice Research Station, Bapatla Released in 2010	Breeder seeds available at RRS, Bapatla.
		Swarna Sub1	Submergence tolerant variety <ul style="list-style-type: none"> • Tolerant to submergence of about 2 weeks • Duration: 140 - 145 days 	International Rice Research Institute (IRRI) and National Rice Research Institute (NRRI), Cuttak	Breeder seeds available at NRRI.

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
			<ul style="list-style-type: none"> • Average yield: 5.0 -5.5 t/ha • Recommended for cultivation in shallow low land areas of coastal region of Srikakulam, Vizianagaram, Vishakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakasam and Nellore. 	Released in 2009	
		Indra (MTU-1061)	<p>Submergence tolerant variety</p> <ul style="list-style-type: none"> • Tolerant to submergence & flash floods • Late duration • Average yield: 48.0 -50.0 q/ha • Recommended for Krishna and Godavari zone. 	<p>Acharya NG Ranga Agricultural University ANGRAU, Andhra Pradesh</p> <p>Notified in 2007</p>	Foundation and Certified seeds available with Andhra Pradesh State Seeds Development Corporation Limited

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
		Cottondora Sannalu (MTU-1010)	Submergence tolerant variety <ul style="list-style-type: none"> • Tolerant to submergence & flash floods • Duration: 120 days • Average yield: 74.0 q/ha • Recommended for cultivation in Godavari, Krishna, Southern zone, Northern, Central and Southern telengana zone. 	Regional Agriculture Research Station (RARS), Maruteru Notified in 2000	Foundation and Certified seeds available with Andhra Pradesh State Seeds Development Corporation Limited
		Vijeta (MTU-1001)	Submergence tolerant variety <ul style="list-style-type: none"> • Tolerant to submergence & flash floods • Duration: 120 - 125 days • Average yield : 67.0 q/ha • Recommended for cultivation for Godavari, Krishna, southern zone, Northern, Central and Southern telengana zone. 	RARS, Maruteru, Released in 1997	Foundation and Certified seeds available with Andhra Pradesh State Seeds Development Corporation Limited

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
		Bheema (MTU-1140)	Submergence tolerant variety <ul style="list-style-type: none"> • Tolerant to Submergence & flash floods • Medium slender variety • Duration: 140 - 145 days • Average grain yield: 6.0 t/ha 	Andhra Pradesh Rice Research Institute (APRRI), Maruteru. Released in 2016	Certified seeds available at APRRI, Maruteru
2.	Pearl Millet	Dhanashakti (ICTP 8203 Fe)	Biofortified variety <ul style="list-style-type: none"> • Rich in iron content 71.0 ppm (45.0-50.0 ppm) and zinc 40.0 ppm (30.0-35.0 ppm). • Average grain yield : 2.2 t/ha 	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad Released in 2014	TFL seeds available with Nirmal Seed Company and State Seed Corporation in Andhra Pradesh
		Shakti 1201 (ICMH 1201)	Biofortified (Hybrid) <ul style="list-style-type: none"> • Rich in iron 75.0 ppm and zinc 40.0 ppm • This hybrid has more than 30% yields than dhanasakthi. 	ICRISAT, Hyderabad Released in 2014	TFL seeds available with ShaktiVardhak Seed Company, Haryana

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
3.	Quality Protein Maize	Pusa Vivek QPM 9 Improved	Biofortified (Hybrid) <ul style="list-style-type: none"> • Possess high Pro-Vitamin-A 8.15 ppm (1.0 - 2.0 ppm), lysine 2.67 % (1.5 - 2.0 %) and tryptophan 0.74% (0.3 - 0.4%). • Maturity: 83 days • Grain yield: 59.2 q/ha. 	ICAR- Indian Agricultural Research Institute (IARI), New Delhi. Released in 2017	Breeder seeds available at IARI, New Delhi
		Pusa HM8 Improved	Biofortified (Hybrid) <ul style="list-style-type: none"> • Rich in tryptophan 1.06 % and lysine 4.18% • Maturity: 95 days • Grain yield: 62.6 q/ha 	ICAR- IARI, New Delhi. Released in 2017	Breeder seeds available at IARI, New Delhi
		HQPM-1	Biofortified (Hybrid) <ul style="list-style-type: none"> • Quality protein maize hybrid possesses lysine and tryptophan double than conventional maize • Yellow dent grains and late maturity • Average yield: 62.0 q/ha 	CCS-Haryana Agriculture University (HAU), Hisar Released in 2007	Certified seeds available with National Seed Corporation Limited

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
		HQPM-4	Biofortified (Hybrid) <ul style="list-style-type: none"> Quality protein maize hybrid possesses lysine and tryptophan double than conventional maize Orange flint grains and late maturity Average yield: 54.0 q/ha 	CCS-HAU, Hisar Released in 2010	Certified seeds available.
		HQPM-5	Biofortified (Hybrid) <ul style="list-style-type: none"> Quality protein maize hybrid possesses lysine and tryptophan double than regular Maize. Late maturity, orange flint grains. Average yield: 58.0 q/ha. 	CCS-HAU, Hisar Released in 2007	Data not available
		HQPM-7	Biofortified (Hybrid) <ul style="list-style-type: none"> Quality protein maize hybrid possesses lysine and tryptophan double than regular maize. Late maturity, orange flint grains. Average yield: 72.0 q/ha. 	CCS-HAU, Hisar Released in 2008	Certified seeds available.

Sl. No:	Crops	Variety/ Hybrid	Nutrient Availability / Stress tolerance Characteristics	Developed / Released by	Seed Availability Status ¹
4.	Foxtail Millet	Suryanandi (SiA 3088)	Biofortified Variety <ul style="list-style-type: none"> • High iron content 129.0 ppm (27.19 ppm). • It is non-lodging early duration. • Maturity : 70 - 75 days • Average yield: 20.0 - 25.0 q/ha 	Regional Agriculture Research Station (RARS), Nandyal Released in 2012	Breeder and TFL seeds available with RARS, Nandyal.
5.	Little Millet	Tarini (OLM 203)	Biofortified Variety <ul style="list-style-type: none"> • High iron content 51.0 ppm (32.71 ppm). • Duration 105 - 110 days • Average yield : 10.0 - 11.0 q/ha 	Odisha University of Agriculture and Technology, OUAT in 2001	Data not available

Note:

1. Largely drawn from Yadava D.K (2018) and Research Institutions.
2. Figures in brackets in column 4 refer to the nutrient content in conventional crop

“Micronutrient deficiencies are a problem that is much greater than hunger and is a prime example of the need to integrate both food and nutrition security. Sustainable food-based approaches to enable adequate consumption of micronutrients include dietary diversification and biofortification. Agriculture and agricultural biotechnology not only offer the opportunity of increasing crop yields, thereby increasing food security, but also have the potential to improve the micronutrient content of foods, thus contributing to the achievement of both food and nutrition security” (Shetty, 2009).

Given the availability of suitable biofortified varieties, particularly in paddy, there is scope to promote these varieties among farmers through appropriate policies. Needless to add, promoting these varieties will have to be based on detailed field based studies on their efficacy.

Section 5:

POLICY LANDSCAPE ANALYSIS OF ANDHRA PRADESH

This section presents a desk review of the current landscape of state and central government policies that foster nutrition-sensitive agriculture by both promoting farming systems for nutrition and improving food and non-food factors that enhance the availability of nutrition-rich foods in rural households and markets in Andhra Pradesh. The analysis framework recognizes policy emphasis on each of 4 direct or core domains of farming systems for nutrition and 3 enabling or non-core domains⁷. A description of the policies considered within each domain is provided in **Table 5.1**. In order to identify areas for improvement, we review government documentation on both the policy agenda setting and the policy adoption stages of the policymaking process (Sutton, 1999).

The review of policy agenda analyses farming system for nutrition related visions and goals identified formally by the state government in long-term policy documents. The review of policy adoption collates farming system for nutrition related schemes and programmes that have been adopted by the state government through the allocation of funds in the state budget. The landscape analysis conducted at both stages enables us to identify whether policy gaps are arising from lack of recognition of policy issues or solutions, or a lack of implementation of policy solutions.

Table 5.1: Farming System for Nutrition policy domains

Domain	Description
1. Agricultural Production Diversity	Policies that encourage integrated farming systems and farm-level diversity combining agriculture, horticulture, animal husbandry and fisheries with the intention of enhance the availability of nutrients within a household or local market.
2. Agricultural Production	Policies that improve the production and productivity to enhance the availability of nutrient-rich food in the regional market
3. Biofortification	Policies that encourage the production of nutrient-dense biofortified varieties for the regional market
4. Agricultural Value Chains	Policies that support the production of nutrient-rich crops by creating handling, storage, processing infrastructure, and avenues for marketing and value addition to enhance availability in the local market

⁷ Policies to improve access to safe drinking water and sanitation have not been covered in this analysis. However, the status with respect to these factors has been discussed in Section 2.

5. Nutrition-education and behaviour change	Policies that improve the demand for nutrient-rich crops through awareness creation and behaviour change communication
6. Women's empowerment	Policies that improve the demand for nutrient-rich crops by empowering women to exercise their choice in household agriculture and nutrition
7. Natural resource management	Policies that support the production of nutrient-rich crops by conserving natural resources

Though the state government has accorded great importance to agriculture and has undertaken several initiatives to improve productivity and farmer incomes while conserving resources, there is ample potential to integrate nutrition objectives into agricultural policy, with the aim of reducing Andhra's malnutrition burden while also encouraging the production of diverse, risk tolerant, high-value and marketable crop and animal products. The scope available in the policies to enhance the nutrition focus is discussed below.

