

**FARMING SYSTEM FOR NUTRITION:
NEED AND SCOPE IN ODISHA**

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July 2018

**M. S. Swaminathan Research Foundation
Chennai**

MSSRF / RR / 18 / 44

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Abbreviations

APMC	Agriculture Produce Marketing Committee
ATMA	Agriculture Technology Management Agency
BCC	Behaviour Change Communication
BMI	Body Mass Index
CCSAMMN	Climate Change and Sustainable Agriculture Monitoring, Modelling and Networking
CED	Chronic Energy Deficiency
DFID	Department for International Development (UK Govt.)
DRWA	Directorate of Research on Women in Agriculture
ECCE	Early childhood care and education
FSN	Farming System for Nutrition
FPO	Farmer Producer Organization
GCA	Gross Cropped Area
GDP	Gross Domestic Product
GoO	Government of Odisha
GP	Gram Panchayat
GSDP	Gross State Domestic Product
IFS	Integrated Farming Systems
ICAR	Indian Council of Agricultural Research
ICDS	Integrated Child Development Services
ICMR	Indian Council of Medical Research
ICT	Information and Communication Technology
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IMR	Infant Mortality Rate
INM	Integrated Nutrient Management
ISOPOM	Integrated Scheme of Oilseeds Pulses Oil Palm and Maize
IPM	Integrated Pest Management
IWMP	Integrated Watershed Management Programme
IYCF	Infant and Young Child Feeding
KVK	Krishi Vigyan Kendra
LAMPS	Large Area Multipurpose Cooperative Societies

MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MIDH	Mission for Integrated Development for Horticulture
MMR	Maternal Mortality Rate
MoU	Memorandum of Understanding
MSSRF	M. S. Swaminathan Research Foundation
NFSM	National Food Security Mission
NMAET	National Mission for Agriculture Extension and Technology
NMSA	National Mission for Sustainable Agriculture
NGO	Non-Governmental Organization
NRLP	National Rural Livelihood Project
NSSO	National Sample Survey Organisation
OLM	Odisha Livelihoods Mission
ONAP	Odisha Multi-Sectoral Nutrition Action Plan
OTELP	Odisha Tribal Empowerment and Livelihoods Programme
OUAT	Odisha University of Agriculture and Technology
PACS	Primary Agricultural Credit Societies
PKVY	Paramparagat Krishi Vikas Yojana
PPP	Public Private Partnership
RDA	Recommended Dietary Allowance
RIDF	Rural Infrastructure Development Fund
RMC	Regulated Market Committee
RKVY	Rashtriya Krishi Vikas Yojana
SC	Scheduled Caste
SRI	System of Rice Intensification
ST	Scheduled Tribe
UNICEF	United Nations International Children's Fund
WCD	Women and Child Development
WHA	World Health Assembly
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 Odisha”* 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; Akshaya Kumar Panda, S. Malarvannan and E. D. Israel Oliver King helped in taking the FSN concept forward in Odisha; 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 Odisha have been extremely supportive and receptive to the concept of FSN. They willingly gave their time and allowed us to share our findings and recommendations for promoting FSN in Odisha. We are particularly thankful to Shri. R. Balakrishnan I.A.S., Development Commissioner cum Additional Chief Secretary, Planning & Convergence Dept., Dr. Sourabh Garg, I.A.S., Principal Secretary and Dr. M. Muthukumar, Director, from the Department of Agriculture and Farmers' Empowerment, Govt. of Odisha. We thank senior officials from the National Institute of Rural Development and Panchayati Raj, Hyderabad and Institute on Management of Agriculture Extension (IMAGE), Bhubaneswar for their support in organising advocacy workshops in Bhubaneswar. Odisha University of Agriculture and Technology, Regional Centre of Central Tuber Crops Research Institute, Bhubaneswar, National Rice Research Institute, Cuttack, as well as colleagues from CARE India, Odisha Hub and LANDESA have been very supportive and our heartfelt thanks to them.

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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 at 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 International Children's Education 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 Farming System for Nutrition (FSN) as a pathway for addressing malnutrition in India. The FSN approach is defined by Prof. 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 nutritious food 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 and 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 Odisha. Odisha, with its rich natural resources and large rural and tribal population presents a unique development challenge to policymakers. In recent years, Odisha’s Gross Domestic Product (GDP) growth has consistently outpaced the national average although per capita incomes continue to lag behind the all-India figures. The state government has taken several initiatives to improve social sector performance, achieving the largest reduction in poverty among major states in India in the period 2004-05 and 2011-12, as well as major improvements in several

key health and education indicators. Despite the progress, poverty and malnutrition, especially among Scheduled Tribes and Scheduled Castes and among women and children, remain a major challenge in rural Odisha.

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 Odisha; Section 4 provides details on biofortified crops suitable for adoption in Odisha; Section 5 provides a desk review of government policies (central and state) that foster nutrition-sensitive agriculture in the state of Odisha; and Section 6 provides the policy recommendations for promoting farming system for nutrition approach in Odisha.

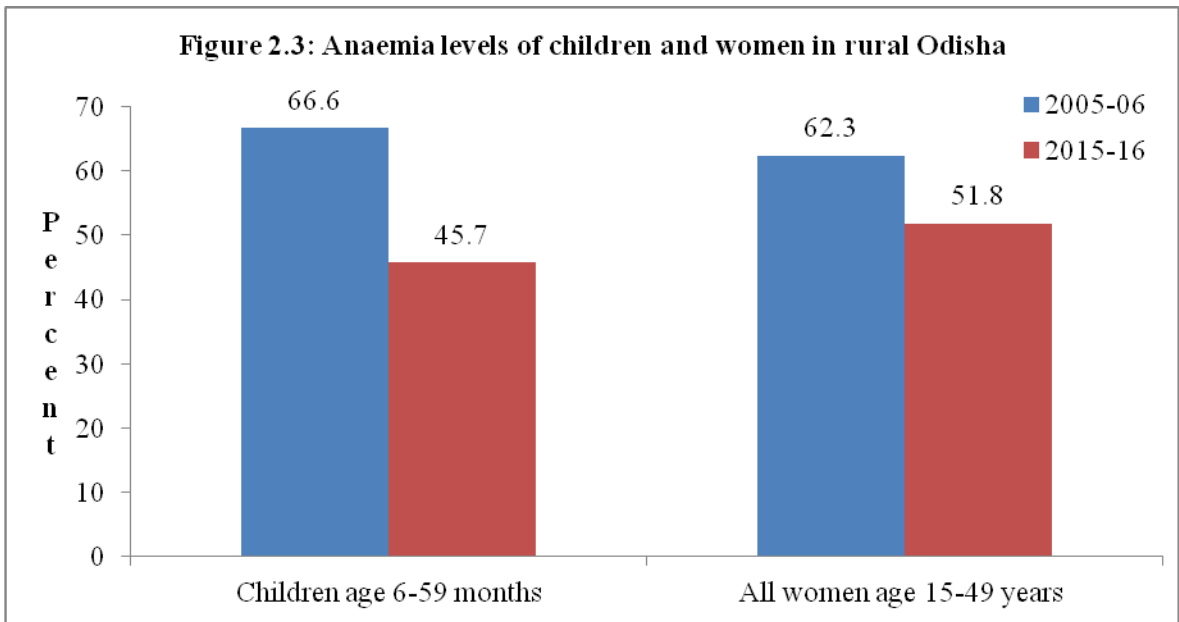
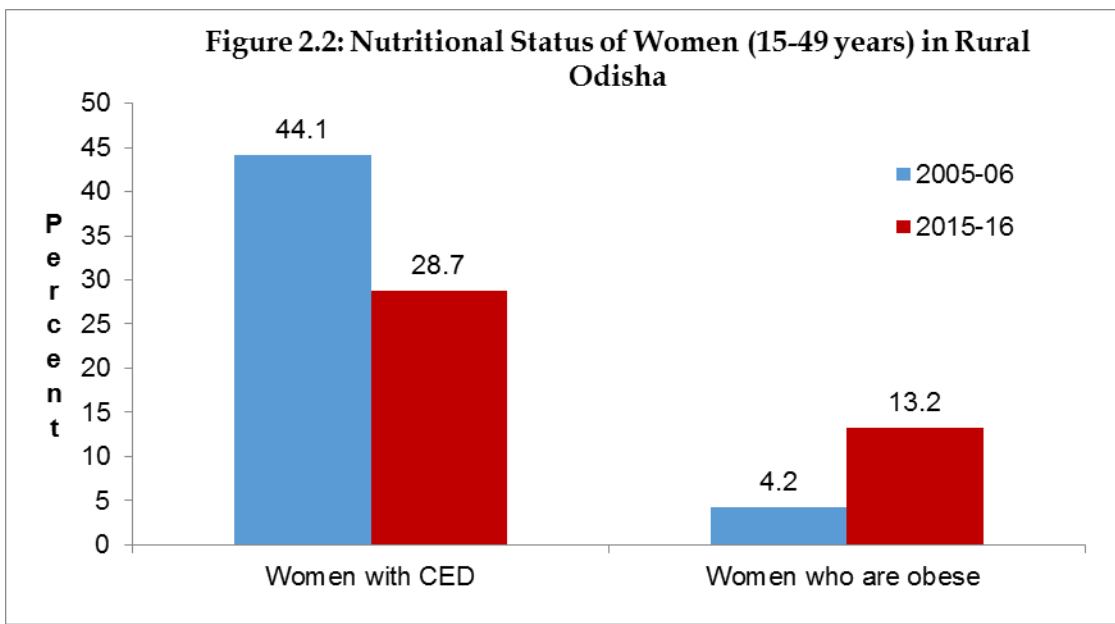
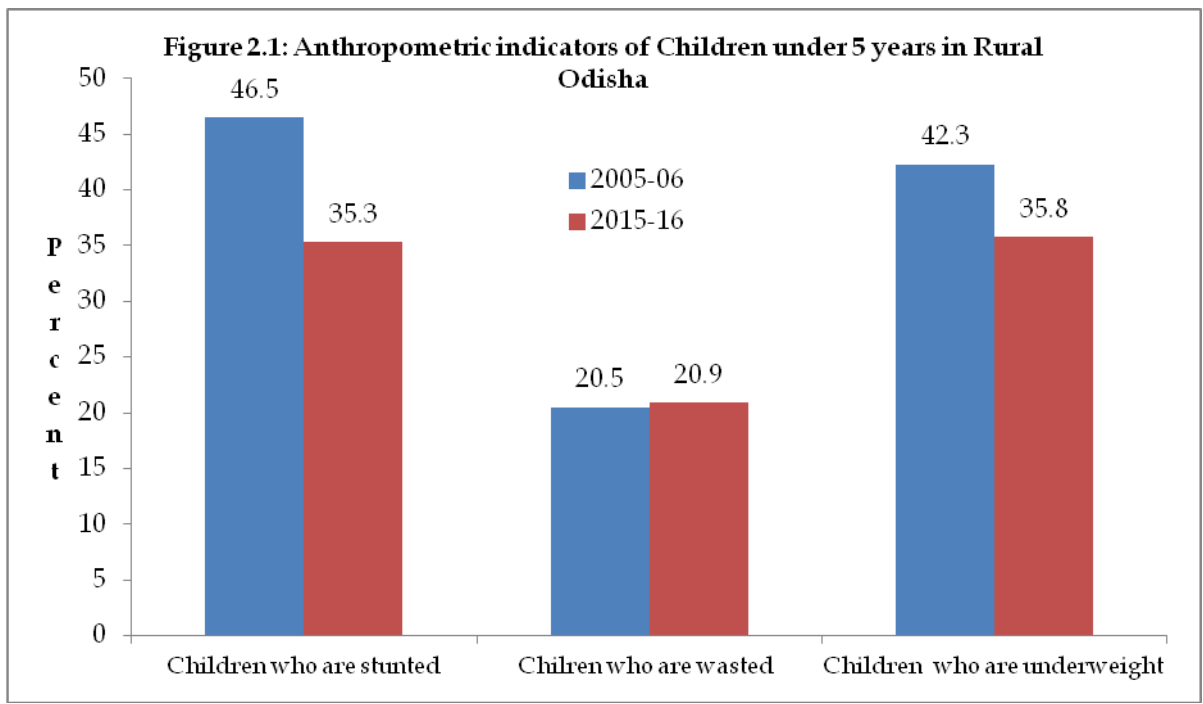
Section 2:

NUTRITIONAL PROFILE OF ODISHA

2.1 Nutritional Status of Children and Women

Odisha has made reasonable strides in improving maternal and child health and nutrition over the last decade, between 2005-06 and 2015-16 (IIPS, 2008; IIPS&ICF, 2017), as reflected by the three anthropometric indicators of child malnourishment, namely, stunting (too short for their age), wasting (too thin for their height), underweight (thin for their age) as also anaemia. Similarly, malnourishment among women in reproductive age group (15-49 yrs), measured using the Body Mass Index (BMI) and prevalence of anaemia shows progress over the last decade.

Figure 2.1 reveals a decline in percentage of children under 5 years stunted and underweight in rural Odisha while Figure 2.2 indicates a decline in percentage of women (15 – 49 yrs) with Chronic Energy Deficiency (CED). However, obesity and overweight is emerging as a nutritional problem among women even in rural Odisha. Figure 2.3 shows a decline in percentage of women and children suffering from anaemia. Despite considerable reduction in incidence of women and children suffering from anaemia, as many as 50% of women (15 – 49 yrs) and 45% of children under 5 years report to be anaemic, in rural Odisha in 2015-16; one-third of children remain stunted or underweight while close to 30% of women in reproductive age group suffer from CED. Thus the problem of child and women malnutrition continues to remain a huge challenge, in 2015-16, in rural Odisha.



The nutrition status of women and children vary across social groups. Figure 2.4 shows that the problem of stunting, wasting and underweight of children under 5 years is most severe among ST category.

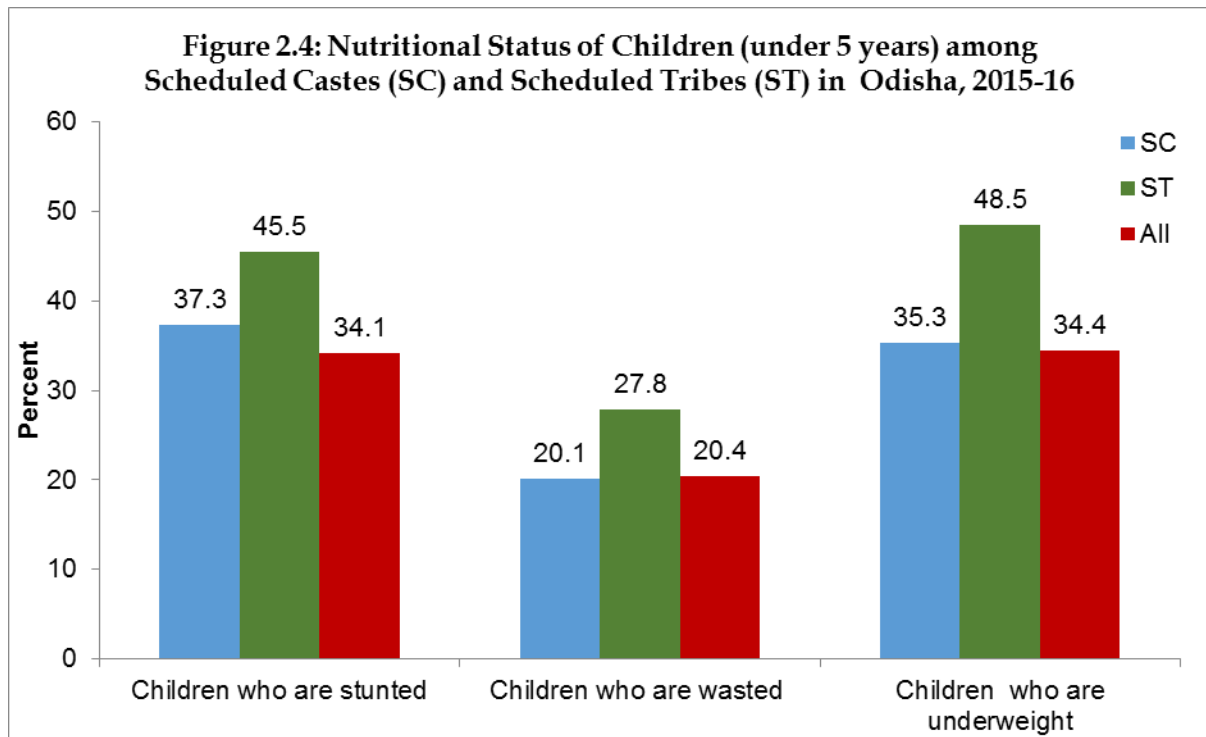


Table 2.1 provides the nutritional status of children and women, across districts of Odisha.

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

Sl. No:	Name of the District	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 (15-49 yrs) with CED (%)	Non – Pregnant women age 15-49 years who are anaemic (%)
1.	Angul	33.6	21.6	36.2	35.6	23.5	44.5
2.	Boudh	42.8	22.8	44.4	43.6	31.5	49.6
3.	Bolangir	44.4	28.3	46.8	68.0	34.5	61.1
4.	Bargarh	39.8	25.2	39.8	68.2	32.0	69.2
5.	Balasore	32.1	18.4	34.0	29.1	26.6	41.0
6.	Bhadrak	36.7	16.3	30.6	22.4	31.2	44.1
7.	Cuttack	12.4	7.9	15.5	16.1	22.0	36.5
8.	Debagarh	33.2	20.4	37.8	29.2	32.5	42.8
9.	Dhenkanal	28.7	18.6	31.2	40.2	27.8	40.8
10.	Ganjam	31.2	17.5	23.0	41.4	23.1	43.7
11.	Gajapati	34.0	18.9	33.9	59.8	24.1	59.5
12.	Jharsuguda	42.5	24.2	40.2	68.0	34.1	71.3
13.	Jajpur	30.1	17.3	30.1	30.8	28.4	43.8
14.	Jagatsinghapur	19.4	12.6	16.8	22.7	18.0	35.9
15.	Khordha	24.8	12.7	19.8	24.6	19.2	46.7
16.	Kendujhar	44.2	18.6	42.6	29.1	31.2	40.4
17.	Kalahandi	37.3	25.5	40.8	69.6	36.1	70.6
18.	Kandhamal	39.5	23.5	44.3	42.4	28.9	52.9
19.	Koraput	43.7	29.3	46.6	73.1	37.4	67.6
20.	Kendrapara	27.2	12.5	24.7	29.2	25.1	42.8
21.	Malkangiri	47.2	33.0	52.5	72.6	47.5	71.4
22.	Mayurbhanj	44.6	17.6	44.9	31.5	33.2	42.0
23.	Nabarangpur	46.6	36.0	51.6	72.7	37.2	71.5
24.	Nuapada	36.4	27.0	40.0	65.6	35.1	65.8
25.	Nayagarh	27.8	18.2	26.4	26.7	16.9	39.9
26.	Puri	16.7	11.2	17.7	29.0	16.8	44.9
27.	Rayagada	46.5	23.3	44.4	51.5	35.6	56.7
28.	Sambalpur	44.2	30.4	51.3	75.3	32.2	75.6
29.	Subarnapur	47.1	22.3	43.4	73.7	33.3	69.2
30.	Sundergarh	38.3	34.4	46.0	80.3	30.3	72.8
	Odisha	35.3	20.9	35.8	45.7	28.7	51.7

Note: CED refers to Body Mass Index of less than 18.5 kg/m²

Child Anaemia refers to haemoglobin level of <11.0grams / decilitre;

Women Anaemia refers to haemoglobin level of <12.0grams / decilitre;

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 five categories using equal interval classes based on the level of the problem, namely, very low, low, moderate, high and very 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)

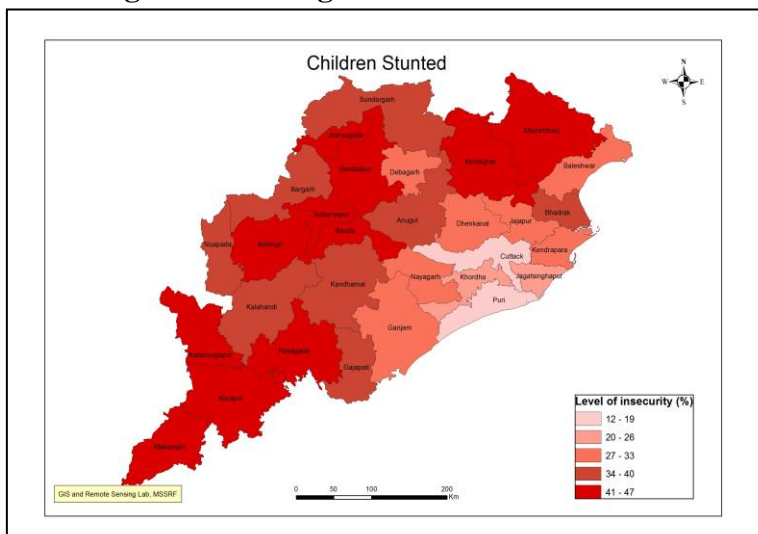
Table 2.2: Categorisation of Districts, w.r.to Stunting of Children under 5 years, Rural Odisha, 2015-16

Level of Insecurity	Names of Districts
Very Low	Cuttack, Puri
Low	Jagatsinghapur, Khordha
Moderate	Kendrapara, Nayagarh, Dhenkanal, Jajpur, Ganjam, Balasore, Debagarh
High	Angul, Gajapati, Nuapada, Bhadrak, Kalahandi, Sundergarh, Kandhamal, Bargarh
Very High	Jharsuguda, Boudh, Koraput, Kendujhar, Sambalpur, Bolangir, Mayurbhanj, Rayagada, Nabarangpur, Subarnapur, Malkangiri

Note: Percentage of children stunted in different categories are in the range of:12-19% in very low level insecurity; 20-26% in low; 27-33% in moderate; 34-40% in high and 41-47% in very high.

Source: Table 2.1

Fig 2.5 Percentage of Children Stunted



Percentage of stunted children under 5 years varies widely across the districts of rural Odisha with a minimum of 12.4 in Cuttack to a maximum of 47.2 in Malkangiri in 2015-16. Cuttack and Puri fall in the very low intensity of problem category as the percentage of children stunted are relatively

lower in these districts. On the contrary, 11 out of 30 districts - Jharsuguda, Boudh, Koraput,

Kendujghar, Sambalpur, Bolangir, Mayurbhanj, Rayagada, Nabarangpur, Subarnapur and Malkangiri - have more than 40% of children who are stunted and are categorised as ‘very high’ intensity of the problem. The average percentage of stunted children in rural Odisha is 35.3. In 19 districts, in the high and very high categories, the problem is much worse than the state average.

Table 2.3: Categorisation of Districts, w.t.to Wasting of Children under 5 years, Rural Odisha, 2015-16

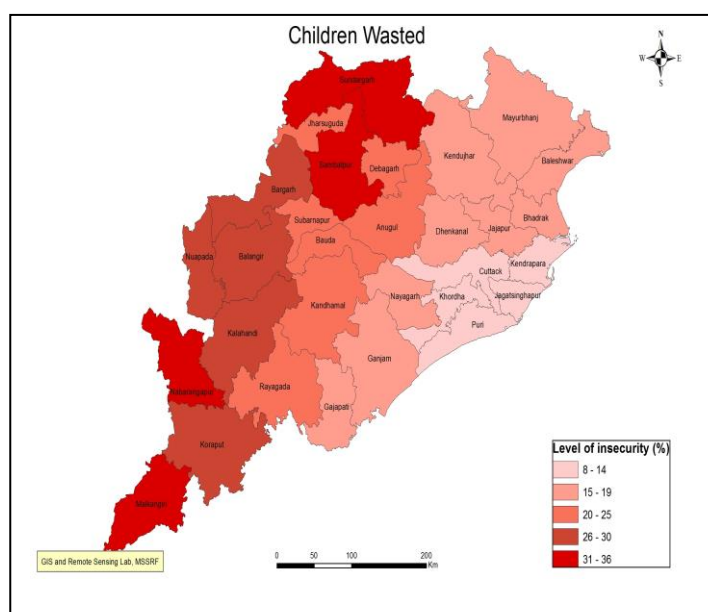
Level of Insecurity	Names of Districts
Very Low	Cuttack, Puri, Kendrapara, Jagatsinghapur, Khordha
Low	Bhadrak, Jajpur, Ganjam, Mayurbhanj, Nayagarh, Balasore, Dhenkanal, Kendujhar, Gajapati
Moderate	Debagarh, Angul, Subarnapur, Boudh, Rayagada, Kandhamal, Jharsuguda
High	Kalahandi, Nuapada, Bolangir, Koraput, Bargarh
Very High	Sambalpur, Malkangiri, Sundergarh, Nabarangpur

Note: Percentage of children wasted in different categories are in the range of: 8-14% in very low level of insecurity; 15-19% in low; 20-25% in moderate; 26-30% in high and 31-36% in very high.

Source: Table 2.1

Fig 2.6 Percentage of Children Wasted

Percentage of children under 5 years who are wasted varies widely across the districts of rural Odisha with a minimum of 8% in Cuttack to a maximum of 36% in Nabarangpur in 2015-16. Cuttack, Puri, Kendrapara, Jagatsinghapur and Khordha districts fall in the very low insecurity category as the percentage of children wasted are relatively lower in these districts. On the contrary Sambalpur, Malkangiri, Sundergarh



and Nabarangpur districts have more than 30% of children who are wasted. The average percentage of wasted children in rural Odisha is 20.9 and it is clear that in 16 districts in the moderate, high and very high insecurity categories, the problem is worse than the state average.

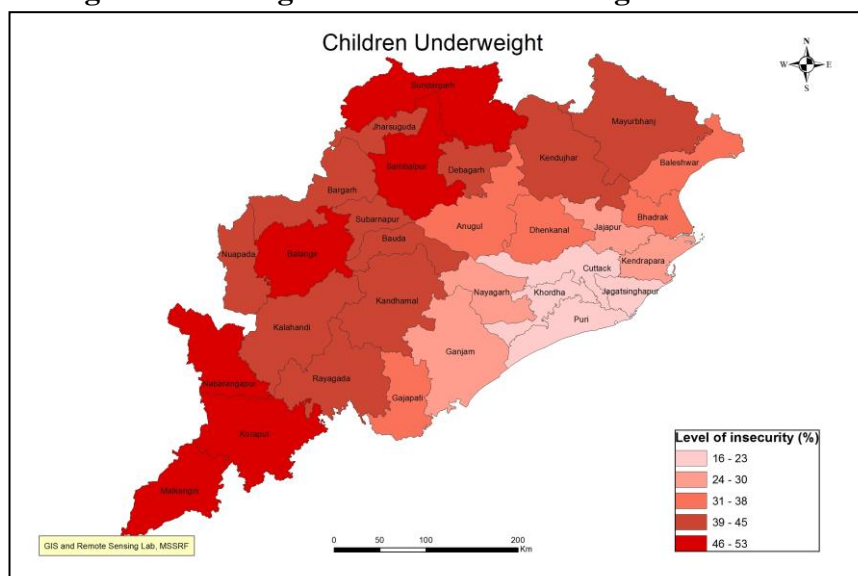
Table 2.4: Categorisation of Districts, w.r.to Underweight of Children under 5 years, Rural Odisha, 2015-16

Level of Insecurity	Name of Districts
Very Low	Cuttack, Jagatsinghapur, Puri, Khordha
Low	Ganjam, Kendrapara, Nayagarh, Jajpur
Moderate	Bhadrak, Dhenkanal, Gajapati, Balasore, Angul
High	Debagarh, Bargarh, Nuapada, Jharsuguda, Kalahandi, Kendujhar, Subarnapur, Kandhamal, Boudh, Rayagada, Mayurbhanj
Very High	Sundergarh, Koraput, Bolangir, Sambalpur, Nabarangpur, Malkangiri

Note: Percentage of children underweight in different categories are in the range of: 16 -23% in very low level of insecurity; 24 -30% in low; 31-38% in moderate; 39-45% in high and 46-53% in very high.

Source: Table 2.1

Fig 2.7 Percentage of Children Underweight



Percentage of underweight children under 5 years varies widely across the districts of rural Odisha with a minimum of 16% in Cuttack to a maximum of 53% in Malkangiri with the state average at 35.8% in 2015-16. Cuttack, Puri, Jagatsinghapur and Khordha districts fall in the very low

insecurity category as the percentage of underweight children are relatively lower in these districts. On the contrary Sundergarh, Koraput, Bolangir, Sambalpur, Nabarangpur and Malkangiri districts have more than 30% of children who are wasted. The percentage of underweight children in 18 districts is above the state average and mostly falls in the high and very high insecurity categories.

Anaemia is a major health problem in Odisha³.

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).

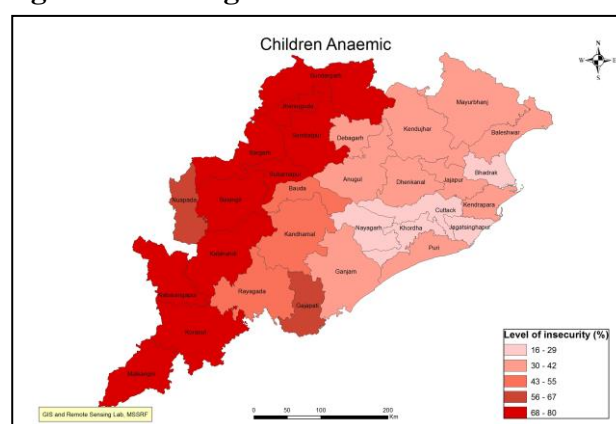
Table 2.5: Categorisation of Districts, w.r.to Children (6-59 months) with Anaemia, Rural Odisha, 2015-16

Level of Insecurity	Name of Districts
Very Low	Cuttack, Bhadrak, Jagatsinghapur, Khordha, Nayagarh
Low	Puri, Balasore, Kendujhar, Debagarh, Kendrapara, Jajpur, Mayurbhanj, Angul, Dhenkanal, Ganjam
Moderate	Kandhamal, Boudh, Rayagada
High	Gajapati, Nuapada
Very High	Bolangir, Jharsuguda, Bargarh, Kalahandi, Malkangiri, Nabarangpur, Koraput, Subarnapur, Sambalpur, Sundergarh

Note: Percentage of children with anaemia in different categories are in the range of: 16 -29% in very low level of insecurity; 30-42% in low; 43-55% in moderate; 56-67% in high and 68-80% in very high.

Source: Table 2.1

Fig 2.8 Percentage of Children with Anaemia



Percentage of children (6-59 months) who are anaemic in rural Odisha varies widely across the districts with a minimum of 16% in Cuttack and a maximum of 80% in Sundergarh. On an average 45.7% of children are anaemic in rural Odisha. 13 districts which largely fall in the high and very high insecurity categories have higher percentages of children who are anaemic than the state average. Cuttack, Bhadrak, Jagatsinghapur, Khordha and Nayagarh districts have relatively lower percentage of children with anaemia while Bolangir, Jharsuguda, Bargarh, Kalahandi, Malkangiri, Nabarangpur, Koraput, Subarnapur, Sambalpur and Sundergarh districts have more than 68% of children who are anaemic.