5.1 Review of Policy Agenda and Policy Adoption

The first step in the policy-making process is “agenda-setting” or the recognition of a problem or space where policy can make a positive difference. Once a problem is recognized by policymakers and policy influencers, the scope arises for democratic deliberation to “adoption” of a policy solution (Jann and Wegrich, 2007). To understand whether state governments have recognized nutrition as a policy problem and the potential for agriculture to provide a policy solution, we review progress made in both the “agenda-setting” and “adoption” stages.

We analyze prominent long term mission or vision statements pertaining to agriculture and nutrition, formally adopted by the Government of Andhra Pradesh. These include the State Primary Sector Mission (2014), the State Nutrition Mission (2016) and the White Paper on Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries and Agricultural Marketing (2014). In addition, an outcome budget, defined for the first time as part of the 2017-18 State Budget with the purpose of guiding department activities, is also considered.

In 2014, Andhra Pradesh Government adopted a long term vision for the state, termed “Swarnandhra 2029” consisting of 7 missions in 7 different sectors (Primary sector, Industry sector, Infrastructure sector, Social empowerment sector, Urban Development sector, Knowledge

and Skill Development and Service sector). Each of these missions describes a roadmap and implementation plan for the sector and is constituted to work alongside and achieve strategic convergence between all relevant Government departments pertaining to that sector. Of these, the Primary Sector Mission, prepared with participation from ICRISAT addresses challenges facing agriculture and allied sectors. Its objectives are specified as making agriculture “equitable, scientific, prosperous and climate smart” while retaining the overall goal of inclusive growth. The Primary Sector Mission lists key drivers of sustainable agricultural growth and lists essential proactive steps, many of which are echoed in the White Paper on Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries and Agricultural Marketing (2014). The Nutrition Mission was subsequently adopted in 2016 with the aim of ending malnutrition in ten years, with UNICEF as a key partner. In the short term, the Andhra Pradesh state government in 2017-18 decided to depart from tradition and introduce a special section in place of the Annual Plan (State Budget Volume VII/I). Termed as the Outcome Budget, the new section lays down the overall goal as well as tangible outcomes for each department.

These key agenda documents together define the scope of priorities for the state government in agriculture and nutrition including the scope for building a “farming system for nutrition”. A brief description of the government agenda categorized according the key aspects identified in **Table 5.1** is summarized below. The full list of agenda points can be found in Appendix 1.

1. Agricultural Production Diversity:

The agriculture, horticulture, fisheries, food civil supplies, tribal welfare and women and child development departments declared achieving food security and nutrition for all to be among their goals for 2017-18. The State Primary Sector Mission recognizes the importance of encouraging integrated farming systems to increase profitability and climate resilience. It calls for the convergence of agriculture, horticulture, animal husbandry, irrigation and rural development to improve productivity and resource efficiency. While the State Nutrition Mission does not explicitly mention the role of integrated farming, it does suggest partnership with Agriculture and Horticulture departments to achieve the objectives of the mission. There is also a thrust on zero budget natural farming and organic farming as a

strategy to conserve natural resources, although no explicit description of these farming systems or references to integrating agriculture, animal husbandry and aquaculture is made.

The state agenda includes mention of the benefits of incorporating legumes and millets in the paddy rotation. Specifically millets like sorghum are recommended to be included in the rice-blackgram/greengram-maize rotation to enhance the utility of rice fallow and conserve resources. Encouragement of rural backyard poultry and rearing of livestock for organic manure in the Primary Sector Mission and White Paper can also promote integrated farming systems. The State Nutrition Mission alone mentions the need for developing community kitchen gardens at Anganwadi Centres to incorporate horticulture crops in local diets.

2. Agricultural Production:

Strategies to improve production include an emphasis on the development and supply of improved seeds, timely supply of fertilizer, promotion of mechanization through subsidies, custom hiring and service centres, and improvement in the transparency of land records. Importance has also been given to strengthening of extension systems by appointing multi-purpose extension officers in place of adarsha rythus or progressive farmers and leveraging information and communication technology.

Pulses, horticulture, livestock and aquaculture are promoted through specific strategies to improve production and productivity. Many of these call for precision farming or ICT led strategies. For horticulture, emphasis has been given to micro-irrigation and the identification of crop-specific clusters to promote high-value crop production. For livestock, the need for a feed and fodder development program is well recognized in both the State Primary Sector Mission report as well as the White Paper. The overall importance given to mechanization and extension is also echoed in crop-specific strategies. There is however no clear targets set for large-scale improvement in production of coarse cereals/millets and non-commercial horticulture crops such as roots and tubers, green leafy vegetables or vitamin A-rich fruits and vegetables.

3. **Biofortification:**

Despite the availability of biofortified rice and pearl millet in Andhra, the primary sector and nutrition missions do not call for the promotion of these varieties or the development of biofortified varieties for other crops.

4. **Agricultural Value Chains:**

The Ministry of Rural Development recognizes livelihood diversification through improvement of value chains as one of its key outcomes for 2017-18. The primary sector mission calls for the creation of a separate policy framework for agri-processing and fish-processing. It also calls for the establishment of agri-processing and agri-logistics parks to promote private participation in this sector. The Andhra Pradesh government aims to improve its score on the agricultural marketing and farmer friendly reforms index developed by NITI Aayog, which evaluates state reforms on the implementation of the APMC act provisions, the government's virtual commodity market and initiatives for fruits and vegetable marketing

Emphasis is placed on developing value chains for horticulture and animal products. The Primary Sector Mission and White Paper call for the large scale expansion of post-harvest management facilities in horticulture – including ripening chambers, cold storage and pack houses – to rapidly reduce post-harvest losses. Hygienic slaughterhouse maintenance, training for butchers and establishment of market yards is encouraged for the safe handling of meat products. For value addition in dairy and fish as well as other animal by-products, technology upgradation and private participation in cold chains is recommended. Dairy farmers are encouraged to access milk cooperatives and an online milk monitoring and payment gateway (called Milkosoft).

Farmer Producer Organizations and groups are central to the market linkage strategies envisioned in the Primary Sector Mission. Rythu Bazaars to be run by FPOs are required to establish connections with post-harvest centres and cold storage units to improve availability

of fruits and vegetables. Mahila Matsya Groups have been specifically identified by the Fisheries department to play a larger role in fish processing and marketing.

5. Nutrition Education and Behaviour Change:

The State Nutrition Mission specifies several key strategies to provide nutrition education towards improving dietary practices. It identifies the need for state-specific social and BCC strategy that provides nutrition education to key stakeholders through key communication channels, with involvement from the Panchayat and communities. Capacity of ICDS to provide such BCC must be improved and several media can be used – including print and electronic media and a mobile application called Nutri-Ed. Specific mention is made to improve consumption of millets by creating awareness on the importance and benefits. The Tribal Welfare department stresses on the need to provide health and nutrition education specifically to tribal women.

6. Women's Empowerment:

No specific recognition is made in the Primary Sector Mission on the role of women in agriculture. The Fisheries department however makes the effort to envision a larger role for fisherwomen in fish production and marketing through the platform of Mahila Matsya Groups. The State Nutrition Missions and includes several aspects of women's empowerment while defining the scope of nutrition-sensitive interventions. These include efforts to prevent child marriage and promote gender equity in access to health, nutrition and education services. A special focus on nutrition, maternal health and sanitation of tribal women is recorded in the outcome budget of the Tribal Welfare department. The outcome budget also makes a reference to empowerment of women through self-managed organizations in the Rural Development department goals.

7. Natural Resource Management:

Given that reorganized Andhra Pradesh is exposed to considerable climatic variability, strong importance has been given to natural resource management, especially for soil and water. Soil conservation strategies suggested include - soil testing and satellite-based soil

health mapping, balanced fertilizer use, improvement of soil organic matter through composting, minimum tillage, and cultivation of nitrogen-fixing plants. Water conservation strategies suggested include - rejuvenation of water bodies, reuse and recycling of wastewater, rainwater harvesting and use of water management technologies. Andhra Pradesh is also placing a focus on micro irrigation in rainfed areas. Several conservation strategies make direct reference to the adoption of integrated farming systems and cropping patterns suited to resource availability.

5.2. Review of Policy Adoption

After the agenda has been set, governments formulate and decide between various policy options available to tackle the recognized policy problem. Subsequently, one among the available alternatives is formally adopted, in the form of schemes, orders or legislation. A core element of policy adoption is the specification of program details and the allocation of resources, including human and physical capital (Jann and Wegrich, 2007). In the absence of a publicly available comprehensive record of adopted policies, we define the set of adopted policies as those that have received a budget allocation in the state budget. For Andhra Pradesh, we include the two most recently presented state budgets, for 2016-17 and 2017-18. All policies relating to the 6 “core” domains and nutrition-sensitive policies in the 3 “non-core” domains of “farming system for nutrition”, from the budgets of the departments of agriculture, co-operation and farmer’s welfare, animal husbandry, fisheries, women and child development, rural development, health, medical and family welfare, backward classes and minority welfare.