It is clear from the above analysis that in Cuttack, Puri, Jagatsinghapur, Khordha and Nayagarh 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, Sambalpur, Nabarangpur, Malkangiri, Bolangir, Sundergarh and Koraput 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, w.r.to Women (15-49 years) with Chronic Energy Deficiency, Rural Odisha, 2015-16

Level of Insecurity	Name of Districts
Very Low	Puri, Nayagarh, Jagatsinghapur, Khordha, Cuttack
Low	Ganjam, Angul, Gajapati, Kendrapara, Balasore, Dhenkanal, Jajpur, Kandhamal
Moderate	Sundergarh, Bhadrak, Kendujhar, Boudh, Bargarh, Sambalpur, Debagarh, Mayurbhanj, Subarnapur, Jharsuguda, Bolangir, Nuapada
High	Rayagada, Kalahandi, Nabarangpur, Koraput
Very High	Malkangiri

Note: Percentage of women with CED in different categories are in the range of: 17 -23% in very low level of insecurity; 24-29% in low; 30-35% in moderate; 36-41% in high and 42-48% in very high.

Source: Table 2.1

Fig 2.9 Percentage of Women with CED

As regards nutritional problems among women (15-49 years), the percentage of women with CED was lowest in Puri district at 17% and highest in Malkangiri district at 48%, in 2015-16. On an average 29% of women were suffering from CED in rural Odisha and 17 districts recorded a higher percentage of women with CED than the state average. Puri, Nayagarh, Jagatsinghapur, Khordha and Cuttack are the districts with relatively lower percentage of women with CED while Malkangiri, Rayagada, Kalahandi, Nabarangpur and Koraput districts are in the high insecurity category.

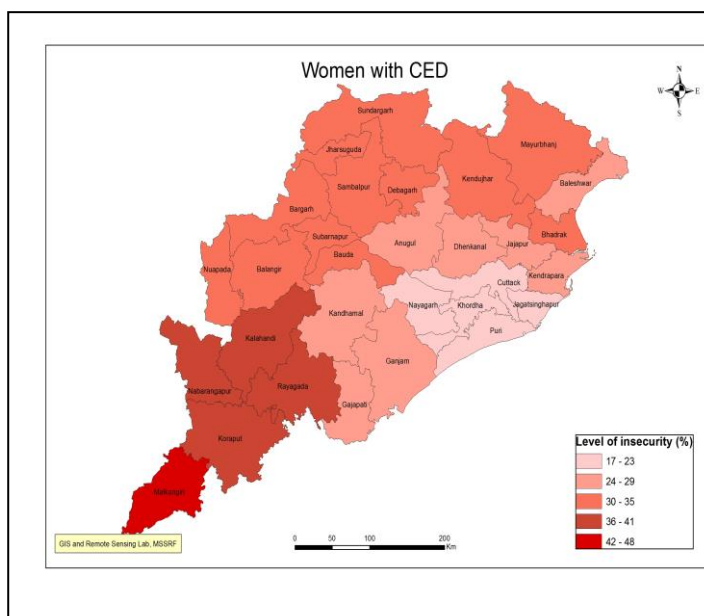


Table 2.7: Categorisation of Districts, w.r.to Women (15-49 years) with Anaemia, Rural Odisha, 2015-16

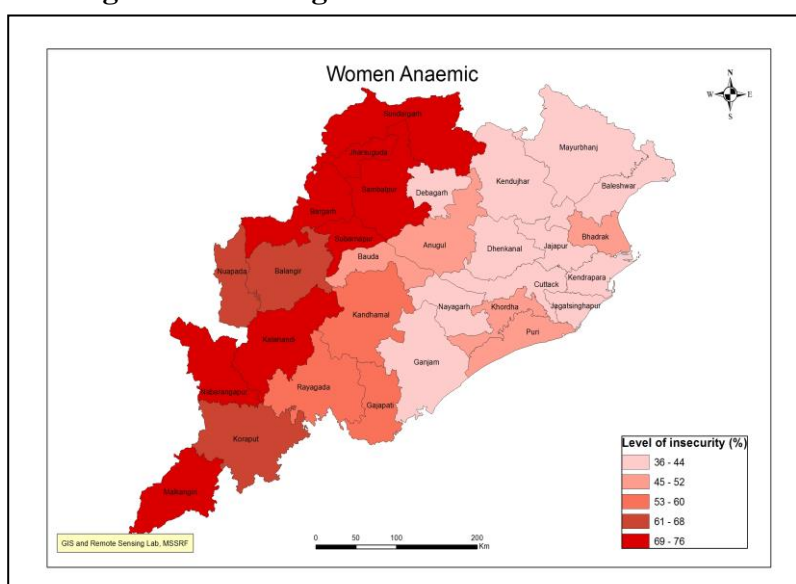
Level of Insecurity	Name of Districts
Very Low	Jagatsinghapur, Cuttack, Nayagarh, Kendujhar, Dhenkanal, Balasore, Mayurbhanj, Debagarh, Kendrapara, Ganjam, Jajpur
Low	Bhadrak, Angul, Puri, Khordha, Boudh
Moderate	Kandhamal, Rayagada, Gajapati
High	Bolandir, Nuapada, Koraput
Very High	Bargarh, Subarnapur, Kalahandi, Jharsuguda, Malkangiri, Nabarangpur, Sundergarh, Sambalpur

Note: Percentage of women with anaemia in different categories are in the range of: 36 -44% in very low level of insecurity; 45-52% in low; 53-60% in moderate; 61-68% in high and 69-76% in very high.

Source: Table 2.1

Fig 2.10 Percentage of Women with Anaemia

On an average 52% of women in the reproductive age group in rural Odisha suffer from any form of anaemia. The intensity of the problem varies widely across the districts. Jagatsingpur district has a minimum of 36% of women who are anaemic while Sambalpur has a maximum of 76%. 14 districts that fall in the moderate, high and very high insecurity categories have higher percentage of women with CED than the state average.



Nayagarh, Jagatsinghapur and Cuttack districts have relatively lower problems while Malkangiri, Nabarangpur and Kalahandi have relatively higher problems, with respect to the two indicators of women malnutrition.

On the whole, in rural Odisha, Cuttack, Jagatsinghapur and Nayagarh are the three districts which have relatively low intensity of nutritional problems with respect to children and women whereas Malkangiri and Nabarangpur are the two districts which have relatively high intensity of nutritional problems with respect to children and women⁴.

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

2.2 Average Consumption Levels in Rural Odisha

Some of the immediate factors influencing the malnutrition levels of women and children are related to the quantity and quality of food intake. Using available secondary data on quantity of food intake, it is seen that the per capita average monthly intake of cereals in rural Odisha is 12.12kg, on par with the recommended dietary allowance (RDA) norm⁵ of 12kg/month/person. Rice is the major cereal consumed in rural Odisha (GoI, 2014a; ICMR, 2011). Average per capita consumption of pulses and milk in rural Odisha is much lower than the daily recommended allowance as well as the national average (Table 2.8). Table 2.9 indicates that with respect to all nutrients, except Vitamin C and Niacin, the average consumption levels are lower than the RDA.

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	
	Odisha	India
Rice (kg)	12.12	6.03
Wheat (kg)	0.67	4.29
Total cereals	13.42 (112%)	11.22 (94%)
Arhar (Tur) –kg	0.16	0.21
Moong (green gram) -kg	0.18	0.09
Masur (red lentil)-Kg	0.06	0.11
Urd (black gram) kg	0.05	0.08
Gram split (kg)	0.04	0.08
Total pulses	0.61 (25%)	0.78 (33%)
Milk (litre)	1.20 (13%)	4.33 (48%)
Eggs (no.)	1.34 (8.9%)	1.94 (13%)
Fish (kg)	0.44	0.27
Goat meat /mutton (kg)	0.02	0.05

Note: 1) RDA as per the norms of Indian Council of Medical Research (ICMR) are as follows:

Cereals=12kg/capita/month; Pulses=2.4kg/capita/month; Milk=9kg/capita/month; Egg=15 numbers/capita/month

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

Source: GoI (2014a); ICMR (2011)

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

Items	Consumption of nutrients (CU/day)	Consumption as a % of RDA
Protein (g)	48	80
Energy (Kcal)	2017	74
Calcium (mg)	416	69
Iron (mg)	15.2	89
Vitamin A (µg)	554	92
Thiamin (mg)	1.3	76
Riboflavin (mg)	0.7	41
Niacin (mg)	19.3	107
Vitamin C (mg)	92	230

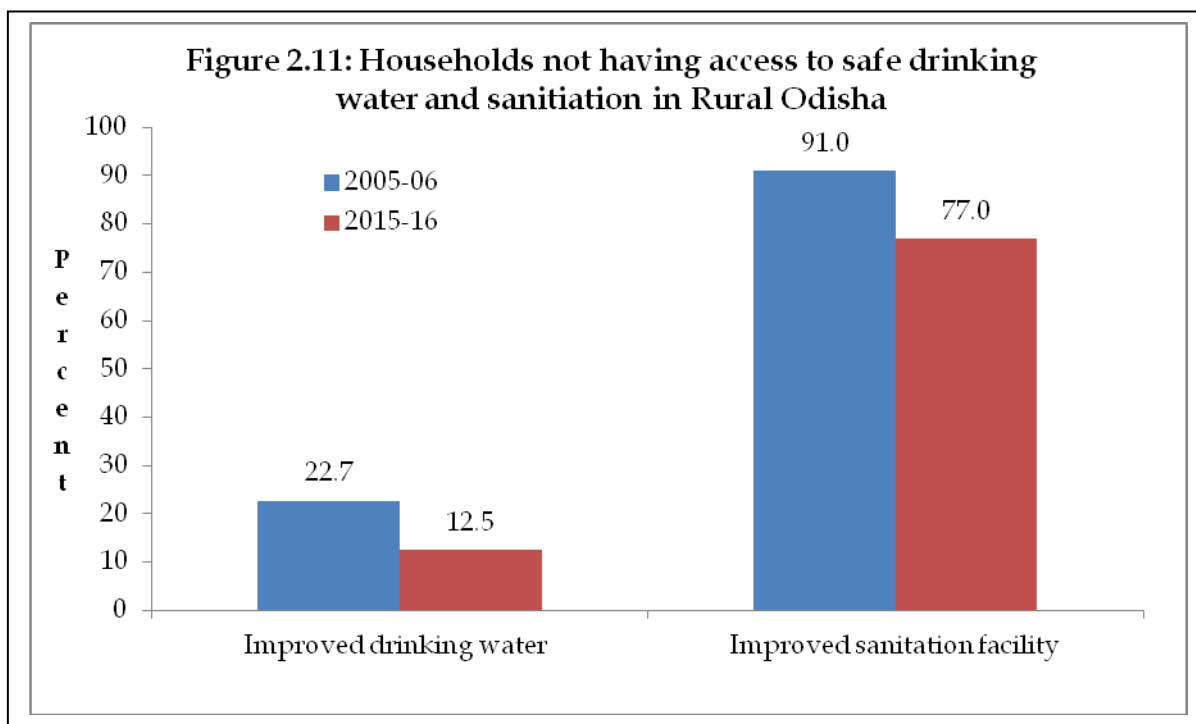
Note: One consumption unit is defined as the calorie consumption of an average adult man, weighing 60kg, doing sedentary type of work

Source: NIN, 2012

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).

2.3. Access to Water and Sanitation in Rural Odisha

Access to safe drinking water, clean and hygienic environment have a positive influence on nutrition status. Figure 2.11 shows that over the decade 2005 to 2015, there is considerable improvement in the percentage of rural households that have access to safe drinking water and sanitation. However, in 2015 nearly 77 percent of rural households do not have access to improved sanitation facility while 13 percent of rural households do not have access to improved drinking water sources in Odisha.



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 Odisha.

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 Odisha; 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 one fourth 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.

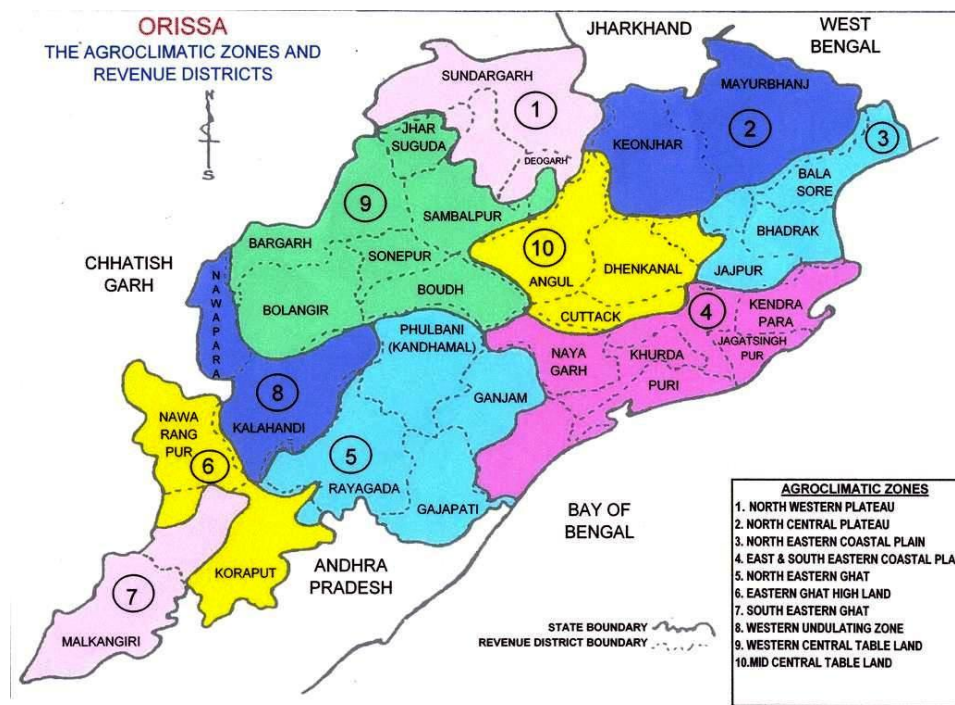
Section 3:

AGRICULTURAL PROFILE OF ODISHA

Odisha is primarily an agrarian economy where agriculture continues to be the most important source of livelihood for a large section of the population. However, the contribution of agriculture to the Gross State Domestic Product (GSDP) has declined over time. The share of the agriculture sector which was around 55% of GSDP in 1950-51 has come down to a level of 19.91% by 2016-17, while the combined share of industries and services sectors has risen from 45% to 80.09% during the same period (GoOD, 2018).

Agriculture in Odisha is prone to natural calamities such as floods, cyclones and droughts and their frequent occurrences lead to instability in the agricultural production system. Agriculture is also affected by acidic soils, salinity and water logging. The state is divided into ten agro climatic zones based on the soil type, topography, rainfall and cropping pattern (GoOD, 2017a). **Figure 3.1** depicts the various agro-climatic zones of Odisha.

Figure 3.1: Agro-Climatic Zones of Odisha

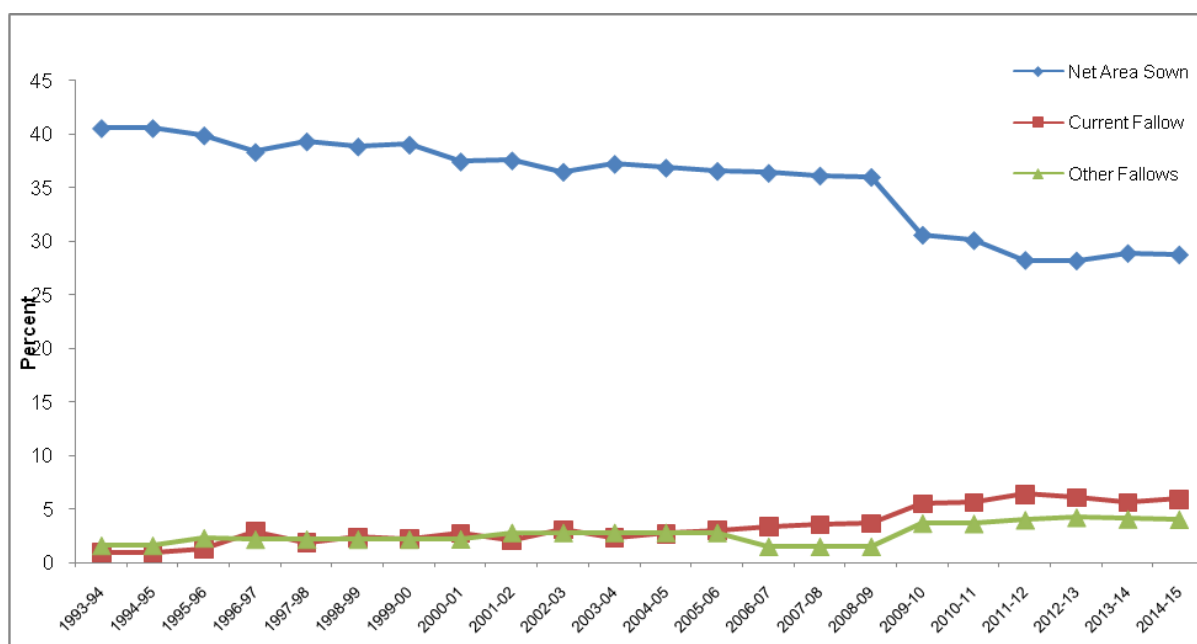


Source: GoOD, 2017a

The frequent occurrence of natural calamities in Odisha contributes to instability in the agricultural scenario and the state recorded a decline in the net sown area from 38% of total

geographical area in 1999-2000 to 29% in 2012-13⁶ (Paltasin et. al, 2013). The gross cropped area also declined during the reference period bringing down the cropping intensity from 1.38 in 1999-2000 to 1.15 in 2014-15.

Figure 3.2: Share of Net Sown Area and Fallows to Total Geographical Area, Odisha, 1993-94 to 2014-15



Source: 1. EPWRF, 2017; 2. GoOD, 2017a

Figure 3.2 shows that net sown area has registered a declining trend since the early 1990s and this trend had not been arrested till 2014-15. Contributing to the decline in net sown area is the increase in current fallows and other fallows, particularly since 2010-11.

Agriculture in Odisha is predominantly rainfed with 29 percent of gross cropped area under assured sources of irrigation while the corresponding percentage for the country as a whole is 49% (GoI, 2017a). Moreover, the area under irrigation in Odisha has not recorded any improvement and remained stagnant over the years.

⁶ The values are triennium averages centred around the given years (EPWRF, 2017; GoI, 2017a).

Table 3.1: Area under Major Crop Groups, Odisha, 1994-95 to 2015-16,
(Area in '000 ha)

Triennium Average centered around the year	Total Cereals	Total Pulses	Total Vegetables	Total Oilseeds	Gross Cropped Area
1994-95	5020.4	2153.4	8.8	1127.9	9435.3
	53.2	22.8	0.1	12.0	100.0
1997-98	4911.4	1564.8	6.0	886.9	8139.5
	60.3	19.2	0.1	10.9	100.0
2000-01	4958.0	1586.1	5.8	801.6	8097.7
	61.2	19.6	0.1	9.9	100.0
2003-04	4842.7	1536.1	8.1	741.4	8029.2
	60.3	19.1	0.1	9.2	100.0
2006-07	4900.5	1937.5	7.6	833.5	8614.3
	56.9	22.5	0.1	9.7	100.0
2009-10	4814.3	2057.5	8.2	798.7	8364.8
	57.6	24.6	0.1	9.5	100.0
2012-13	4555.4	2044.6	8.2	756.0	8381.0
	54.4	24.4	0.1	9.0	100.0
2015-16	4499.6	1972.7	8.1	686.1	8164.4
	55.1	24.2	0.1	8.4	100.0

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

Source: GoOD, 2017a

The cropping pattern in the state appears to be more or less stable with food grains constituting more than three fourth of the total cultivated area, cereals accounting for more than 50 percent of the gross cropped area and pulses accounting for 20 to 24 percent, over the last two decades (**Table 3.1**). However, a closer examination of area under crops brings out a slight decline in crop diversity within the broad groups of cereals and perhaps, pulses too (**Tables 3.2 & 3.3**). While paddy was the single most important cereal crop even in early 1990s, the position of paddy got further consolidated over the two decades with decline in area under all other cereal crops except maize. Wheat, ragi, bajra, sorghum and small millets registered a decline in area under cultivation. Similarly, even while total area under pulses has fluctuated over the two decades since 1994-95, some pulse crops- green gram, Bengal gram, cow pea and field pea- have registered an absolute increase in area under cultivation while some others- horse gram, red gram and a variety of pulses clubbed together as other pulses- have registered a decline in area.

Table 3.2: Area under Cereals, Odisha, 1994-95 to 2015-16 (Area: in '000 ha)

Triennium Average centered around the year	Rice	Wheat	Maize	Finger Millet (Ragi)	Jowar (Sorgum)	Pearl Millet (Bajra)	Small Millets	Total Cereals
1994-95	4513.4	20.3	168.0	229.9	21.7	6.1	61.1	5020.4
	89.9	0.4	3.3	4.6	0.4	0.1	1.2	100.0
1997-98	4470.3	16.3	166.4	190.6	15.8	4.1	47.9	4911.4
	91.0	0.3	3.4	3.9	0.3	0.1	1.0	100.0
2000-01	4511.7	18.2	171.4	198.1	13.0	4.1	41.6	4958.0
	91.0	0.4	3.5	4.0	0.3	0.1	0.8	100.0
2003-04	4422.2	16.3	172.7	190.2	10.7	3.4	27.3	4842.7
	91.3	0.3	3.6	3.9	0.2	0.1	0.6	100.0
2006-07	4460.4	17.5	200.5	188.9	9.4	2.7	21.0	4900.5
	91.0	0.4	4.1	3.9	0.2	0.1	0.4	100.0
2009-10	4348.5	19.3	234.9	182.5	8.9	3.0	17.1	4814.3
	90.3	0.4	4.9	3.8	0.2	0.1	0.4	100.0
2012-13	4069.2	13.8	274.1	169.3	8.0	3.0	18.0	4555.4
	89.3	0.3	6.0	3.7	0.2	0.1	0.4	100.0
2015-16	4053.9	6.9	254.3	152.8	6.5	2.2	23.1	4499.6
	90.1	0.2	5.7	3.4	0.1	0.0	0.5	100.0

Note: Figures in shaded cells are percentage to total cereals area

Source: GoOD, 2017b

Table 3.3: Area under Pulses, Odisha, 1994-95 to 2015-16 (Area: in '000 ha)

Triennium Average centered around the year	Green Gram (Moong)	Black Gram (Biri)	Red Gram	Bengal Gram	Field Pea	Lentil	Cow Pea	Horse Gram (Kulthi)	Other Pulses	Total Pulses
1994-95	756.7	598.1	166.4	34.9	18.8	8.5	20.7	373.7	175.6	2153.4
	35.1	27.8	7.7	1.6	0.9	0.4	1.0	17.4	8.2	100.0
1997-98	543.8	468.6	136.6	31.1	20.5	9.2	31.1	324.0	0.0	1564.8
	34.8	29.9	8.7	2.0	1.3	0.6	2.0	20.7	0.0	100.0
2000-01	578.4	490.7	137.2	27.9	20.8	9.4	39.4	282.2	0.0	1586.1
	36.5	30.9	8.7	1.8	1.3	0.6	2.5	17.8	0.0	100.0
2003-04	577.0	499.2	127.0	27.5	19.9	6.9	38.5	240.0	0.0	1536.1
	37.6	32.5	8.3	1.8	1.3	0.4	2.5	15.6	0.0	100.0
2006-07	732.5	590.2	134.2	37.0	23.5	11.9	79.6	258.5	70.2	1937.5
	37.8	30.5	6.9	1.9	1.2	0.6	4.1	13.3	3.6	100.0
2009-10	808.1	620.3	135.6	41.5	30.5	13.3	64.4	246.3	97.5	2057.5
	39.3	30.1	6.6	2.0	1.5	0.6	3.1	12.0	4.7	100.0
2012-13	830.0	593.7	140.6	42.4	33.0	12.5	50.4	230.5	111.6	2044.6
	40.6	29.0	6.9	2.1	1.6	0.6	2.5	11.3	5.5	100.0
2015-16	819.0	545.6	138.1	43.2	31.6	9.9	51.1	213.8	120.5	1972.7
	41.5	27.7	7.0	2.2	1.6	0.5	2.6	10.8	6.1	100.0

Note: Figures in shaded cells are percentage to total pulses area

Source: GoOD, 2017b

Green gram has remained the most important pulse crop in Odisha accounting for 35 to 42% of total area under pulses, over the time period under consideration. According to the Agriculture Statistics at a Glance 2016, vegetables and fruits constitute 12% of Gross Cropped Area (GCA), in 2015-16: fruits occupied 320.04 thousand hectares (4% of GCA); and vegetables covered 664.23 thousand hectares (8% of GCA) (GoI, 2017b). The Economic Survey of Odisha 2017-18 notes that the potential to cultivate vegetables and fruits have not been fully exploited. “Diversity in agro-climatic conditions and physiographic zones help Odisha to enjoy a natural comparative advantage for horticulture crops with possibilities for growing a diversified basket of fruits, vegetables, spices, tuber crops and flowers; whose potential has not been fully exploited” (GoOD, 2018). In sum, the cropping pattern continues to be dominated by food grains, with paddy remaining as the most important cereal crop and green gram emerging as the most important pulse crop over the two decades under consideration. But it is a matter of concern that area under cereals and pulses have declined over the years.

Rice production in the state has increased over the two decades under consideration in spite of an absolute reduction in area under cultivation, mainly due to an increase in yield (**Table 3.4**). Yield of rice has increased from 1452 kg/ha in 1993-94 to 1992 kg/ha in 2014-15 in Odisha. However, the yield of rice in Odisha is lower than the all India average. For example, the state average was 1992 kg/ha in 2014-15 whereas the all India average was 2416 kg/ha during the same year. Maize is the only foodgrain which reported both increase in area as well as yield during 1994-95 to 2015-16. Maize yield increased from 1100 kg/ha in 1993-94 to 2053 kg / ha in 2014-15. Yield of maize in Odisha remains lower than the all India average yield of 2632 kg/ha in 2014-15. Production of ragi, small millets, black gram and total pulses have registered a downward trend over 1994-95 to 2015-16 in Odisha. With respect to vegetables and fruits too, yield levels in Odisha are relatively lower. The share of area under fruits in Odisha to all India was 5.3%, but the production share was 2.6% only. Likewise, the share of area under vegetables in Odisha to India was 6.2%, whereas the production share was 5%, indicating relatively lower yield levels in 2015-16 (GoI, 2017b).

Table 3.4: Production of Major Crops in Odisha, 1994-95 to 2015-16 (in '000 MT)

Triennium Average Centred around the Year	Rice	Maize	Ragi	Small Millets	Total Cereals	Green Gram	Black Gram	Total Pulses
1994-95	6398.8	203.5	201.0	31.3	6737.1	385.9	318.7	1154.4
1997-98	5344.2	196.2	120.5	21.6	5715.6	205.0	185.2	629.8
2000-01	5649.8	206.5	149.9	18.2	6058.5	206.9	182.1	619.2
2003-04	5504.9	205.7	136.4	11.4	5888.0	187.6	167.9	568.6
2006-07	7182.0	360.4	150.5	9.5	7734.9	289.4	238.6	856.1
2009-10	6956.6	554.1	161.7	8.7	7718.5	348.8	269.2	985.3
2012-13	7668.4	687.5	148.1	9.2	8543.9	378.8	263.1	1005.3
2015-16	7860.0	708.8	132.5	11.6	8730.4	387.8	246.5	996.4

Source: GoOD, 2017a

Livestock

In 2017, the share of Odisha to total livestock population of India was 4.05% (**Table 3.5**).

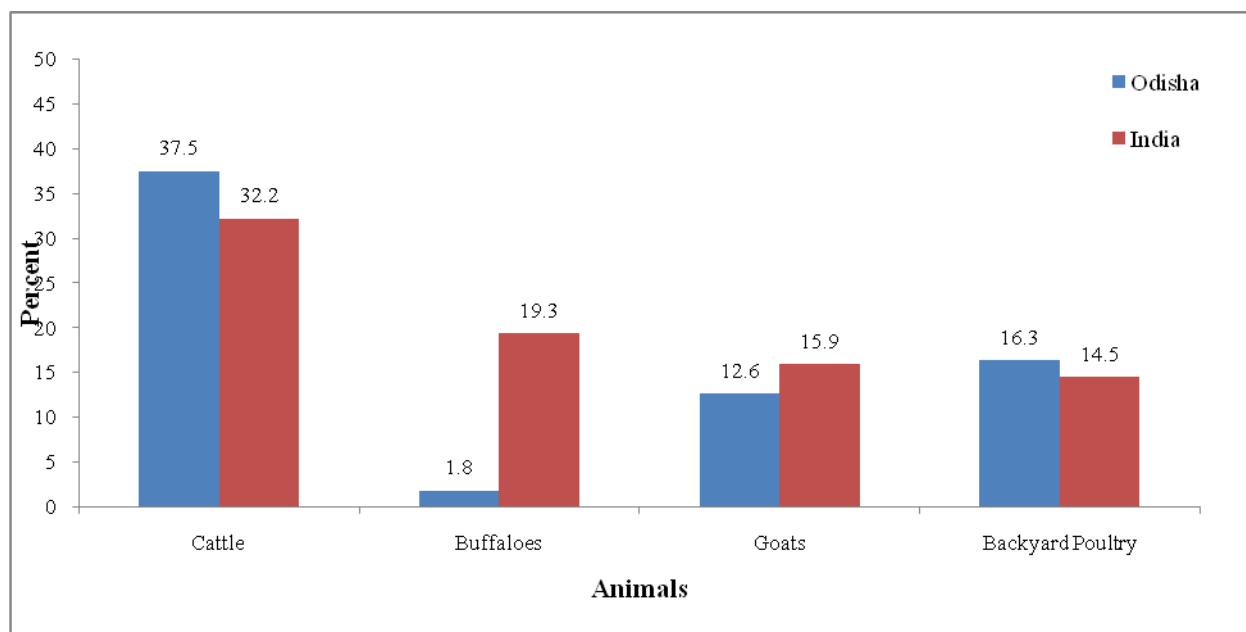
Table 3.5: Livestock Population of Odisha and India, 2012

Name	Numbers (in '000)		% share of Odisha to India
	Odisha	India	
Cattle	11621.27	190904.10	6.09
Of which, Crossbred	1305.77	39731.81	3.29
Buffaloes	726.31	108702.10	0.67
Sheep	1581.13	65069.19	2.43
Goats	6513.09	135173.10	4.82
Total livestock	20732.50	512057.30	4.05
Total Poultry	19890.54	729209.30	2.73

Source: GoI, 2014b

Of the total 11621.77 thousand cattle, 11% were crossbred, in Odisha in 2017, while the corresponding percentage is 21% at all India level. That is, 89% of cattle in Odisha are either indigenous or non-descript that give much lower milk yield. Average per capita milk availability in Odisha was 128 gm/day whereas the all India average was 355 gm/day, in 2016-17. According to Livestock Census, 2012, percentage of rural households owning cattle and backyard poultry are higher in Odisha than the all India average whereas percentage of households that own goats and buffaloes are higher in India (**Figure 3.3**) (**GoI, 2014b**).