There are minor differences between the budgets for both years. From the 2016-17 budget the list of schemes receiving plan and non-plan expenditure allocation and described in the Annual Plan (Volume VII/1) are included. In the 2017-18 budget, expenditure was reclassified from plan and non-plan to revenue and capital expenses. The Annual Plan was done away with and replaced by an Outcome Budget in Volume VII/1. The schemes receiving revenue or capital expenditure continue to be included, however the list of outcomes specified in the Outcome Budget are included in the previous section on policy agenda. Prominent stand-alone policies adopted by the state government – Fisheries Policy (2015-2020), Fodder Security Policy (2015-2020), Poultry

Development Policy 2016-2020 and the Food Processing Policy (2015-2020) – also specify program details and receive allocation, and are thus included in the analysis. In addition, the only available policy document for the Agricultural Marketing department, the Marketing Policy 2015 is also included under the assumption that the policy continues to remain in place.

The schemes and policies listed in the state budget and stand-alone documents provide a picture of the existing policy framework that promotes and enables “farming system for nutrition”. A summary of the schemes and policies under each of the 8 “core” and “non-core” domains is provided below. The complete list of policies and schemes is categorized in Appendix 2 and matched to the source document in Appendix 3.

1. Agricultural Production Diversity:

Andhra Pradesh has introduced a few initiatives to promote integrated farming. The Polambadi program, introduced in 2009, uses farmer field schools to encourage the use of economical and environment-friendly cropping techniques. This includes integrated crop management, a technique that includes crop rotation, choice of crop variety and the use of appropriate natural inputs to improve sustainable production. The half-acre Annapurna model, also promoted for soil and water conservation and implemented by an NGO (Jattu Trust) is a flexible and intensive integrated farming model that incorporates organic horticulture, intercropping, farm ponds and poultry. The Andhra Pradesh Rural Inclusive Growth Project 2015-2020, implemented with assistance from the World Bank envisions livelihoods diversification through community based initiatives including farmer field schools, women’s self-help groups and producer organizations.

Several distinct schemes make references to farm-level integrated farming techniques. Under the National Food Security Mission, intercropping of pulses and incorporation of pulses into the crop rotation are introduced into the cereal dominated cropping system. The fodder security policy as well as the horticulture department plan call for the intercropping of fodder crops or other food crops with horticulture. The Integrated Livestock Management, National Livestock Management and the Poultry Development Policy provide subsidies for rural

backyard poultry and mini dairy farms. Although they promote crop and livestock diversity, these schemes don't explicitly mention nutrition as a goal for integrated farming.

2. Agricultural production:

As with the agenda, the state schemes also give high importance to the availability of seeds and mechanization to improve production. Prominent national schemes such as the National Food Security Mission (NFSM) and the Rashtriya Krishi Vikas Yojana (RKVY), along with several sub-missions such as those pertaining to mechanization and input subsidy and organic farming are implemented, with emphasis provided to the improvement of prominent local crops. Andhra Pradesh relies on its flagship extension schemes – chandranna rythu kshetralu and polampilustondi – alongside the National Mission on Agriculture Extension and Technology (NMAET) to promote best practices. These extension schemes use a combination of strategies including farmer field schools, demonstrations and mobile based communication to boost productivity.

Initiatives under NFSM are targeted at improving the productivity of rice, pulses (red gram, black gram and green gram) and coarse cereals. Under NFSM, the state government has piloted the Comprehensive Revival of Millets program in 47 mandals to promote seeds, agronomic practices and custom hiring technology for millets. The centrally sponsored Mission on Integrated Development of Horticulture (MIDH) which subsumes earlier national horticulture schemes and the RKVY provide the guidelines for implementation of programs improving horticulture production. Several infrastructure, health and disease control, breed improvement and feed/fodder initiatives are in place for cattle and poultry. Fewer initiatives are available for other small livestock such as goats, sheep and pigs. The Fisheries Policy and state plans promote the improvement of both marine and inland fisheries and make efforts to improve the livelihoods of SC/ST fishermen and women.

3. Biofortification:

No major state-wide policy initiatives have been taken to promote the production of biofortified varieties of rice, millet and tubers.

4. Agricultural Value Chains:

Andhra Pradesh Department of Industries adopted a Food Processing Policy (2015-2020) which outlines several key initiatives to tap the value-addition potential of the industry. These include support for infrastructure, technology R&D and fiscal incentives. Subsidies for smaller food processing plants and post-harvest facilities are provided through the RKVY. The Andhra Pradesh Rural Inclusive Growth Project (APRIGP) aims to improve rural incomes through value-chain development by providing technical and financial assistance to producer groups to improve small-scale infrastructure for local value-addition and enhance market linkages. The Andhra Pradesh Marketing Policy 2015 followed by the Agricultural Marketing department also provides a comprehensive set of initiatives to initiate primary value-addition at the village and improve the efficiency, transparency and competitiveness of agricultural markets.

Several schemes for improving the handling and marketing of horticulture and animal products exist. The National Horticulture Mission subsidises post harvest storage and processing facilities for horticulture. The Poultry development Policy also subsidises egg and chicken processing centres, while a state plan scheme subsidises processing infrastructure for dairy, poultry and sheep. The fisheries schemes for the welfare of SC/ST fishermen and women offers the local community opportunity to participate in value addition by subsidising capital expenses for processing plants, reefer vans and aqua labs. Specific focus is provided to horticulture certification and branding, feed and fodder value-addition and marketing and retail fish marketing. The Comprehensive Revival of Millets program envisions the creation of decentralized processing centres for millets along with marketing campaigns and linkage to rythu bazaars and urban markets. Such a comprehensive programs for improving the availability of food grains and nutritious horticulture crops such as tubers and green leafy vegetables in local markets is not present.

5. *Nutrition Education and Behaviour Change:*

The Women and Child Development (WCD) department schemes such as the Integrated Child Development Services (ICDS) Anna Amrutha Hastam program, schemes for pregnant and lactating women and the Girimuddalu scheme in tribal areas provide some form of nutrition education and behaviour change communication through the anganwadi worker. In

addition, the APRIGP has envisaged awareness creation on nutrition, diet, health, water, sanitation and hygiene.

6. Women's Empowerment:

Schemes for the empowerment of women under the WCD department that make reference to nutrition include the National mission for Empowerment of Women/ Indira Gandhi Matritva Sahyog Yojana and the Sabla scheme (Rajiv Gandhi Scheme for Empowerment of Adolescent Girls). The behaviour change communication component of the APRIGP also address women's empowerment and gender equity in its human development, social development, safety nets and entitlements programming.

7. Natural Resource Management:

Multiple schemes across the agriculture, horticulture, animal husbandry and rural development departments call for the conservation of key resources for Andhra Pradesh, namely soil and water. National schemes such as the Integrated Watershed Management Program, the Pradhan Mantri Krishi Sinchayi Yojana and the Water Conservation Mission, subsidise watershed development and micro irrigation, promote recharge and rejuvenation of water bodies, development of new irrigation projects and water treatment methods. State schemes and programs for water conservation include the Andhra Pradesh Drought Mitigation Project with IFAD, the Irrigation and Agricultural Transformation Project with the World Bank and the Navya Andhra Jala Prabha/NTR Jala Siri which calls for convergence with MGNREGA for irrigation and land development. National schemes such as NMSA and RKVY promote integrated nutrient management for soil health and cropping patterns for rainfed area development. Organic farming and zero budget natural farming are also receiving a major push in the state.

The agenda and policy documents together define the scope of priorities recognized by the state government and action taken thus far in building a FSN approach. A brief description of the government agenda categorized according to the key aspects identified in Table 5.1 is summarized below. The full list of agenda statements and policies points can be found in Appendix 1 and 2 respectively.

Table 5.2: Status and Scope for FSN in Andhra Pradesh across Policy Domain

Domain	Policy Agenda Status (in brief)	Policy Agenda Gap	Policy Adoption Status (in brief)	Policy Adoption Gap
1. Agricultural Production Diversity	<ul style="list-style-type: none"> • Integrated farming systems (IFS) are encouraged primarily for risk mitigation • The State Nutrition Mission calls for kitchen gardens in anganwadi centres to improve the availability of locally grown fruits and vegetables 	<ul style="list-style-type: none"> • Potential impact of IFS on nutrition is not recognized • Kitchen gardens as a strategy has not been recommended for households 	<ul style="list-style-type: none"> • Few schemes to promote integrated farming are in place 	<ul style="list-style-type: none"> • Need to reorient IFS to take nutritional needs of the household/community into account wherever possible. • No allocation or guidelines have been made available for the development of kitchen gardens at anganwadi centers.
2. Agricultural Production	<ul style="list-style-type: none"> • The agenda for productivity improvements targets those crops that are already cultivated by a majority. 	<ul style="list-style-type: none"> • No specific agenda to improving production of fruits and vegetables and small animals (eg. goat, sheep and pigs) for domestic consumption 	<ul style="list-style-type: none"> • Several schemes focus on improving production of livestock and fisheries and high-value horticulture crops, while the NFSM provides support to pulse and 	<ul style="list-style-type: none"> • In the absence of a clear agenda, there is also no explicit state-wide allocation for a program that aims to improve coarse cereal, green leafy vegetables and vit A rich fruits and vegetables, and small livestock