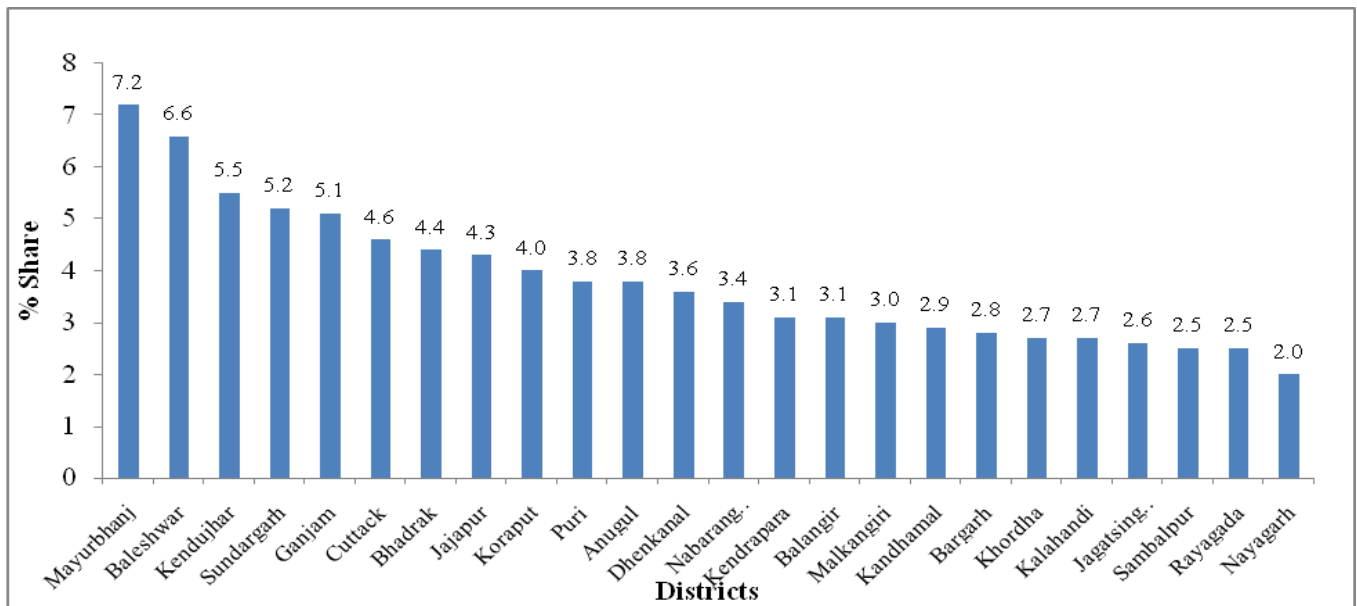
Figure 3.3: Percentage of Households Owning Animals/Poultry Birds in Rural Areas, 2012



Source: GoI, 2017c

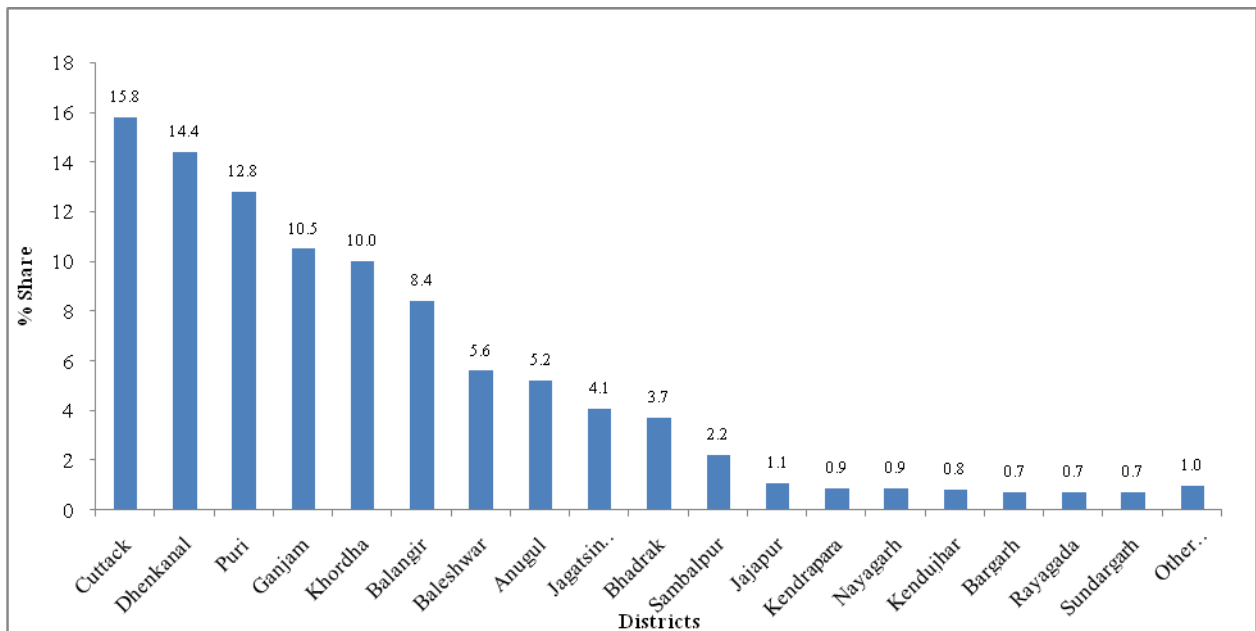
District-wise analysis of cattle population reveals that cattle population is well spreadout among all districts in Odisha (**Figure 3.4**). The maximum share of cattle population is 7.2% in Mayurbhanj. As a contrast, poultry appears to have a geographical concentration with more than three-fifth of the total poultry seen in five districts, namely, Cuttack, Dhenkanal, Puri, Ganjam and Khordha (**Figure 3.5**). Balesore district has 7% of total cattle population and 6% of poultry in the State, in 2012.

Figure 3.4: Percentage Share of Districts in Cattle Population, Odisha, 2012



Source: GoI, 2017c

Figure 3.5: Percentage Share of Districts in Poultry Population, Odisha, 2012

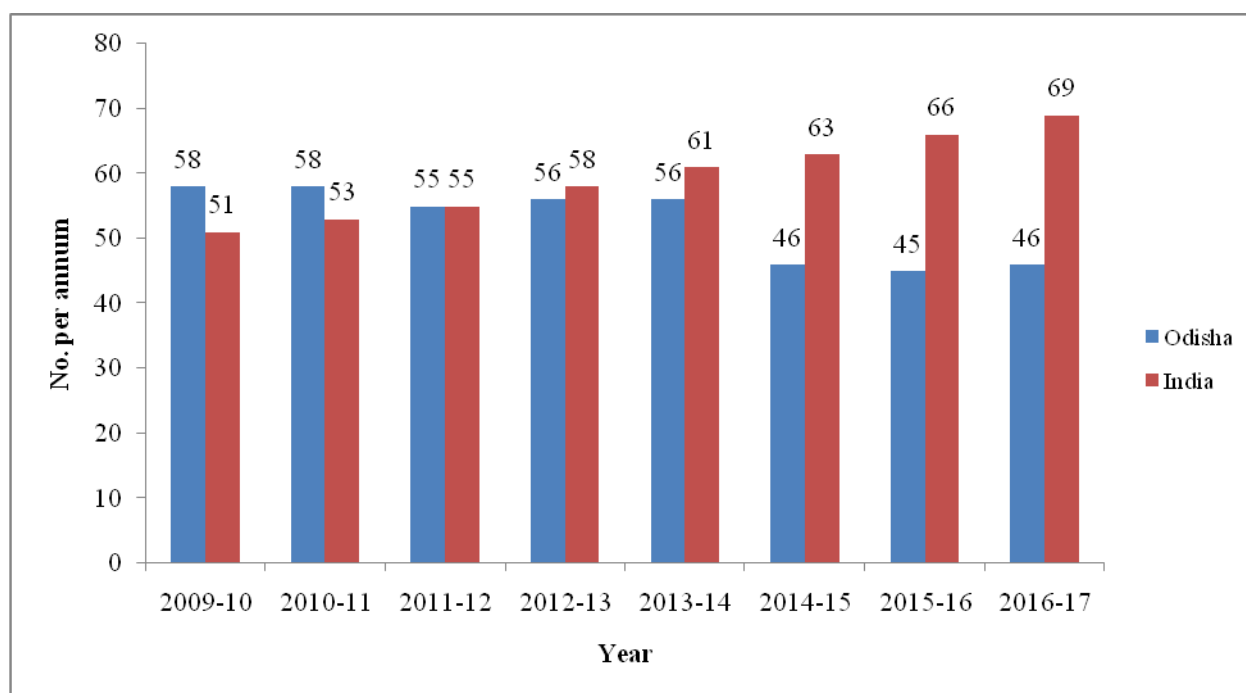


Source: GoI, 2017c

Figure 3.6 shows the per capita availability of eggs has declined from 58 eggs/annum in 2009-10 to 46 eggs/annum in 2015-16, in Odisha and this is a matter of concern. In contrast,

in the country as a whole per capita availability of egg has steadily increased over the same period.

Figure 3.6: Per Capita Availability of Egg (No./annum)



Source: GoI, 2017c

Fisheries

Odisha has the largest inland fishery resources among all states of India, as per Basic Animal Husbandry and Fisheries Statistics, 2015. The state has 9.89 lakh hectares of inland fishery resources and it constitutes 13% of all India resources. Apart from this, the state has 480 KM of coastal line. However, the share of fish production of Odisha to India is just 4% indicating the state's potential to improve production. Reservoirs are an important source for fisheries and the average productivity of the reservoirs in Odisha is 9.3 kg per ha whereas at all India level it was 15 kg/ha in 2012-13 (GoI, 2015a).

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 3.6**. Of the total rural households in Odisha, 25 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, a notable section uses their produce for home consumption: 77% of households consume rice, 53% of households consume milk, 46% of

households consume vegetables and 33% of households consume pulses and nutri-cereals from their own production. As regards the quantity that is consumed from home grown stock, it is seen that 60 percent of rice that is consumed by producer households is from home grown production; and 70% of the total milk consumed is from home production. This analysis clearly indicates that farmers do retain a portion of their production for home consumption and there is scope to 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 3.6: Consumption from Home Grown Stock in Rural Odisha, Self-Employed Agricultural Households, 2011-12

Item	Percentage of Consumption from Home Grown Stock	Percentage of Households consuming items from Home Produce
Rice	60.30	77.14
Nutri Cereals	39.70	33.59
Pulses	28.10	32.90
Vegetables	18.10	46.40
Fruits	18.50	25.40
Milk	70.20	53.37
Eggs	13.40	12.48
Chicken	29.90	24.37

Note: 1. Nutri cereals, referred to as coarse cereals, include Jowar, Bajra, Maize and millets

2. 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 Odisha, it would be necessary to strengthen the agricultural extension system. **Table 3.7** indicates a large number of vacancies in the agriculture extension services in Odisha, particularly in the cadre of service providers at the village level. 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 3.7: Status of Manpower in Department of Agriculture, Odisha, February, 2018

Sl. No:	Name of the Post	Number of Posts Sanctioned	Number of Posts filled-in	Number of Vacant Posts	
				Nos.	%
1.	Additional Directors of Agriculture	2	0	2	100.0
2.	Joint Directors of Agriculture	4	2	2	50.0
3.	Deputy Directors of Agriculture	8	5	3	37.5
4.	Deputy Directors of Agriculture (Range)	30	25	5	16.7
5.	District Agriculture Officers	100	97	3	3.0
6.	Subject Matter Specialists	264	126	138	52.3
7.	Assistant Agriculture Officers	902	747	155	17.2
8.	Agriculture Overseers	1568	1280	288	18.4
9.	Village Agriculture Workers	3218	2321	897	27.9
	Total	6096	4603	1493	24.5

Source: Collected from the Department of Agriculture and Farmers' Welfare, Govt. of Odisha

Concluding Observations

To sum up, an analysis of the agricultural profile of Odisha indicates that even while food grains dominate the cropping scenario, there has been a decline in production of small millets, ragi as also pulses. As paddy occupies nearly half the gross cropped area, promoting pulses and vegetables in paddy bunds and fallows (without altering the basic cropping pattern), could be an important way to increase pulse and vegetable production while also diversify crop production. For instance:

1. Cultivation of vegetables and pulses (black gram, green gram) in bunds in paddy fields is said to be a prevalent practice in the western region (e.g. Bolangir, Bargarh districts) of Odisha. There is considerable scope to expand this practice of bund cultivation to other areas of Odisha. Appropriate technical advice on suitable varieties to be grown in bunds need be disseminated to farmers through an agricultural research extension system. Further, distribution of appropriate varieties of pulse/vegetable seeds to farmers on subsidy for bund cultivation would also promote this practice.
2. Scope to convert paddy fallows for pulse cultivation remains huge in Odisha. Early maturing paddy varieties can be used in coastal areas so that pulses can be grown in the residual moisture after paddy is harvested. Thus, making available appropriate

advice and suitable paddy seed materials to coastal farmers would help in promotion of pulses in paddy fallows.

With regard to Fisheries, according to a report of NITI Aayog Task Force writes “By judiciously harnessing these resources, the fish production from capture and culture based capture fisheries could be substantially augmented to meet the domestic market demands, create employment and income generating opportunities for the rural poor and enhance *their food, nutritional and livelihood security*” (GoOD, 2015a). Further, Odisha Fisheries Policy, 2015 discusses the need to promote production of small fish species that are rich in micro nutrients in seasonal and perennial ponds and water logged rice fields”(GoOD, 2015b). Thus there is a recognition at the official level on the need to augment fish production for enhancing the nutritional security of the people. Similarly, with regard to poultry, the Odisha Poultry Policy 2015 notes that efforts to increase egg production are needed to “eradicate the protein hunger of the State” (GoOD, 2015c).

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 Odisha are listed below:

Table 4.1 Biofortified/ Stress Tolerant Crops Suitable for Odisha

Sl. No:	Crop	Variety/ Hybrids	Nutrient Availability / Stress Tolerance Characteristics	Developed / Released by	Seed Availability status ¹
1.	Rice	CR Dhan 310 (IET 24780)	Biofortified Variety <ul style="list-style-type: none"> • Contains high protein content 10.3% (7.0-8.0 %) • Maturity days: 125 days • Grain yield: 45.0 q/ha 	National Rice Research Institute, (NRRI), Cuttack Released in 2016	Breeder seed 16.5q and Truthfully Labelled (TFL) seeds 13.12q available at NRRI
		CR Dhan 311 (Mukul)	Biofortified Variety <ul style="list-style-type: none"> • High protein rice variety with 10.1% protein content • Long bold grains, non-lodging plant type with average yield 5.54 t/ha 	National Rice Research Institute, (NRRI), Cuttack Released by State Varietal Release Committee (SVRC) and notified in 2016	Breeder and TFL seeds available at NRRI
		Swarna Sub1	Submergence <ul style="list-style-type: none"> • Tolerant to submergence & flash floods • Tolerant to submergence of about 2 weeks • Duration: 140-145 days • Average yield: 5.0-5.5 t/ha • Recommended for cultivation in shallow low land areas. 	International Rice Research Institute (IRRI) and NRRI Released in 2009	Breeder and TFL seeds available at NRRI.
		CR1009Sub 1	Submergence <ul style="list-style-type: none"> • Tolerant to submergence • Short bold grains with 	IRRI and NRRI, Released in 2014	Breeder seed of parental lines available at

		<p>high milling percentage and head rice recovery</p> <ul style="list-style-type: none"> • Maturity: 155 days • Average yield: 5.8 t/ha • Recommended for shallow low lands 		NRRI.
	Varshadhan	<p>Submergence</p> <ul style="list-style-type: none"> • Tolerant to submergence • Long bold grains, late maturity 160 days • Average grain yield: 4.0 t/ha • Recommended for low land areas 	IRRI and NRRI, Released in 2006	Certified seed available
	Dhan 500	<p>Submergence</p> <ul style="list-style-type: none"> • Tolerant to submergence • Medium slender variety • Maturity duration: 160 days • Grain yield: 3.5 t/ha • Recommended for lowlands 	IRRI and NRRI, Released in 2011	Breeder seed of parental lines available at NRRI.
	Jalamani (CR Dhan 503)	<p>Submergence</p> <ul style="list-style-type: none"> • Tolerant to submergence • Medium slender grains • Maturity: 160 days • Average yield: 4.6 t/ha • Recommended for cultivation in deep water situation of Odisha 	IRRI and NRRI, Released in 2012	Breeder seed of parental lines available at NRRI.
	Sahbhagi Dhan	<p>Drought</p> <ul style="list-style-type: none"> • Highly drought tolerant variety • It is semi-dwarf variety with long bold grains • Early maturing: 100 days • Average yield: 3.8-4.5 t/ha 	Central Rainfed Upland Rice Research Station (CRURRS), Hazaribag, Jharkhand & NRRI, Cuttack Released in 2010	Breeder seed available with CRURRS, Hazaribag, Jharkhand
	DRR Dhan 42 (IR64 Drt 1)	<p>Drought</p> <ul style="list-style-type: none"> • High yielding and drought tolerant variety • Average yield: 5.0 -5.5 t/ha • Recommended for drought regions of Odisha especially in Puri, Bhadarak, and Balasore and Khorda districts. 	Indian Institute of Rice Research (IIRR), Hyderabad Released in 2014	Foundation and TFL seeds available with IIRR, Hyderabad
	CR 405 (Luna Shanki)	<p>Salinity</p> <ul style="list-style-type: none"> • Highly saline tolerant variety • Medium slender grains • Early maturing: 110 days 	IRRI and NRRI Released in 2013	Breeder seed of parental lines available at NRRI.

			<ul style="list-style-type: none"> • Average grain yield: 4.6 t/ha • Recommended for coastal saline areas 		
2.	Quality Protein Maize	Pusa HM9 Improved	Biofortified (Hybrid) <ul style="list-style-type: none"> • Contains tryptophan 0.68 % (0.3-0.4%) and lysine 2.97% (1.5-2.0%) • Maturity: 89 days • Grain yield: 52.0 q/ha • Recommended for Kharif seasons 	IARI, New Delhi Released in 2017	Breeder seed of parental lines available at IARI.
		HQPM-4	Biofortified (Hybrid) <ul style="list-style-type: none"> • Quality protein maize hybrid possess lysine and tryptophan double than conventional maize • Orange flint grains, late Maturing variety • Average yield: 54 q/ha 	Haryana Agriculture University (HAU), Hisar Released in 2010	Certified seed available
3.	Little Millet	Tarini (OLM 203)	Biofortified Variety <ul style="list-style-type: none"> • High iron content 51ppm (32.71 ppm) • Duration 105-110 days • Average yield: 10-11 q/ha 	Odisha University of Agriculture and Technology, (OUAT) in 2001	Data not available
4.	Foxtail Millet	Suryanandi (SiA 3088)	Biofortified Variety <ul style="list-style-type: none"> • High iron content 129 ppm (27.19 ppm) • It is non-lodging early duration variety. • Maturity: 70-75 days • Average yield: 20-25 q/ha 	Regional Agriculture Research Station (RARS), Nandyal Released in 2012	Breeder and TFL seeds available with RARS, Nandyal
5.	Sweet Potato	Bhu Sona (ST-14)	Biofortified Variety (Orange fleshed) <ul style="list-style-type: none"> • It is pure line variety (Clonal selection). • High Beta-carotene 14.0 mg/100 gm (2.3-3.0 mg/100gm) • Tuber yield: 19.8 t/ha • Dry matter: 27.0-29.0 % • Starch content: 20.0% 	Regional centre, Central Tuber Crop Research Institute, (CTCRI), Bhubaneswar Released in 2017	15,500 vine cuttings were marketed
		Bhu Krishna (ST-13)	Biofortified Variety (Purple fleshed) <ul style="list-style-type: none"> • It is pure line variety (Clonal selection). • High anthocyanin content 90.0 mg/100gm • Saline tolerant variety • Tuber yield: 18.0 t/ha 	Regional centre, CTCRI, Bhubaneswar Released in 2017	82,000 vine cuttings were marketed

	Sree Kanaga	Biofortified Variety (Dark orange fleshed) <ul style="list-style-type: none"> • High beta-carotene 8.8-10 mg/100gm • Early maturity: 75-58 days • Tuber yield: 12-15 t/ha • Recommended for Kharif season 	Regional centre, CTCRI, Bhubaneswar Released in 2009	Data not available
	Bhu Kanti (CIP-440127)	Biofortified Variety (Orange fleshed) <ul style="list-style-type: none"> • It is pure line variety (Clonal selection). • High beta-carotene content 6.2-7.6 mg/100gm • Duration: 100-110 days • Tuber yield: 23 t/ha 	Regional centre CTCRI, Bhubaneswar Released in 2017	Data not available
	CIP-440038	Biofortified Variety (Orange fleshed) <ul style="list-style-type: none"> • It is pure line variety (Clonal selection). • Beta-carotene content 5.8-7.0 mg/100gm • Duration: 100-110 days • Tuber yield: 14-16 t/ha 	Regional centre CTCRI, Bhubaneswar Released in 2017	Data not available
	Bhu Jha (CIP-SWA-2)	Biofortified Variety (Orange fleshed) <ul style="list-style-type: none"> • It is pure line variety (Clonal selection). • High beta-carotene content 6.5-7.2 mg/100g • Duration: 110 days • Tuber yield: 23 t/ha 	Regional centre CTCRI, Bhubaneswar Released in 2017	Data not available
	Gouri	Biofortified Variety (Orange-fleshed) <ul style="list-style-type: none"> • High beta-carotene content 4.5-5.5 mg/100 gm • Duration: 110-120 days • Tuber yield: 19 t/ha 	Regional centre CTCRI, Bhubaneswar Released in 2009	Data available not

Note: Figures in brackets in column 4 refer to the nutrient content in conventional crop

Source: CTCRI, 2017; CCSHAY, 2011; Dash et.al, 2015; Banik, et.al, 2016; Singh, 2010; Singh, 2017; Yadava et.al, 2017;

“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 rice, there is scope to promote these varieties among farmers through appropriate policies. Further, given that agriculture is prone to natural calamities in Odisha, promotion of stress tolerant rice varieties among farmers would be an important way to reduce the risk involved in cultivation and ensure increased quantum of rice grain availability at the farm household level. 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 ODISHA

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 Odisha. 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
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

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.

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 Odisha'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

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. Such recognition sets off deliberation among policymakers and policy influencers on the problem, eventually leading to the democratic adoption of a policy solution (Jann and Wegrich 2007). We analyze prominent 'agenda documents' - long term mission or vision statements or policies adopted by the Government of Odisha for indications that the various domains of farming systems for nutrition form a part of the state government's agenda. The documents analysed include the State Agricultural Policy (2013), the Recommendations of the State Level Task Force on Agricultural Development (2015), Odisha Health Sector and Nutrition Plan (2009-2015), Nutrition Operation Plan, Animal Husbandry Department Perspective Plan 2010-2020, Fisheries Department Perspective Plan (2010-2020) and the Draft Policy on Organic Farming (2017). In addition, the State Girl and Women Policy (2014) and Draft Early Childhood Care and Education (ECCE) (2017) were also reviewed.

The most prominent agenda document for the agriculture department is the State Agricultural Policy. The Odisha state government adopted their very first State Agricultural Policy in 1996 and followed it up with another Policy in 2008 which met with relative success in boosting agricultural production and earnings. The need for more frequent policy revisions was recognized and the latest State Agricultural Policy was adopted in 2013 to continue the growth momentum and further expand the goals and priorities of agriculture and allied sectors. Under the direction of NITI Aayog, the state Department of Agriculture also set up a task force for agricultural development which came up with several recommendations for rejuvenating the agriculture sector. Together, these two documents define the agenda for agriculture in the state. The nutrition agenda for the state is defined in the recently adopted

multi-sectoral Nutrition Action Plan (ONAP)⁸ in partnership with the Azim Premji Philanthropic Initiative. However, as this document is not yet available in the public domain, the recommendations of the preceding Nutrition Operation Plan (2009-13) and Odisha Health Sector and Nutrition Plan (2008-15) were included in the analysis. These plans have played a big role in fostering the remarkable progress made by the state in reducing malnutrition among women and children and provide the base for ONAP. Other prominent policies and long term plans of the Fisheries and Animal Resources Department were included. Odisha has not set a long term growth vision for the economy as a whole.

These plans and policy documents together define the scope of priorities recognized by 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. On-Farm Production Diversity:

Ample emphasis is given to integrated farming practices in the state agenda. The State Level Task Force on Agricultural Development (Task Force) devotes an entire section to integrated farming systems discussing the importance and benefits of on-farm diversification and the need to encourage the practice among farmers, especially those in vulnerable agro-climatic and soil conditions. The State Agricultural Policy too recognizes the benefits of integrated farming systems for risk mitigation, income and nutritional security. The practice is recommended for wastelands, areas with problematic soils (high acidity, salinity or water-logging) and rainfed areas.

The Task Force recommends the planning of cropping system recommendations suited to the agro-climatic and regional context – incorporating cereals, pulses, millets, horticulture, aquaculture, livestock and other livelihood activities such as bee-keeping and mushroom cultivation. Involving the agricultural universities, KVKs and NGOs in further developing the concept and improving outreach is recommended. However, the nutritional benefits of diversification and the need to develop cropping systems that can also satisfy nutritional needs do not find mention.

⁸ Launched by the Chief Minister of Odisha on 22nd December 2016 as reported in http://niti.gov.in/writereaddata/files/Odisha-PPT_Niti%20Aayog.pdf

Specifically, incorporation of horticulture, backyard poultry and duck farming and fish farming is encouraged in both the Task Force and Agricultural Policy 2013. Intercropping in horticulture farm, intercropping horticulture and fodder crops, cultivation of dual food-fodder crops and composite horticulture-dairy-aquaculture systems are recommended strategies. In order to support backyard poultry farming, the policies specify the need to develop appropriate backward and forward linkages and ensure access to veterinary and disease prevention services. Although the need to develop pulse-based and millet-based cropping systems is mentioned, no specific strategies to incorporate them into rotations are provided. The nutritional benefits of pulses, millets, horticulture, livestock, poultry and fish are not discussed.

2. Agricultural production

Recommendations to improve overall agricultural production include improving supply of seed and planting material, sustainable fertilization and plant protection practices, farm mechanization and better extension services. Direct-benefits-transfer through electronic means is recommended as an efficient strategy to transfer input subsidy to farmers.

In addition, emphasis has been placed on conservation and promotion of indigenous varieties of crops, livestock and fish. Organic farming is also encouraged and several measures to improve the availability of seeds, knowledge of bio-fertilizers and bio-pesticides and market linkages are provided. Promotion of crops with high market value and value-addition potential is recommended to improve incomes to farmers.

In horticulture, a matrix of priority crops for each district is laid out by the Task Force according to which district crop development plans are to be drawn. The use of labour saving equipment and protected cultivation in horticulture is encouraged. The Fisheries and Animal Resources Department recommends a variety of measures to improve the production of livestock, poultry and fisheries.

Dairy production is to be enhanced through breeding techniques (eg. cross breeding, artificial insemination, embryo transfer, progeny testing and bull calf rearing by departments) and improvement of fodder availability and veterinary services. Development of small animals is also recommended through improved breeding practices, nutrition and disease control.

Conservation of indigenous breeds of cattle, goat, sheep and pigs is accorded high importance. Several measures are recommended for improving healthcare and extension for livestock. Incentives to new commercial poultry units and dairy entrepreneurs are specified.

Fisheries production is to be improved by ensuring better supply and quality of seed, exploitation of untapped resources such as community ponds and waterlogged areas and promotion of best practices related to tank and sea cage culture.

3. Biofortification

Despite the availability of biofortified rice, millets and sweet potato in Odisha, 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

Agenda documents call for several infrastructure developments to improve post-harvest management, and marketing – including establishment of community threshing yards, storage facilities, market yards, procurement centres for paddy, and collection centers in hub and spoke format for horticulture crops, as well as use of post harvest machinery such as automated cleaning and bagging machinery at APMC *mandis*. The state should provide subsidy for custom hiring centres and SHGs for threshing equipment. They also call for the involvement of farmers in procurement and food processing at cluster level.

There is also specific reference to the need for promoting organic farming. Recommendations under the Draft Organic Policy call for the government to bear cost of certification for first 3 years, promote organic farmers associations or cooperatives and use participatory guarantee system or group certification to reduce costs. Setting up of separate post harvest infrastructure and marketing for organic produce and indigenous varieties is recommended to reach urban and high value markets.

For horticulture, a cluster based approach is recommended in order to develop storage, processing and marketing infrastructure while at the same time avoiding market glut. FPOs/Federations and private players are encouraged to enter marketing contracts. Quality control, packaging and branding of high value crops for export market is gaining importance. For livestock, specific recommendation is made to establish the Odisha Small Animal

Development Federation for promotion of small animal production and marketing of meat products. Emphasis has also been given to the development of post-harvest infrastructure, cold chains and cooperatives for the marketing of fisheries.

5. Nutrition Education and Behaviour Change

The recommendations of the Nutrition Operation Plan and the Odisha Health Sector and Nutrition Plan emphasize the importance of nutrition education and BCC in complementing other supply side interventions of the Women and Child Development Department to improve the health and nutrition status of women and children. Several strategies are recommended. The Draft ECCE Policy recommends using mother tongue or local language to deliver contextualized health and nutrition messages. The Girls and Women Policy among other gender equality and women's empowerment issues, recommends creating an awareness campaign on the gender disparity in food intake. Special attention is accorded to adolescent nutrition education and BCC. The OHSNP calls for increasing social accountability of nutrition programmes by involving women's groups and other community groups in programme planning and management.

6. Women's Empowerment

Along with the nutrition policy documents, the Girl and Women Policy focuses on gender equality, especially in education, livelihood, asset ownership, decision-making and political participation, safety and health. Women's groups are a prominent platform for delivering women's empowerment and nutrition messages.

The State Agricultural Policy recognizes the crucial role played by women in agricultural development and strongly calls for capacity-building and empowerment of women, gender sensitization of department staff and gender analysis of all agricultural development approaches in order to achieve its goals for the sector. Pertinently, it calls for the design of women-friendly farm equipment along with DRWA to reduce drudgery and burden on women. It also called for measures to augment the income of women, including training on post-harvest management and value addition, involvement of women's SHGs in dept schemes, agricultural credit to women. The fisheries department takes special efforts to provide a role for women in fisheries cycle planning, production and marketing.