Domain	Policy Agenda Status (in brief)	Policy Agenda Gap	Policy Adoption Status (in brief)	Policy Adoption Gap
			millet production	productivity. <ul style="list-style-type: none"> • Schemes for livestock are yet to be converged into a State Livestock Mission.
3. Biofortification	<ul style="list-style-type: none"> • No state-wide agenda in place 	<ul style="list-style-type: none"> • While biofortified varieties of rice and pearl millet are available in AP, the benefits of these crops and strategies to improve production and market linkages have not been specified in the agenda documents analyzed. Given the prevalence of both high cereal consumption and micro-nutrient deficiency in AP, this could be a pertinent policy direction. 	<ul style="list-style-type: none"> • No state-wide scheme or policy in place 	<ul style="list-style-type: none"> • In the absence of a clear agenda, relevant schemes for the promotion of biofortified cereals have not yet been adopted.
4. Agricultural Value Chain	<ul style="list-style-type: none"> • Emphasis has been placed on commercial horticulture and animal products. 	<ul style="list-style-type: none"> • Prominence has not been given to nutritious food grains such as pulses, millets and non-commercial horticulture crops. 	<ul style="list-style-type: none"> • Schemes providing subsidies to local dairy/poultry and sheep and fish 	<ul style="list-style-type: none"> • There is a lack of allocation for the value chain development of pulses and non-

Domain	Policy Agenda Status (in brief)	Policy Agenda Gap	Policy Adoption Status (in brief)	Policy Adoption Gap
		<ul style="list-style-type: none"> • Policy recognition needed to improve availability of processed and perishable commodities in local rural wet markets. • Convergence of food processing under Dept. of Industries and Dept. of Agriculture needed. 	<p>processing units promote local entrepreneurs and producer groups.</p> <ul style="list-style-type: none"> • Marketing Policy 2015 outlines key reforms that can be beneficial to all agricultural commodities. 	<p>commercial horticulture crops.</p> <ul style="list-style-type: none"> • Initiatives to improve availability of processed and perishable commodities in local rural wet markets required
5. Nutrition Education and Behaviour Change	<ul style="list-style-type: none"> • The State Nutrition Mission adequately recognizes the importance of nutrition education and behaviour change alongside improvements in availability of diverse food crops and animal products. • Recommendation for a state specific social and 	<ul style="list-style-type: none"> • Awareness generation on all food groups (not just millets) is needed • The need for programs on over nutrition and non-communicable diseases has not yet been recognized. 	<ul style="list-style-type: none"> • Major national schemes of the Dept. of WCD are in place 	<ul style="list-style-type: none"> • State specific social and behavioural change communication strategy has not been formalized. • No specific guidelines exist for awareness generation on millets. • The existing WCD programs do not provide nutrition education to men and women who are not

Domain	Policy Agenda Status (in brief)	Policy Agenda Gap	Policy Adoption Status (in brief)	Policy Adoption Gap
	behavioural change communication strategy <ul style="list-style-type: none"> • Recommendation for specific awareness generation on the benefits of millets 			of reproducible age.
6. Women's Empowerment	<ul style="list-style-type: none"> • Women's empowerment has been explicitly recognized as an important area for nutrition-sensitive programs by the State Nutrition Mission. • The White Paper mentions the use of Mahila Sadhikara Samsthas as platforms for extension, while the fisheries department envisions a role for Mahila Matsya groups. 	<ul style="list-style-type: none"> • The role of women in agriculture and the promotion of labour-saving technologies or practices specifically for women and potential indirect impacts on nutrition are not discussed. 	<ul style="list-style-type: none"> • Major national schemes of the Dept. of WCD are in place 	<ul style="list-style-type: none"> • No state specific policies have been adopted over and above the existing National schemes.

Domain	Policy Agenda Status (in brief)	Policy Agenda Gap	Policy Adoption Status (in brief)	Policy Adoption Gap
7. Natural Resource Management	<ul style="list-style-type: none"> • There is substantial recognition of the importance of water and soil conservation. • Integrated farming systems are mentioned as a strategy for sustainable use of natural resources. • The need for cropping systems designed to available natural resources is also recognized. • Emphasis is placed on organic and zero-budget natural farming. 	<ul style="list-style-type: none"> • An attempt has not been made to specify cropping systems that can both be climate resilient as well nutrition-sensitive. 	<ul style="list-style-type: none"> • There are several schemes in place that focus on the conservation of soil and water through multiple strategies. • Policies promoting organic and zero budget natural farming are in place. 	<ul style="list-style-type: none"> • These programs are not specifically designed to be nutrition-sensitive.

Section 6:
RECOMMENDATIONS FOR PROMOTING
FARMING SYSTEM FOR NUTRITION IN ANDHRA PRADESH

Government of Andhra Pradesh has both a sound vision and policy framework to promote agricultural growth while improving climate resilience and natural resources. There is recognition of integrated farming systems, organic and natural farming and the importance of animal food products. However, there is scope to make existing primary sector policies more nutrition-sensitive and introduce supportive policies that will enable the state to improve its nutritional indicators while maintaining agricultural growth. Some recommendations to promote a farming system for nutrition approach are listed below:

- a. **Improved nutrition must be placed as a key agenda in promoting Integrated Farming Systems (IFS).** The benefits of IFS for diet and nutrition are not suitably recognised and the advantages of this system are seen only in terms of risk mitigation, climate resilience and incomes. Vision documents can incorporate improved nutrition as an explicit objective of IFS. Guidelines for IFS that introduce crop rotations, intercropping and animal/fish rearing can address location specific IFS designs to address particular nutritional needs of the area.
- b. **A road map for promotion of biofortified cereals is necessary.** There is a conspicuous absence in long term and short term policy documents of a plan to improve the adoption of biofortified varieties of rice, pearl millet and sweet potato. Promotion of Dhanshakti- the high-iron rich pearl millet- released in 2014 and DRR Dhan 45 -a high-zinc rice variety- released in 2016 have the potential to address micronutrient malnutrition among the rice/millet growing farm households. The experience of districts where DRR Dhan was introduced as a pilot may be studied to assess feasibility for scale up.
- c. **Production and processing strategies to increase the availability of pulses, millets, vegetables and fruits in local rural markets to be formulated.** The Comprehensive Revival of Millets programme provides a holistic development plan for improving the

productivity and production of millets in 7 districts of Andhra Pradesh. This programme supplements other state initiatives to improve processing and marketing of value-added millet based products aimed at improving farmer income, market availability and consumption. Similar initiatives that target the entire value chain can also be implemented for pulses. It is necessary to formulate production strategies that include improving availability of quality seeds/planting material for non-commercial horticulture crops such as green leafy vegetables, vit A rich fruits and vegetables, roots and tubers that have the potential to address micronutrient malnutrition in the state. Programmes to promote local entrepreneurship, such as through Farmer Producer Organisations and women's groups, in processing and value addition can improve the availability of these commodities in rural markets.

- d. **State specific strategy for nutrition-education and women's empowerment in agriculture and nutrition may be developed.** The State Nutrition Mission adequately recognizes the importance of nutrition education and behaviour change alongside improvements in availability of diverse food crops and animal products. While the Mission recommends a state specific social and behavioural change communication strategy the state is yet to develop any such strategy. To create awareness on the nutrient content of local foods and bring about changes in specific behavioural patterns it is necessary to have state specific policies, over and above the existing National schemes. Further, nutrition education programmes must address all sections across gender and age groups through the life cycle.
- e. **State Livestock Mission:** As recommended in the long term vision document of the state, convergence of all existing schemes in the livestock sector into a State Livestock Mission would help focus on holistic development of the sector and improve production and productivity of livestock. This mission should also include a separate small ruminant policy focussing on improving productivity of animals such as goats, sheep and pigs.
- f. **Strengthening the agricultural extension system** would be necessary so that farmers can receive appropriate technical guidance for adopting the FSN approach. It would be

necessary to address the large number of vacancies that exists within the agriculture extension services in Andhra Pradesh. The agricultural extension service providers should be equipped with knowledge on nutritive content in different varieties of crop/fish as also from egg and milk from different breeds so that they can provide suitable advice to farmers.

- g. **Legislation on Homestead Land:** A comprehensive legislation that is applicable to **all** families that do not own homestead in rural areas is needed. The Andhra Pradesh Occupants of Homesteads (Conferment of Ownership) Act, 1976 is applicable for the ‘landless agriculturist’, ‘agricultural labourer’ or ‘artisan’ in occupation of the dwelling house built at his expense (or at the expense of his predecessor) on a homestead belonging to a land owner. This Act can be suitably amended to have much wider scope to include dwelling houses built on land belonging to the State (and not belonging only to land owners), as also other categories of persons than what is specified by the Act, and a larger extent of area, say 10 cents (and not 5 cents as prescribed by the Act) can be put in place. Homestead plot provided to a homestead-less family shall help in enabling the family build a shelter and take up supplementary activities such as backyard poultry, goat-rearing, horticulture and vegetable cultivation in a kitchen/nutrition garden. This would enhance food and livelihood security of the homestead-less families, in addition to ensuring their human dignity. The title to the homestead may be granted in the name of adult woman of the eligible family given the fact that women are primary decision-makers on consumption diversity and that they value household nutrition more than men.

References:

- Das, P K, R V Bhavani and M S Swaminathan** (2014): “A farming system model to leverage agriculture for nutritional outcomes”, *Agricultural Research*, 3(3), pp.193-203.
- Gillespie, Stuart and Suneetha Kadiyala** (2012): “Exploring the Agriculture-Nutrition Disconnect in India”, in Pandya-Lorch, R and S Fan (eds.), *Reshaping Agriculture for Nutrition and Health*, Washington DC: International Food Policy Research Institute, pp.173–182.
- Government of Andhra Pradesh – GoAP** (2014a): *A Strategy Paper for Mission on Primary Sector*, Accessed online (04-12-2017)
<http://www.aponline.gov.in/apportal/Strategy%20Paper.html>
- GoAP** (2014b): *White paper on agriculture, horticulture, sericulture, animal husbandry, dairy, fisheries and agricultural marketing*, Departments of Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries and Agricultural Marketing
<http://ap.meeseva.gov.in/DeptPortal/Download-lat/White%20Paper%20on%20Agriculture%20Department.pdf>
- GoAP** (2015a): *Compendium of Area and Land use Statistics of AP 1960-61 to 2013-14*, Directorate of Economics and Statistics, Vijayawada Rural.
- GoAP** (2015b): *Fisheries Department – Fisheries Policy of Andhra Pradesh 2015-2020*, G.O.MS No. 30, Accessed through <https://www.apfinance.gov.in/budget.html>
- GoAP** (2015c): *Animal Husbandry Department – Fodder Security Policy for Livestock-Andhra Pradesh 2015-2020*, G.O.MS No. 18, accessed through http://www.ap.gov.in/wp-content/uploads/2015/12/30062015AHF_MS18.pdf
- GoAP** (2015d): *Food Processing Policy 2015-2020*, accessed through <https://www.apindustries.gov.in/APIndus/UserInterface/SingleWindowServicesApplication/Public/AgroAndFoodProcessingPolicy.aspx>
- GoAP** (2015e): *Marketing Policy 2015*, G.O.Ms No. 27, accessed through <http://market.ap.nic.in/GOs/27.PDF>
- GoAP** (2016a): *Supplementary Nutrition Programme – Launching of “State Nutrition Mission” in Andhra Pradesh 2016-26 to aims to eradicate the Malnutrition in the state in the next 10 years*, G.O.MS No. 39 dated 21-07-2016, accessed through <http://www.cbgaindia.org/wp-content/uploads/2016/10/Launching-of-State-Nutrition-Mission-Andhra-Pradesh.pdf>
- GoAP** (2016b): *Animal Husbandry Department – Poultry Development Policy of Andhra Pradesh 2016 -2020*, G.O.MS No. 27, accessed through http://www.ap.gov.in/wp-content/uploads/2016/11/2016AHF_MS27.pdf

GoAP (2017a): *Socio-Economic Survey 2016-17*, Planning Department, Vijayawada Rural

GoAP (2017b): *Annual Budget 2017-18*, accessed through <https://www.apfinance.gov.in/budget.html>

Government of India -GoI (2014a): “*Nutritional Intake in India, 2011-12*”, *NSSO Report No.560*, National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, New Delhi: NSSO, October.

GoI (2014b): *19th Livestock Census 2012*, Ministry of Agriculture and Farmers Welfare, New Delhi.

GoI (2015a): *Basic Animal Husbandry and Fisheries Statistics 2015*, Ministry of Agriculture and Farmers Welfare, New Delhi.

GoI (2015b): “Public Distribution System and Other Sources of Household Consumption, 2011-12”, *NSSO Report No.565*, National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, New Delhi:NSSO, June.

International Institute of Population Sciences- IIPS (2008): *National Family Health Survey, 2005-06: Andhra Pradesh and India*, Mumbai: IIPS.

IIPS and ICF (2017): *National Family Health Survey, 2015-16: Andhra Pradesh and India Reports*, Indian Institute of Population Studies, Mumbai.

Indian Council of Medical Research - ICMR (2011): “Nutrient Requirements and Recommended Dietary Allowances for Indians”, *Report of the Expert Group of the Indian Council of Medical Research*, New Delhi: ICMR. Accessed through <http://ninindia.org/DietaryGuidelinesforNINwebsite.pdf>

Jann, W, and K Wegrich (2007): “Theories of the policy cycle”, in Fischer, F, G J Miller and M S Sidney (eds.), *Handbook of public policy analysis: Theory, politics and methods*, CRC Press, Pennsylvania, pp.43-62.

Nagarajan, S, R V Bhavani and M S Swaminathan (2014): “Operationalizing the concept of farming system for nutrition through the promotion of nutrition-sensitive agriculture”, *Current Science*, 107 (6), pp.959-964.

National Institute of Nutrition - NIN (2012): “Diet and Nutritional Status of Rural Population, Prevalence of Hypertension & Diabetes among Adults and Infant and Young Child Feeding Practices”, *NNMB Technical Report No.26*, NIN, Hyderabad.

Rao, Nitya and M S Swaminathan (2017): “A Farmer-Led Approach to Achieving a Malnutrition-Free India”, *Agriculture Research*, 6(1), pp.1-7.

Shetty, Prakash (2009): “Incorporating nutritional considerations when addressing food insecurity”, *Food Security*, 1, pp.431–440.

Shetty, Prakash (2015): “From food security to food and nutrition security: Role of agriculture and farming system for nutrition”, *Current Science*, 109 (3), pp. 456-461.

Sutton, R (1999): *The policy process: an overview*, London: Overseas Development Institute.

United Nations Children’s Fund – UNICEF (2017): *Multi-sectoral Approaches to Nutrition: Nutrition-Specific and Nutrition Sensitive Interventions to Accelerate Progress*, accessed through https://www.unicef.org/eapro/Brief_Nutrition_Overview.pdf on 4th December, 2017.

World Health Organisation - WHO (2016): *Biofortification of staple crops*, e-Library of Evidence for Nutrition Actions, accessed through <http://www.who.int/elena/titles/biofortification/en/>.

Yadava, D K (2018): “Production trends in Crops and Animal Husbandry and implications for Nutrition” presented during the meeting organized by NITI Aayog during 30 January, 2018 at New Delhi.

APPENDIX A

REVIEW OF POLICY AGENDA: GOALS AND VISIONS RECOGNIZED BY THE STATE GOVERNMENT OF ANDHRA PRADESH

Part A of Review of Policy Agenda: GENERAL AGENDA STATEMENTS EXTRACTED FROM LISTED SOURCES*

CORE DOMAINS	1. Agricultural Production Diversity	<ul style="list-style-type: none"> - End hunger, achieve nutrition for all - goals of the agriculture, horticulture, fisheries, food civil supplies, tribal welfare and women and child development - Convergence of agriculture, integrated watershed management, horticulture, sericulture ,animal husbandry, Irrigation and rural development to improve productivity, production, profitability and resource efficiency - Promote integrated farming system as a response to reduced profitability of food grain farming and increased climatic variability. Alternate income sources for farmers must be developed through Convergence of the schemes of agriculture, horticulture, livestock, and fisheries departments - Integrated farming system approach to mitigate risk in drought-prone areas
	2. Agricultural Production	<ul style="list-style-type: none"> - Ensure timely supply of quality seeds, fertilizers through coordination with different agencies - Strengthen R&D for development of improved varieties - Provide access to farm machinery through establishment of custom hiring centres, service stations - Strengthen extension by appointing multipurpose extension officers (MPEO) in place of adarsha rythus. Use IT to deliver extension through MPEO/MAOs - GIS based certified land titles
	3. Biofortification	-
	4. Agricultural Value Chains	<ul style="list-style-type: none"> - Formulation of agri-processing policy - Promotion of agri-logistics and processing parks - Improve Agriculture Marketing and Farmer Friendly Reforms Index from 56.2 to 81.7 (developed by NITI Aayog) - Encourage livelihoods diversification by improving value chains

NON-CORE DOMAINS	<p>6. Nutrition Education and Behaviour Change Communication</p>	<ul style="list-style-type: none"> - <i>Develop state-specific social and BCC strategy for each prioritized intervention identifying key stakeholders and communication channels, expand and improve nutrition edu and involvement of Panchayat and communities</i> - <i>Expand and improve nutrition education and involvement at Panchayat and communities in demand creation</i> - <i>Deliver health and nutrition services to tribal women by imparting health and nutrition education</i> - <i>Promote consumption of millets by creating awareness through demonstrations on the importance, nutritive value and health benefits of millets</i> - <i>Build capacity of ICDS to promote BCC</i> - <i>Engage print and electronic media</i> - <i>Develop and prioritize use of a mobile app on Nutri-Ed, adaptation of U-Report, a mobile platform where communities can raise views and get essential info on initiatives</i>
	<p>7. Women's Empowerment</p>	<ul style="list-style-type: none"> - <i>Empowerment of women through self-managed organizations to overcome all social, economic, cultural and psychological barriers</i> - <i>Increase gender equity - Step up advocacy efforts to prevent child marriage, increase opportunities for female education, increased access to basic health services by women</i> - <i>Large Scale participation of women fishers through Mahila Matsya Mitra Groups (MMGs) in fish marketing and fish processing through up-gradation of their skills</i> - <i>Ensure supplementary nutrition, maternal health and sanitation to all tribal women</i>
	<p>8. Natural Resource Management</p>	<ul style="list-style-type: none"> - <i>Encourage natural and organic farming</i> - <i>Improvement of soil organic matter content by promoting growth of nitrogen-fixing plants including pulses, composting and vermicomposting, popularizing minimum tillage</i> - <i>Soil health mapping using satellite imagery and soil testing, modernize soil testing labs in Agricultural Marketing Committees. Target 100% coverage of soil health cards, for balanced fertilizer use.</i> - <i>Water conservation through rejuvenation of water bodies, reuse and recycling of wastewater. Harvest rainwater and construct groundwater recharge to reverse depletion and salinity</i>