7. Natural Resource Management

As Odisha is prone to natural calamities and problematic soil conditions, the state agenda includes sufficient measures for conservation of water resources and soil fertility. The need to develop/maintain irrigation infrastructure to improve availability and reduce transmission loss is well recognized. The Odisha Watershed Mission and the central schemes on watershed development emphasize identification of priority blocks and relevant conservation and cropping techniques. Policies also recommend using community driven methods like participatory irrigation management, establishment of pani panchayats, fisheries cooperatives and rotational water supply to conserve water and aquatic resources. Soil testing is to be expanded. The agriculture policy documents promote use of conservation agriculture machinery and sustainable agricultural practices like INM and IPM, organic farming and need-based fertilization and plant protection.

5.2. Review of Policy Adoption

The next step after agenda-setting in the policy-making process is the policy formulation and adoption stage. Once a policy problem has been recognized, governments decide on a policy solution. A core element of policy adoption is the specification of programme 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 Odisha, we include the two most recently presented state budgets, for 2016-17 and 2017-18, as well as the Agriculture Budgets of the same years. All policies relating to the 4 *core* domains and nutrition-sensitive policies in the 3 *non-core* domains of *farming systems 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.

The Odisha Government each year presents its annual budget in two parts – the first part forms the agriculture budget which not only provides the outlays for agriculture and allied departments but also macroeconomic outlook and context, and the second part consists of the general budget. This split reiterates the importance of the sector to majority of the state population and its GDP. As with other states, Odisha too moved from distinguishing expenditures into Plan and Non-Plan categories to State Contribution and Central Contribution categories in the financial year 2017-18. All schemes in the agriculture and

allied department budgets, as well as those of rural development, women and child development, health and family welfare and SC, ST and minority welfare were analysed. Further information on selected schemes was included from the Activity Report (2016-17) of the Department of Agriculture and Farmer's Empowerment and the Citizen's Charter of the Directorate of Agriculture and Food Production. Prominent stand-alone policies adopted by the state government – Odisha Poultry Policy 2015, Odisha Fisheries Policy 2015, and the Food Processing Policy 2016 – that were mentioned in the budget and specify programme details or receive allocation were included.

The schemes listed in the state budget and stand-alone policy documents provide a picture of the existing policy framework that promotes and enables *farming systems 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. On-farm Production Diversity

Provision has been made in the agriculture budget for programmes on “Promotion of integrated farming” in all areas and especially in tribal areas. Under this scheme, demonstrations on integrated farming systems are conducted and subsidy assistance is provided to set up a number of these farms in rural and tribal areas. The National Mission for Sustainable Agriculture (NMSA) under its sub-schemes Cropping systems suitable to bio-physical environment promoted under Climate Change and Sustainable Agriculture Monitoring, Modelling and Networking (CCSAMMN) and Rainfed Area Development, and the Integrated Watershed Management Programme (IWMP) recommend mixed cropping systems to natural resources and create farms resilient to climate fluctuations. The IWMP also calls for a number of integrated farming activities to enhance livelihoods in areas of water scarcity.

The National Food Security Mission (NFSM) – Pulses sub-scheme conducts demonstrations on rice-rice-pulse and blackgram-greengram intercropping and rotations. The Rashtriya Krishi Vikash Yojana (RKVY) also promotes the cultivation of pulses in rice fallow areas/seasons. The Mission for Integrated Development of Horticulture (MIDH) promotes intercropping of horticulture crops in fruit orchards. The Horticulture Department also provides seedlings of fruit trees, coconut and drumstick at a subsidized rate for backyard

plantation. Rural backyard poultry and backyard duck farming is promoted by the Animal Husbandry Department state schemes through provision of chicks, assistance in construction of shelters and vaccination. The integration of duck and fish farming is also encouraged through trainings.

2. Agricultural production

Prominent national schemes such as the National Food Security Mission (NFSM) and the 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. Odisha is one of the states where RKVY sub-mission Bringing Green Revolution to Eastern India is being implemented to promote modernization of inputs. Central extension programmes such as NMAET are supplemented by state schemes promoting specific practice and crops. National schemes for the promotion of organic farming – PKVY, NMSA and National Project for Organic Farming are in place. In addition, special programmes for under-performing districts to boost production have been sanctioned.

Initiatives under NFSM and ISOPOM are targeted at improving the productivity of pulses and coarse cereals. Demonstrations on HYV seeds and improved package of practices are conducted. Pulse production is also targeted by the Technology Mission on Pulses and Oilseeds. Under NFSM and a state workplan scheme, special emphasis is given to boosting the production of ragi (finger millet), a popular millet in Odisha. A provision has also been made by the state for promotion of millets in tribal areas through extension on best practices.

The centrally sponsored Mission on Integrated Development of Horticulture (MIDH) and the National Horticulture Mission mandate several guidelines for the usage of quality seeds, inputs and mechanization of horticulture. Horticulture “Mission Plus” activities focus on protected cultivation and post-harvest management. State plans for horticulture include implementation of programmes in non-NHM districts, popularization of implements and equipment and special programmes for potato, vegetable and spice development.

Livestock and poultry production programmes abound with central schemes focusing on infrastructure development, improvement of breeds, upgradation of veterinary services and extension. The RKVY programme on Small Animal Development and state schemes for genetic upgradation will improve the production of small animals like goats, sheep and pig.

Ample emphasis has also been given to poultry development and fodder cultivation. Odisha also has several state schemes to promote inland, marine and brackishwater fisheries with ample support for infrastructure creation, mechanization and welfare of fishermen.

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

The Odisha State Government has adopted a Food Processing Policy in 2016 to develop a competitive food processing industry that can improve farmer incomes. The Policy provides fiscal and non-fiscal incentives for value addition and set up of cold chains, primary processing centre. It also seeks to enhance credit availability and skill development for local farmers and entrepreneurs. State schemes to establish marketing infrastructure such as sale centres and farmer markets (krushak hata) are in place.

The Horticulture Department has adopted schemes to support Farmer Producer Organizations and setting up of a company for marketing of fruits and vegetables and development of post-harvest infrastructure specific to horticulture. Schemes to strengthen dairy entrepreneurship and self-employment in animal products value chain through capital and interest subsidy and capacity building are in place. Fisheries value chains are aided by state and central schemes for development of marine fisheries infrastructure & post-harvest operation, and state plan schemes for the rejuvenation of fisheries cooperatives and a hub Kaushalyaganga.

5. Nutrition Education and Behaviour Change

Information on current nutrition interventions is limited due to the non-availability of the ONAP document. Nutrition education and BCC is primarily conducted through the Department of WCD schemes, namely the Integrated Child Development Services (nutrition counselling, supplementary nutrition and community management of malnutrition), Kishori Shakti Yojana and SABLA Scheme for adolescent girls and the Pradhan Mantri Matritva Vandana Yojana/Indira Gandhi Matritva Sahyog Yojana. The state government's effective conditional cash transfer scheme for pregnant women, known as the MAMATA scheme also includes a counselling component where awareness on nutrition is provided. An allocation

has also been provided to the newly constituted National Nutrition Mission. NRLP SHGs were also recipients of a nutrition BCC programme called Shakti Varta.

6. Women's Empowerment

Central schemes for women - the National Mission for Empowerment of Women, One Stop Centre, Prevention of violence against women, State Commission for Women, Gender Cell, Anti-human trafficking measures, Pradhan Mantri Matritva Vandana Yojana/Indira Gandhi Matritva Sahyog Yojana and the MAMATA scheme are in operation in Odisha. Central schemes for adolescent girls - the Kishori Shakti Yojana and SABLA Scheme also improve women's empowerment in the state. A novel scheme, Biju Krushak Kaylan Yojana, provides health and accident insurance for farm families, thereby providing a safety net to women farmers. Despite recognition of the need to orient extension, farm mechanization and agricultural planning towards women farmers, no such scheme has been undertaken. The Mahila Vikas Samabaya Nigam and the NRLP coordinate programmes for self-employment and income generation for women.

7. Natural Resource Management

Several schemes on soil and water conservation are being implemented in Odisha. The NMSA and state plan schemes promote Soil Health Management through soil testing, usage of Soil Health Card and soil conservation training. In order to facilitate integrated nutrient management, the state will set up or upgrade soil testing facility (static and mobile) and provide nutrient subsidy based on soil analysis. Central schemes for irrigation and watershed development such as IWMP, RKVY, Pradhan Mantri Krishi Sinchayi Yojana/Har Khet ko Pani, Jalanidhi/RIDF and NMSA subsidise infrastructure creation. Biju Krushak Vikash Yojana, Biju KBK Yojana, Mukhyamantri Adibandha Tiari Yojana, World Bank assisted Odisha Community Tanks Management Programme and Neeranchal Project and the Asian Development Bank assisted Odisha Integrated Irrigated Agricultural and Water Management Project are state schemes to improve availability of irrigation through infrastructure development.

Further strategies to conserve natural resources includes crop planning through the NMSA sub-schemes Watershed management, Rainfed Area Development, Climate Change and Sustainable Agriculture Monitoring, Modelling and Networking (CCSAMMN), Organic Farming Policy and effective management of crop residue. A Global Environmental Facility

Project is also in operation in Odisha to prevent land degradation and mitigate the effects of climate change through biodiversity conservation.

5.3. Policy Analysis

Odisha in recent years has emerged as a success story in combating malnutrition on the strength of innovative multi-sectoral community-led interventions, effective implementation of national nutrition and child health schemes and coordination between governmental and non-governmental partners. The momentum generated must be maintained in order to achieve the WHA targets on maternal and child nutrition and expand the scope to improve nutrition in men and women of all age groups. Odisha has taken initial steps to do that through the adoption of a multi-sectoral Nutrition Action Plan (ONAP). The long-term path to sustainable improvements in the nutritional status of the state population however lies in the propagation of nutrition-sensitive agricultural practices to ensure availability and access of nutrients to all. Given that the average landholding size is approximately 1 acre and many districts are predominantly tribal and contained communities, farming system for nutrition strategies are especially relevant in Odisha.

Although the state government has prioritized agriculture by periodically adopting medium-term perspective policies and presenting a separate annual budget for agriculture, the convergence of nutrition and agriculture goals will improve the policy environment for a farming system for nutrition in Odisha. The policy landscape analysis reveals the status and scope available that can be addressed in order to achieve nutrition for all through agricultural growth. These gaps occur in both the policy agenda-setting as well as policy adoption stages. A summary of these gaps in relevance to the priority areas for improvement is provided in Table 5.2.

Table 5.2: Policy Analysis with a farming system for nutrition perspective: A case of Odisha

On-farm Production Diversity	
Policy Agenda	Policy Adoption
<p>Status</p> <p>Integrated farming systems (IFS) are well encouraged</p> <p>Scope:</p> <p>Integration of nutrition focus in the IFS</p>	<p>Status</p> <p>Promotion of specific schemes to enhance production diversity:</p> <ul style="list-style-type: none"> • IFS in rural and tribal areas; • Mixed cropping systems under watershed and rain-fed area development plans; • Backyard plantation and intercropping of horticulture crops; • Backyard poultry, duck and fish farming. <p>Scope</p> <ul style="list-style-type: none"> • Integrate nutrition dimension in the existing schemes • Strengthen convergence across agriculture, horticulture and animal husbandry schemes
Agricultural Production	
Policy Agenda	Policy Adoption
<p>Status</p> <p>Enhancing availability and quality of inputs, mechanization and extension.</p> <p>Organic farming, conservation of indigenous varieties and breeds.</p> <p>Improved breeding practices, nutrition and disease control for livestock and small ruminants</p> <p>Better inputs and exploitation of untapped resources for fisheries</p> <p>Focus on priority horticultural crops for districts</p> <p>Scope</p> <p>Nutritional benefits of indigenous varieties of cereals, millets and livestock can be highlighted</p>	<p>Status</p> <p>Central and State schemes in place to improve availability, quality of inputs, mechanization and extension.</p> <p>Organic Policy has been drafted</p> <p>Poultry Policy and Fisheries Policy will provide impetus to both sectors.</p> <p>Programmes in place for bovine and small animal development</p> <p>Scope</p> <p>Priority may be given to improve availability of stress-tolerant paddy seeds</p>

Biofortification	
Policy Agenda	Policy Adoption
<p>Status</p> <p>No agenda in place to promote cultivation of biofortified crops</p> <p>Scope</p> <p>Policy agenda should incorporate a road map for promoting bio fortified crops</p>	<p>Status</p> <p>No state-wide schemes are in place for the promotion of biofortified paddy and millets</p> <p>Pilot promotion of beta-carotene rich sweet potato</p> <p>Scope</p> <p>Existing schemes can include promotion of biofortified cereals and tuber crops</p>
Agricultural Value Chain	
Policy Agenda	Policy Adoption
<p>Status</p> <p>Improvement of post-harvest, storage and marketing infrastructure is recommended for paddy, organic produce, high value horticulture crops and animal products including fish.</p> <p>Scope</p> <p>Policy recognition needed to improve availability of processed and perishable commodities and pulses in rural markets.</p>	<p>Status</p> <p>Schemes for improvement of post-harvest activities, storage and marketing of horticulture, dairy and fisheries are in place.</p> <p>Food Processing Policy focuses on developing value chains for high value commodities.</p> <p>Scope</p> <p>Schemes are required to promote processing, storage and marketing of pulses and non-commercial horticulture crops, especially in rural markets</p>

Nutrition Education and Behaviour Change	
Policy Agenda	Policy Adoption
<p>Status</p> <p>The nutrition policy documents recognize the importance of nutrition knowledge and behaviour change communication</p> <p>Involvement of women's groups and adolescents is encouraged.</p> <p>Scope</p> <p>Nutrition knowledge and behaviour change communication must recognize importance of communicating concepts of diet diversity, linkage between nutrition and agriculture and appeal to men and women of all age groups.</p>	<p>Status</p> <p>Major national schemes of the Dept. of WCD are in place.</p> <p>State conditional transfer scheme MAMATA incorporates nutrition education.</p> <p>Scope</p> <p>The existing WCD programmes can include nutrition education to cover men and women of all age groups</p> <p>Nutrition education can cover the importance of integrating locally available nutrient rich food items in diets</p>
Women's empowerment	
Policy Agenda	Policy Adoption
<p>Status</p> <p>Laudable emphasis has been provided to women's role in agriculture and the need for gender sensitization of agriculture policy</p> <p>Need for developing women-friendly technologies, involving them in planning and post-harvest activities recognized.</p> <p>State Policy for Girls and Women adopted</p>	<p>Status</p> <p>Major national schemes of the Dept. of WCD are in place</p> <p>Scope</p> <p>Specific state wide schemes, in tune with the agenda documents can be developed</p>
Natural Resource Management	
Policy Agenda	Policy Adoption
<p>Status</p> <p>There is substantial recognition of the importance of water and soil conservation.</p> <p>Integrated farming systems are mentioned as a strategy for sustainable use of natural resources.</p> <p>Sustainable and conservation agriculture practices, organic farming, soil testing and community participation in resource management are encouraged.</p>	<p>Status</p> <p>Central and state schemes for watershed management and sustainable agriculture are available</p> <p>Rainfed and watershed area development through mixed cropping is promoted under the IWMP</p>

Note: See Appendix A for the full list of goals and vision recognized by the Odisha State Government
See Appendix B for the full list of schemes and programmes adopted by the Odisha State Government.
See Appendix C for the sources referred.

Section 6:

RECOMMENDATIONS FOR PROMOTING FARMING SYSTEM FOR NUTRITION

Government of Odisha has both a sound vision and policy framework for improving agricultural production and natural resource management. Odisha has also adopted a multi-sectoral Nutrition Action Plan. However, nutrition has not yet been recognised as a goal for agriculture and allied sectors. The long-term path to sustainable improvements in the nutritional status of the population lies in the propagation of nutrition-sensitive agricultural practices to ensure availability and access of nutritious food to all. Given that the majority of farmers in Odisha operate small or marginal holdings, ‘farming system for nutrition’ (FSN) strategies are especially relevant in Odisha. While there is recognition of integrated farming systems, organic and natural farming and the importance of animal food products, 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 rapid agricultural growth.