	<p>ingression.</p> <ul style="list-style-type: none"> - <i>Integrated farming system approach for drought-prone areas, promote designed crop pattern in wetlands, upalnds/lowlands</i> - <i>Continuation of AP Micro Irrigation program in rainfed areas (up to 2 lakh ha). Drip and sprinkler systems for crops like cotton, sugarcane and ground nut</i> - <i>Improve water efficiency and access to water management technologies, eg. deficit irrigation, water impact calculator, integrating domestic waste water treatment, DSR etc through machine hiring centres</i> - <i>Improve water quality database, licensing of borewells, GIS monitoring, regulation of groundwater extraction, user management and accountability</i> - <i>Adopt convergence strategy under MGNREGS to create permanent rural infrastructure and assets by different departments, and develop farm ponds, IHLS, vermi compost, horticulture, avenue plantation, solid waste management and other necessary rural infrastructure</i>
--	--

Part B of Review of Policy Agenda: AGENDA STATEMENTS EXTRACTED FROM LISTED SOURCES* - FOR MAJOR NUTRITIOUS CROPS/LIVESTOCK (IN CORE DOMAINS)

	Legumes	Nutri-cereals/Millet	Horticulture	Livestock and poultry	Aquaculture
1. Agricultural Production Diversity	- Enhance utility of rice fallows by integrating less water-intensive crops such as sorghum into the rice-blackgram/gram-maize rotation	- Enhance utility of rice fallows by integrating less water-intensive crops such as sorghum into the rice-blackgram/gram-maize rotation	- Initiate kitchen gardens in all AWCs as a partnered effort by Depts of WCD, Ag and Hort	- Promotion of backyard poultry - Promote livestock for organic manure	
2. Agricultural Production	-Improve pulse production through crop and area-specific initiatives and development of pulse value chain for ecological benefits - specifically pigeonpea, chickpea and groundnut	-	- Promotion of precision-farming and modern farm machinery for horticulture - Promotion of pandal cultivation - Identification of crop-specific clusters and promotion	- Achieve 18% growth in milk, meat and egg production - Breed improvement through cross-breeding, selective-breeding, promotion of AI/embryo transfer technology for cattle - Establishment of Comprehensive Livestock Health	- Reach 42 lakh tonnes production with GVA of Rs. 80,000 crore by 2019-20 from the current level of 22.78 lakh tonnes with GVA of Rs. 26157 crore. - Sustainability and enhancement of Marine

			<p>n of high-value horticulture</p> <ul style="list-style-type: none"> - Focus on improving extension efforts of Dept and Horticulture University to improve productivity - Mechanization through incentives for farmers, collaboration with tech firms - Enhance productivity by 25-30% income by 25-30%, by using micro-irrigation systems. - Improve productivity especially for banana, mango, tomato 	<p>Care centres, disease surveillance program, vaccine production centres, improve veterinary service</p> <ul style="list-style-type: none"> - Creation of feed and fodder development program, engage with Dept of Ag extn to promote best practices for fodder cultivation and residue management, fodder processing in surplus areas and deficit areas - Modify policy to enable contract farming, exports, linkages from farmers to large distributors 	<p>fish/Marine shrimp production.</p> <ul style="list-style-type: none"> - Establishment of SPF Brood Stock for freshwater and brackish water aquaculture - Establishment of more fishing harbours in multiple districts - Allotment of areas for cage culture through fisherman cooperatives and private participation - Explore opportunities to reduce cost of production from power,
--	--	--	---	--	--

				<ul style="list-style-type: none"> , land acquisition for poultry - Use ICT to promote best practices in dairy farming - Promote effective coordination between Livestock and Dairy development - Launch State Livestock Mission 	feed etc.
3. Biofortification	-	-	-	NA	NA
4. Agricultural Value Chains	-	-	<ul style="list-style-type: none"> - Establish ment of post-harvest management facilities, eg. pack houses, cold storages, ripening chambers - Reduce post-harvest losses from 30% to 20% by improving post-harvest 	<ul style="list-style-type: none"> - Promoting hygienic rural slaughterhouses and training butchers for sheep/goat meat - Process development and technology up-gradation for byproducts like variety meats, wool, hides, bone 	<ul style="list-style-type: none"> - Develop policy framework to promote fish processing and fish feed industry by private participation - Establish cold chains through PPP/Govt schemes. Increase

			<p><i>infrastructure</i></p> <ul style="list-style-type: none"> - <i>Formation of 100 FPOs with 1,00,000 farmers in total to establish forward and backward linkages. Equip with cold storage facility.</i> - <i>Distribution of Farm Fresh Vending Vans to farmer groups</i> - <i>Shape agricultural market committees into integrated supply chain centres</i> - <i>Linkage of post-harvest infrastructure to rythu bazaar, vegetable</i> 	<p><i>etc.</i></p> <ul style="list-style-type: none"> - <i>Establish Bulk Milk Cooling Units, Milk Chilling Centres and dairy plants under coop/PPP/JV models</i> - <i>Promote marketing agencies and market yards for sheep and goat under cooperative /PPP mode.</i> - <i>Increase share of milk procurement by organized sector</i> - <i>Develop marketing cooperatives in areas currently not covered by cooperatives, facilitate common cooperative brand "Vijaya"</i> - <i>Provide online milk monitoring</i> 	<p><i>the no. of cold chains from the current 29 to the demand level of 66 and increase capacity of cold chains from 25,000 to 55,000</i></p> <ul style="list-style-type: none"> - <i>Build skills for women to play larger role in processing and marketing through Matsya Mitra Groups</i>
--	--	--	---	--	---

			<i>markets, collection centres, reefer vans to improve direct marketing and remunera tive prices</i>	<i>and payment gateway (OMM&P G) Milkosoft - to enable timely direct payment to farmers' bank accounts</i>	
--	--	--	--	--	--

ii. ***See References – Agenda documents for list of sources**

APPENDIX B

REVIEW OF POLICY ADOPTION: SCHEMES AND PROGRAMS ADOPTED BY ANDHRA PRADESH STATE GOVERNMENT

Part A of Review of Policy Adoption: GENERAL SCHEMES AND PROGRAMS EXTRACTED FROM LISTED SOURCES*

CORE DOMAINS	1. Agricultural Production Diversity	<ol style="list-style-type: none"> 1. Polambadi: Farmer Field Schools to promote Integrated crop management + integrated pest management + water management 2. Soil and water conservation through half-acre Annapurna Model 3. Andhra Pradesh Rural Inclusive Growth Project
	2. Agricultural Production	<ol style="list-style-type: none"> 1. SMAM, RKVY: Subsidy (through direct benefits transfer) and supply of farm mechanization, subsidy and supply of seeds 2. NFSM: Seed Village Program, Comprehensive Revival of Millets 3. Community managed seeds supply program 4. Polampilustondi and Chandranna Rythu Kshetralu: Extension and field demonstrations for advanced farming practices (extension) 5. NMAET: agricultural extension, seed and planting material, agricultural mechanization and plant protection & quarantine (extension)
	3. Biofortification	
	4. Agricultural Value Chains	<ol style="list-style-type: none"> 1. Food Processing Policy: Infrastructural, fiscal support, R&D and testing lab funding 2. RKVY: Financial assistance to food processing units (agriculture, horticulture, dairy) in the form of grant- in-aid 25% of the cost of Plant & Machinery and technical civil works, subject to a maximum of Rs.50 lakhs 3. Andhra Pradesh Rural Inclusive Growth Project -value chain development through producer organizations 4. Marketing Policy: Statewide networked virtual markets, electronic auction system for transparent and competitive pricing, MIS for efficient and timely dissemination of information and money to all stakeholders. Construct warehouse and logistic hubs in the state. 5. Marketing Policy: Simplification of licensing procedures, encouragement of private participation to improve competitiveness, farmer to be allowed choice between private and public, accreditation of warehouses. 6. Marketing Policy: Initiate aggregation and primary value addition at the village level by farmer groups, linkages with secondary market 7. Comprehensive Revival of Millets: Setting up decentralized processing facilities, market development and marketing support for millets

NON-CORE DOMAINS	5. Nutrition Education and Behaviour Change Communication	<p>1.Andhra Pradesh Rural Inclusive Growth Project – human development, social development, safety nets and entitlements</p> <p>2.Poultry Development Policy: Egg consumption promotion - IEC campaign</p> <p>3.Anna amrutha hastham (supplementary nutrition ICDS)</p> <p>4.Girimuddalu scheme: ICDS in tribal areas</p> <p>5.SNP under ICDS: pregnant and lactating women, 6 months-3 yrs, 3-6yrs</p>
	6. Women’s Empowerment	<p>1.Andhra Pradesh Rural Inclusive Growth Project – human development, social development, safety nets and entitlements</p> <p>2.National mission for empowerment of women – IGMSY: CCT for pregnant women</p> <p>3.Sabla Scheme for the empowerment of adolescent girls: promoting health, nutritional, vocational and life skills</p>
	7. Natural resource management	<p>1.Navya Andhra Jala Prabha/NTR Jala Siri: convergence with MNREGA for irrigation and land development</p> <p>2.IWMP/Pradhan Mantri Krishi Sinchayi Yojana: micro irrigation subsidy program</p> <p>3.MNREGA-convergence with horticulture and fisheries</p> <p>4.RKVY: Bhuchetana program to rejuvenate soil health using micronutrients</p> <p>5.NMSA: rainfed area development, soil health management, soil health card scheme</p> <p>6.APDMP, APII, ATP: Drought proofing and climate resilience programs with IFAD and World Bank</p> <p>7.Integrated nutrient management: subsidy based on soil analysis</p> <p>8.Soil and water conservation programmes</p> <p>9.AP Water Vision</p> <p>10.Water Conservation Mission - Repairs, renovation and desilting of tanks and other water harvesting structures, construction of new structures and LI schemes, convergence with NREGA, development of cascades, micro-irrigation, major and minor irrigation projects, plantation to increase green cover by Forest Dept</p> <p>11. RKVY, NMSA-Paramparagat Krishi Vikas Yojana, State Development Plan Scheme: Promotion of organic and zero-budget natural farming</p> <p>12. Poultry Development Policy: Subsidy for organic manure plants from poultry manure</p>

Part B of Review of Policy Agenda: SCHEMES AND PROGRAMS EXTRACTED FROM LISTED SOURCES* - FOR MAJOR NUTRITIOUS CROPS/LIVESTOCK (IN CORE DOMAINS)

	Legumes	Nutri-cereals/Millets	Horticulture	Livestock and poultry	Aquaculture
1. Agricultural Production Diversity	<p>1. NFSM: Intercropping demonstrations and cropping system demonstrations for rice-rice-pulse and blackgram-greengram</p> <p>2. Promotion of red gram on paddy field bunds and as inter crop in ground nut, cotton and other cereal crops</p> <p>3. Promotion of pre-kharif and summer pulses</p>		<p>1. Fodder Security Policy - Subsidy for fodder seed intercropping with horticulture</p> <p>2. State Plan: Multiple cropping system will be promoted</p>	<p>1. Integrated/ National livestock management: Subsidy for calf rearing, backyard poultry, mini dairy farms to cater to ashram schools and residential schools</p> <p>2. Poultry Development Policy: Promotion of rural backyard poultry through setting up of fully subsidised hatchery in every district, support for setting up of mother units, training of women SHGs</p> <p>3. Fodder Security Policy - Subsidy for fodder seed intercropping with horticulture</p>	

<p>2. Agricultural Production</p>	<p>1.NFSM : Accelerated crop production programs and need based inputs for rice, pulses and coarse cereals. Demonstrations of production technologies.</p>	<p>1.NFSM : Accelerated crop production programs and need based inputs for rice, pulses and coarse cereals. Demonstrations of production technologies.</p>	<p>1.RKVY: Promotion of horticulture activities: new area into cultivation of root and tuber crop and flowers, pre and post harvest management activities like supply of plastic crates/poly sheets, awareness programs 2.MIDH: Area expansion and rejuvenation, assistance for protected cultivation of flowers and vegetables, promotion of post-harvest management facilities for fruits and vegetables 3. State Plan: Improve production through innovative technologies</p>	<p>1.RIDF: Infrastructure support to field veterinary institutions 2.Livestock development programs : ksheersagar-reduce inter calving period, animal hostel, suphalam-fertility management, integration of animal health camps with other initiatives (eg. polampilusthondhi, janmabhoomi-maavooru, neeruchettu), mobile veterinary centers 3.National Livestock Management: livestock census and integrated sample survey, feed and fodder development 5.Fodder security Policy: Subsidy for the cultivation of fodder in</p>	<p>1.RIDF: Upgradation and strengthening of fish seed farms 2.Fisheries Policy: Promotion of Aquaculture ponds/farms through financial assistance for farm mechanization 3.Intensive development of inland fish culture 4.Integrated development and management of fisheries 5.Scheme for relief and welfare of fishermen belonging to SCs and STs: supply of boats and nets to reservoir/riverine/tank fishermen, supply of ice boxes, promotion of cage culture in reservoirs, 6.Development of fisheries: revolving fund to fisherwomen, assistance to fisherwomen capacity building of FPOs, supply of boats and nets</p>
--	--	--	--	---	---

			<p>s - protected cultivation, trellispanda l cultivation, mulching for gourds and melons</p>	<p>watersheds, tank beds, forest fringe, as common property resources, vacant government land, for needy farmers, azolla as feed 6.National Livestock Health and Disease Control Program 7.Subsidy for piggery units, poultry farms, sheep farms 8.Poultry Development Policy: Promotion of maize and soya cultivation for poultry feed 9.Fodder and feed development: Promotion of silage, hydroponics and azolla, fodder blocks, fodder seed, fodder banks, subsidy for fodder and feed supply 10. NPBBDD/N PDD: Establishmen</p>	<p>to inland fishermen</p>
--	--	--	--	---	--------------------------------

				t of breeder societies for betterment of dairy cow breeds	
3. Biofortification					NA
4. Agricultural Value Chains			1.NHM: Subsidy for the creation of post harvest facilities 2. Quality improvement and certification of Vegetables, Turmeric, Mango (along with iCCOA and SIMFED) to create brand name for A.P. produce internationally	1.Poultry Development Policy: Capital subsidy and interest subsidy for the establishment of egg processing plant/centres, egg collection centres 2.Poultry Development Policy: Capital subsidy and interest subsidy for the establishment of chicken processing centres 3.Processing infrastructure for dairy/poultry/sheep 4.Poultry Development Policy: Subsidy for small vendors/entrepreneurs: procuring reefer vans, cold storage, setting up meat outlets - restriction on live bird dressing in	1.Scheme for relief and welfare of fishermen belonging to SCs and STs: Promotion of SC entrepreneurs in processing plants, reefer vans and aqua labs 2.Scheme for relief and welfare of fishermen belonging to SCs and STs: assistance for retail fish marketing by provision of 3-4 wheelers

				<p>wet markets</p> <p>5. Fodder Security Policy: Sale of fodder through SERP village groups and extension</p> <p>6. Fodder Security Policy: Subsidy for baling of fodder, silage production, baling of fodder</p>	
--	--	--	--	---	--

***See References – Policy documents for list of sources**

APPENDIX C

COMPREHENSIVE LIST OF POLICIES AND SOURCES: ANDHRA PRADESH

Sl. No:	Scheme name	Source	Category
1.	Soil and water conservation through half-acre Annapurna Model	Budget 16-17	Agricultural Production Diversity
2.	Integrated livestock management: calf rearing, backyard poultry, mini dairy farms to cater to ashram schools and residential schools (also through National Livestock Management)	Budget 16-17, Budget 17-18	Agricultural Production Diversity
3.	Poultry Development Policy: Promotion of rural backyard poultry through setting up of fully subsidised hatchery in every district, support for setting up of mother units, training of women SHGs	Poultry Development Policy 2016-2020	Agricultural Production Diversity
4.	Fodder Security Policy - Subsidy for fodder seed intercropping with horticulture	Fodder Security Policy 2015-2020	Agricultural Production Diversity
5.	Polambadi: Farmer Field Schools to promote Integrated crop management + integrated pest management + water management	Budget 16-17, Budget 17-18	Agricultural Production Diversity
6.	NFSM: Intercropping demonstrations and cropping system demonstrations for rice-rice-pulse and blackgram-greengram	Budget 16-17, Action Plan of NFSM for the year 2016-17, 2017-18	Agricultural Production Diversity
7.	Andhra Pradesh Rural Inclusive Growth Project	Budget 16-17, Budget 17-18, Project Appraisal Document APRIGP (World Bank 2014)	Agricultural Production Diversity
8.	State Plan: Multiple cropping system will be promoted	Ag Budget 17-18	Agricultural Production Diversity
9.	RIDF: Infrastructure support to field veterinary institutions	Budget 16-17	Agricultural production
10.	RIDF: Upgradation and strengthening of fish seed farms	Budget 16-17, Budget 17-18	Agricultural production
11.	Promotion of organic and natural farming (under RKVY, NMSA-Paramparagat Krishi Vikas Yojana)	Budget 16-17, Budget 17-18	Agricultural production
12.	Promotion of horticulture activities: new area into cultivation of root and tuber crop and flowers, pre and post harvest management activities like supply of plastic crates/poly sheets, awareness programs (under RKVY, MIDH)	Budget 16-17, Budget 17-18	Agricultural production
13.	Fodder and feed development: Promotion of silage, hydroponics and azolla, fodder blocks, fodder seed, fodder banks, subsidy for	Budget 16-17, Budget 17-18	Agricultural production

	fodder and feed supply		
14.	Livestock development programs : ksheersagar-reduce inter calving period, animal hostel, suphalam-fertility management, integration of animal health camps with other initiatives (eg. polampilusthondhi, janmabhoomi-maavooru, neeru-chettu), mobile veterinary centers	Budget 16-17, Budget 17-18	Agricultural production
15.	Fisheries Policy: Promotion of Aquaculture ponds/farms through financial assistance for farm mechanization	Budget 16-17, Budget 17-18	Agricultural production
16.	NFSM : Accelerated crop production programs and need based inputs for rice, pulses and coarse cereals	Budget 16-17, Budget 17-18	Agricultural production
17.	SMAM, RKVY: Subsidy (through direct benefits transfer) and supply of farm mechanization, subsidy and supply of seeds	Budget 16-17, Budget 17-18, Ag Budget 17-18	Agricultural production
18.	MIDH: area expansion and rejuvenation, assistance for protected cultivation of flowers and vegetables, promotion of post-harvest management facilities for fruits and vegetables	Budget 16-17, Budget 17-18	Agricultural production
19.	National Livestock Management: livestock census and integrated sample survey, feed and fodder development	Budget 16-17, Budget 17-18	Agricultural production
20.	NPBDD/NPDD: Establishment of breeder societies	Budget 16-17, Budget 17-18	Agricultural production
21.	Intensive development of inland fish culture	Budget 17-18	Agricultural production
22.	Integrated development and management of fisheries	Budget 17-18	Agricultural production
23.	Fodder security Policy: Subsidy for the cultivation of fodder in watersheds, tank beds, forest fringe, as common property resources, vacant government land, for needy farmers, azolla as feed	Fodder Security Policy 2015-2020, Budget 16-17, Budget 17-18	Agricultural production
24.	Scheme for relief and welfare of fishermen belonging to SCs and STs: supply of boats and nets to reservoir/riverine/tank fishermen, supply of ice boxes, promotion of cage culture in reservoirs,	Budget 16-17, Budget 17-18	Agricultural production
25.	Development of fisheries: revolving fund to fisherwomen, assistance to fisherwomen capacity building of FPOs, supply of boats and nets to inland fishermen	Budget 16-17, Budget 17-18	Agricultural production
26.	National Livestock Health and Disease Control Program	Budget 16-17, Budget 17-18	Agricultural production
27.	Supply of seeds to farmers	Budget 17-18	Agricultural production
28.	Calf-rearing program	Budget 17-18	Agricultural production
29.	Subsidy for piggery units, poultry farms, sheep farms	Budget 17-18, Poultry Development Policy 2016-2020	Agricultural production
30.	Poultry Development Policy: Promotion of maize and soya cultivation for poultry feed	Poultry Development	Agricultural production

		Policy 2016-2020	
31.	NFSM: Seed Village Program	Ag Budget 17-18	Agricultural production
32.	Community Managed Seed System	Ag Budget 17-18	Agricultural production
33.	Promotion of red gram on paddy field bunds and as inter crop in ground nut, cotton and other cereal crops	Ag Budget 17-18	Agricultural production
34.	Promotion of pre-kharif and summer pulses	Ag Budget 17-18	Agricultural production
35.	Improve production through innovative technologies - protected cultivation, trellis/pandal cultivation, mulching for gourds and melons	Ag Budget 17-18	Agricultural production
36.	Polampilustondi and Chandranna Rythu Kshetralu: Extension and field demonstrations for advanced farming practices	Budget 16-17, Budget 17-18	Agricultural production (extension)
37.	NMAET: agricultural extension, seed and planting material, agricultural mechanization and plant protection & quarantine	Budget 16-17, Budget 17-18	Agricultural production (extension)
38.	Scheme for relief and welfare of fishermen belonging to SCs and STs: Promotion of SC entrepreneurs in processing plants, reefer vans and aqua labs	Budget 16-17	Agricultural Value Chains
39.	Processing infrastructure for dairy/poultry/sheep	Budget 17-18	Agricultural Value Chains
40.	Poultry Development Policy: Subsidy for small vendors/entrepreneurs: procuring reefer vans, cold storage, setting up meat outlets - restriction on live bird dressing in wet markets	Poultry Development Policy 2016-2020	Agricultural Value Chains
41.	Food Processing Policy: Infrastructural, fiscal support, R&D and testing lab funding	Food Processing Policy 2015-2020	Agricultural Value Chains
42.	RKVY: Financial assistance to food processing units (agriculture, horticulture, dairy) in the form of grant- in-aid 25% of the cost of Plant & Machinery and technical civil works,	Ag Budget 17-18	Agricultural Value Chains
43.	Poultry Development Policy: Capital subsidy and interest subsidy for the establishment of egg processing plant/centres, egg collection centres	Poultry Development Policy 2016-2020	Agricultural Value Chains
44.	Poultry Development Policy: Capital subsidy and interest subsidy for the establishment of chicken processing centres	Poultry Development Policy 2016-2020	Agricultural Value Chains
45.	Andhra Pradesh Rural Inclusive Growth Project -value chain development through producer organizations	Budget 16-17, Budget 17-18	Agricultural Value Chains
46.	Scheme for relief and welfare of fishermen belonging to SCs and STs: assistance for retail fish marketing by provision of 3-4 wheelers	Budget 16-17	Agricultural Value Chains
47.	NHM: Subsidy for the creation of post harvest facilities	Budget 16-17	Agricultural Value Chains

48.	Fodder Security Policy: Sale of fodder through SERP village groups and extension	Fodder Security Policy 2015-2020	Agricultural Value Chains
49.	Fodder Security Policy: Subsidy for baling of fodder, silage production, baling of fodder	Fodder Security Policy 2015-2021	Agricultural Value Chains
50.	Marketing Policy: Statewide networked virtual markets, electronic auction system for transparent and competitive pricing, MIS for efficient and timely dissemination of information and money to all stakeholders. Construct warehouse and logistic hubs in the state.	Marketing Policy 2015	Agricultural Value Chains
51.	Marketing Policy: Simplification of licensing procedures, encouragement of private participation to improve competitiveness, farmer to be allowed choice between private and public, accreditation of warehouses.	Marketing Policy 2015	Agricultural Value Chains
52.	Marketing Policy: Initiate aggregation and primary value addition at the village level by farmer groups, linkages with secondary market	Marketing Policy 2015	Agricultural Value Chains
53.	Quality improvement and certification of Vegetables, Turmeric, Mango (along with iCCOA and SIMFED) to create brand name for A.P. produce internationally.	Ag Budget 17-18	Agricultural Value Chains
54.	Poultry Development Policy: Egg consumption promotion - IEC campaign	Poultry Development Policy 2016-2020	Nutrition education/BCC
55.	Andhra Pradesh Rural Inclusive Growth Project – human development, social development, safety nets and entitlements	Budget 16-17, Budget 17-18	Nutrition education/BCC, Women's empowerment
56.	Anna amrutha hastham (supplementary nutrition ICDS)	Budget 16-17, Budget 17-18	Nutrition education/BCC, Women's empowerment
57.	Girimuddalu scheme: ICDS in tribal areas	Budget 16-17, Budget 17-18	Nutrition education/BCC, Women's empowerment
58.	SNP under ICDS: pregnant and lactating women, 6 months-3 yrs, 3-6yrs	Budget 16-17, Budget 17-18	Nutrition education/BCC, Women's empowerment
59.	Mid-day meals program	Budget 16-17, Budget 17-18	Nutrition education/BCC, Women's empowerment
60.	National mission for empowerment of women – IGMSY: CCT for pregnant women	Budget 16-17, Budget 17-18	Women's empowerment
61.	Sabla Scheme for the empowerment of adolescent girls: promoting health, nutritional, vocational and life skills	Budget 16-17, Budget 17-18	Women's empowerment

62.	Navya Andhra Jala Prabha/NTR Jala Siri: convergence with MNREGA for irrigation and land development	Budget 16-17, Budget 17-18	Natural resource management
63.	IWMP/Pradhan Mantri Krishi Sinchayi Yojana: micro irrigation subsidy program	Budget 16-17, Budget 17-18	Natural resource management
64.	MNREGA-convergence with horticulture and fisheries	Budget 16-17, Budget 17-18	Natural resource management
65.	RKVY: Bhuchetana program to rejuvenate soil health using micronutrients	Budget 16-17	Natural resource management
66.	NMSA: rainfed area development, soil health management, soil health card scheme, paramparagat krish vikas yojana-organic farming cluster	Budget 16-17, Budget 17-18	Natural resource management
67.	Mitigation of droughts and farmer distress through climate resilient agriculture	Budget 17-18	Natural resource management
68.	Integrated nutrient management: subsidy based on soil analysis	Budget 16-17, Budget 17-18	Natural resource management
69.	Soil and water conservation programmes	Budget 17-18	Natural resource management
70.	AP Water Vision	Budget 17-18	Natural resource management
71.	Water Conservation Mission - Repairs, renovation and desilting of tanks and other water harvesting structures, construction of new structures and LI schemes, convergence with NREGA, development of cascades, micro-irrigation, major and minor irrigation projects, plantation to increase green cover by Forest Dept	Budget 17-18	Natural resource management
72.	Poultry Development Policy: Subsidy for organic manure plants from poultry manure	Poultry Development Policy 2016-2020	Natural resource management
73.	APDMP, APII, ATP: Drought proofing and climate resilience programs with IFAD and World Bank	Ag Budget 17-18	Natural resource management