Some Preliminary Recommendations are:

- i. Integrated farming strategies have been recognized in agenda-setting documents such as the State Task Force for Agricultural Development as beneficial for resource poor and climate-vulnerable areas. Benefits of integrated farming on diversification of incomes and risk are recognized. Recommended strategies clearly specify the need for intercropping and mixed cropping of cereals, pulses, millets and horticulture, and also lay down opportunities for integrating livestock and aquaculture. However, the nutritional benefits of these strategies have not been acknowledged. Guidelines of schemes to promote integrated farming can incorporate instructions to design cropping calendars and package of practices to meet the nutritional deficiencies. Other initiatives by the horticulture department to promote backyard plantation and kitchen gardens can also take into consideration nutritional requirements. **Mainstreaming nutrition into integrated farming strategies would be a step towards promotion of FSN.**
- ii. A policy that spells out a clear-cut strategy for biofortification is required for Odisha. In the context of micronutrient and protein-energy malnutrition, high-iron, high-zinc varieties of rice and millets, high-protein maize and orange flesh sweet potato can be an effective way to address nutritional requirements without significantly altering diets and production systems. **Formulating an effective strategy for making**

available the seed and planting materials of biofortified varieties would be necessary.

- iii. Formulating a road map for improving seed **availability of stress tolerant rice varieties** to farmers in vulnerable areas would help reduce risk in cultivation.
- iv. There are specific policies to improve production of most crops in Odisha. However, these can be further expanded to cover region specific non-commercial horticulture crops – Vitamin A rich fruits, green leafy vegetables and other vegetables. 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. **Focused strategies to increase production of non-commercial horticulture crops would be needed.**
- v. Untapped potential available in inland fishery sources to be utilised through appropriate strategies to enhance local availability of fish. **Strategies to promote inland fisheries are required.**
- vi. In 2005-06 the Government of Odisha launched the Vasundhara scheme with an objective to provide homestead plots to the homestead-less population. Bringing about convergence between Vasundhara scheme and other government schemes such as Women Food Security Groups that promote nutrition garden for vegetable cultivation, backyard poultry, goat-rearing and horticulture could be attempted to enhance food and nutrition security of the families that have received homestead plots in the Vasundhara scheme. **Given the positive relationship between ownership of homestead land and household food security, repeating a state-wide survey on homestead- less families for appropriate action may be attempted.**
- vii. **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 Odisha.

While we provide the recommendations based on a systematic review of publicly available state-level formal policy documentation of the Odisha government, we acknowledge that the policy space is rapidly changing. We are limited by access to documentation of newer orders, policy adoption at smaller geographical levels such as the district, block and panchayat and current implementation status of various policies. Further feasibility study is required to deliver recommendations in detail.

APPENDIX A

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

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

CORE DOMAINS	<p>1. Agricultural Production Diversity</p> <ul style="list-style-type: none"> - <i>Integrated farming systems approach will be encouraged in the State. A proper combination of different farm production systems namely, agriculture, horticulture, livestock, poultry, agroforestry, sericulture and pisciculture will be promoted. Benefits recognized - security against complete failure of a system, minimization of dependence for external inputs, optimum utilization of farm resources, efficient use of natural resources etc.</i> - <i>Increase nutritional security through vertical and horizontal expansion of horticulture crops, promotion of crop diversification</i> - <i>Develop farming system packages and plans suited to regional and agro-climatic context : rice-based, vegetable based, pond based, fruit-based, silvi-horti based and integrated farming system</i> - <i>Support on farm diversification by involving OUAT, KVKs, NGOs, resource organizations in conservation and production of indigenous organic seeds, knowledge and tech dissemination to FPOs</i> - <i>Adopt cropping plans suitable for problematic soils - high acidity, high salinity and water logging.</i> - <i>In rainfed areas, transition from cereal based cropping system to oilseed, pulse and vegetable based cropping system, millets in infertile and dryland areas.</i> - <i>Adopt scientific watershed management and agri-horti cropping system, development of allied entrepreneurial activities - bee keeping, dairy, mushroom cultivation in wastelands</i> - <i>Farm pond construction through MGNREGA and State Plan</i>
	<p>2. Agricultural Production</p> <ul style="list-style-type: none"> - <i>Increase certified/hybrid seed production by entrepreneurs, private organizations and contract farming. Establish seed processing plants and storage facilities. Improve quality of seeds by strengthening research and testing institutions</i> - <i>Improve distribution of quality seeds through sale centers in Gram Panchayat, PACS, LAMPS.</i>

	<p><i>Conduct awareness campaigns on seed treatment.</i></p> <ul style="list-style-type: none"> - <i>Conserve and promote indigenous varieties of rice, fish, livestock and poultry. Integrate R&D institutions and local/indigenous seed system</i> - <i>Promote sustainable agricultural practices - INM and IPM, bio-fertilizers and bio-pesticides, seed treatment, pest monitoring devices and surveillance, plant protection equipment</i> - <i>Promote organic farming in paddy, millets, oilseeds, pulses, fruits, plantation crops, spices and medicinal/aromatic herbs through cluster approach to improve availability of safe commodities for rural and urban consumption. Organic Farming Systems/Package of Practices to be developed for each agro-climatic region. Set up Odisha Organic Mission and State Organic Farming Board to promote organic farming.</i> - <i>Promotion of crops amenable to value addition and processing. Development of detailed action plan for market-driven high-value agriculture</i> - <i>Improve efficiency of input subsidy through direct benefit transfer</i> - <i>Increase farm mechanization by developing new relevant farm machinery through a new State Level Training and Testing Centre of Farm Machineries and existing institutions, improving maintenance of machinery through training of farmers and mechanics, promoting agro service centres</i> - <i>Adopt new strategies using farm schools, lead farmer model, gram krushak manch, Information Kiosks, Farm Information and Advisory Centres and use strategic research extension plan to develop and disseminate relevant technology. Improve functioning and capacity of ATMAs for farmer led extension.</i>
3. Biofortification	-
4. Agricultural Value Chains	<ul style="list-style-type: none"> - <i>Establish post-harvest infrastructure - community threshing yards, storage facilities, RMC Market Yards/Sub-Market Yards and Temporary Procurement Centres for paddy, Terminal Market Complex and collection centers in hub and spoke format for horticulture crops.</i> - <i>Promote use of modern post harvest machinery through PACS and in village level clusters, Renovation of automated cleaning and bagging machinery at mandis. Subsidy for custom hiring ops and SHGs for threshing equipment.</i> - <i>Establishment of food processing clusters and common facility centers. Involvement of farmer</i>

		<p><i>groups in village-level primary processing and collection centres of the APMC</i></p> <ul style="list-style-type: none"> - <i>Promote organic farming by bearing cost of certification for first 3 year, use of participatory guarantee system or group certification to reduce costs, promoting organic farmers association.</i> - <i>Involve farmer groups and women's groups set up under OTELP and OLM already initiated in organic/natural farming at NPM to form cooperatives for organic farming, procurement of inputs, certification and marketing</i> - <i>Set up of separate post harvest infrastructure for organic produce, facilitation of direct marketing through weekly organic bazaar, kisan mandis and organic marketing centre, awareness campaign</i> - <i>Promote indigenous rice varieties through branding exercise</i>
NON-CORE DOMAINS	<p>5. Nutrition Education and Behaviour Change Communication</p>	<ul style="list-style-type: none"> - <i>Provide Health and Nutrition Education at Anganwadi Centres in mother tongue or local language. Undertake other relevant interactions in local language to ensure more receptiveness and making the centre more accessible to the community.</i> - <i>Enhance the nutrition security of girls and women by ensuring access to adequate food, public awareness campaign on gender disparity in food intake</i> - <i>Establish multisectoral nutrition policy, supply and demand side interventions and departmental convergence required to address undernutrition in Odisha</i> - <i>Give priority to adolescent nutrition education and BCC</i>
	<p>6. Women's Empowerment</p>	<ul style="list-style-type: none"> - <i>Women recognized as important project partners in agricultural development; emphasis will be laid upon capacity-building and empowerment of women to achieve the goals, gender sensitization of department staff and gender analysis of all agricultural development approaches.</i> - <i>Design of women-friendly farm equipment with cooperation of DRWA, training on post-harvest management and value addition to young women to augment their income, involvement of women's SHGs in dept schemes, availability of agricultural credit to women</i> - <i>Odisha State Girl and Women Policy for education, livelihood, asset ownership, decision-making and political participation, safety, health</i> - <i>Strengthen and empower social accountability mechanisms, women's and community groups to raise awareness and efficiency of nutrition programmes</i> - <i>Involvement of fisherwomen in fisheries cycle planning, training and capacity-building to</i>

	<i>address their requirements and concerns</i>
7. Natural Resource Management	<ul style="list-style-type: none"> - <i>Promote use of conservation agriculture machinery - zero tillage, unpuddled transplanting - through financial incentive</i> - <i>Promote sustainable agricultural practices - INM and IPM, bio-fertilizers and bio-pesticides, seed treatment, use of pest monitoring devices and plant protection equipment, green manure crops, vermi hatchery, vermi compost, SRI and SSI, bio-fuel crops - through training and campaigns</i> - <i>Promote organic farming in rainfed area to improve productivity, soil fertility and resilience to climate change.</i> - <i>Improve availability of water and reduce transmission loss by improving irrigation infrastructure, promotion of rainwater harvesting, subsidy for lift and micro irrigation, rejuvenation of traditional water bodies, electrification of dugwells, link irrigation subsidy to socio-economic status and adoption of sustainable practices</i> - <i>Improve participatory irrigation management by establishing pani panchayats, adopting rotational water supply</i> - <i>Watershed Mission: Identification and prioritization of blocks/GPs, development of integrated watershed development programmes, dissemination of appropriate crop planning and conservation agriculture techniques</i> - <i>Expansion of DFID – assisted Western Odisha Rural Livelihood Project, “Watershed-plus” approach</i> - <i>Expansion of soil testing coverage through awareness creation, establishment/improvement of static and mobile soil testing labs, block level facility, private testing labs</i> - <i>Provide alternate livelihood options to tribals practicing shifting cultivation, compensation mechanism for crop loss due to industrial waste</i> - <i>Reactivation of fisheries cooperatives and community groups for participatory management of aquatic resources.</i> - <i>Effect manure management to mitigate the negative effects of methane production</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/Millets	Horticulture	Livestock and poultry	Aquaculture
1. Agricultural Production Diversity	-	-	<ul style="list-style-type: none"> - Encourage of home gardens and nurseries in urban areas. - Priority for composite pisciculture with horticulture, dairy and poultry - Inclusion of fodder crops in district agricultural plans, coordination with horticulture department for horti-fodder farming systems. 	<ul style="list-style-type: none"> - Priority for composite pisciculture with horticulture, dairy and poultry - Promotion of rural backyard poultry and duck breeding through establishment of small scale hatcheries and broiler units, vaccination coverage and breeding farms. Focus on coastal areas. Expansion of backyard poultry by establishing backward and forward linkages. Setting up of village level chick rearing centres operated by enterprising youth. - Inclusion of fodder crops in district 	<ul style="list-style-type: none"> - Promote adoption of rice-fish farming in waterlogged areas - Priority for composite pisciculture with horticulture, dairy and poultry

				<p><i>agricultural plans, coordination with horticulture department for horti-fodder farming systems. Distribution of seasonal fodder cropping system minikits. Promotion of dual purpose food/fodder crops.</i></p>	
<p>2. Agricultural Production</p>	-	-	<p><i>- District specific crop development plan to be decided based on formulated matrix of priority crops</i> <i>- Promotion of laboursaving tools and equipment and protected structures in horticulture</i> <i>- Improve R&D support for horticulture through OUAT, KVKs and other ICAR institutes</i></p>	<p><i>- Promotion of bovine and buffalo selective breeding, cross breeding, artificial insemination, progeny testing, embryo transfer technology breeding through various initiatives.</i> <i>- Development programme for small ruminants and pigs. Selective breeding, cross breeding, artificial insemination for goats, sheep and pigs, better nutrition, disease control,</i></p>	<p><i>- Enhance production and productivity through quality seed production, establishment of public/PPP/pvt hatcheries/brood banks, feed mills, subsidy for purchasing and operating equipment and machinery</i> <i>- Conservation of aquatic resource and genetic diversity - through</i></p>

				<p>research, input supply, processing and marketing</p> <p>- Indigenous breed conservation and development in bovine, sheep, goat</p> <p>- Incentives for commercial layer and broiler units.</p> <p>Improvement of departmental hatcheries for supply to backyard units.</p> <p>- Promotion of fodder and azolla cultivation among enterprising farmers through training, seed availability improvement, ensilage.</p> <p>Involvement of vana surakshya samiti for fodder collection from forest fringe areas.</p> <p>Provision for leasing of community land for fodder crop cultivation, district-</p>	<p>deployment of artificial reefs and fish aggregating devices, capacity building of fishermen and women, fisheries resources</p> <p>management plan, diversification of aquaculture in inland and brackishwater</p> <p>- Standardised leasing of wasteland, waterlogged areas and government owned water bodies for fishing entrepreneurs.</p> <p>Encouragement of social fishery in small sized perennial ponds.</p> <p>Subsidy under Jalanidhi scheme for deep borewell/shallow</p>
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				<p>wise inventory management of crop-residue for preparation of fodder blocks. Development of pasture land through community action</p> <ul style="list-style-type: none"> - Improve availability of feed by promoting retention of byproducts such as oilcakes, fish meal, broken rice etc and incentivizing manufacturers - Improvement of veterinary/livestock aid facilities, skill upgradation of personnel, provision of non-chemical health care support for livestock. Campaign for deworming/vaccination of livestock and poultry, better control and containment of emerging diseases through better 	<p>tubewell for fish farms.</p> <ul style="list-style-type: none"> - Demonstration of best management practices related to tank and pond fisheries to improve productivity. Promotion of sea cage culture
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				<i>monitoring.</i> <i>- Special focus to the dairy development activities in the Intensive Dairy Zone by ensuring integrated services like AI, Fodder cultivation, marketing, post insemination advisory services</i> <i>- Improvement of livestock extension services by providing mobility, extension aids and infrastructure</i>	
3. Biofortification	-	-	-	NA	NA
4. Agricultural Value Chains	-	-	<i>- Cluster based approach for horticulture production in order to develop storage processing and marketing and avoid market glut. Subsidy to horticulture farmers for packing.</i> <i>- Post harvest management, value addition and marketing</i>	<i>- Establishment of Odisha Small Animal Development Federation for promotion of small animal production and marketing of meat products, set up of marketing infrastructure and farms</i>	<i>- Establishment or improvement of landing centres/harbours, post-harvest infrastructure, fishery clusters, cold chain and support for transport and distribution to reduce losses</i>

			<p><i>linkages through formation of FPOs and federations</i></p> <ul style="list-style-type: none"> - <i>Encouragement to private players to enter into marketing contracts. Capital subsidy and electricity at special rates for cold storage facilities set up by private players.</i> - <i>Quality control, packaging and branding of high value crops for export market</i> 		<ul style="list-style-type: none"> - <i>Development of aquaculture clusters, cold chain, aqua shops, hygienic fish markets</i> - <i>Strengthening of fisheries cooperatives with forward and backward linkages for marketing management.</i>
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**See References – Agenda documents for list of sources*

APPENDIX B

REVIEW OF POLICY ADOPTION: SCHEMES AND PROGRAMMES ADOPTED BY THE ODISHA STATE GOVERNMENT

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

CORE DOMAINS	1. Agricultural Production Diversity	<ol style="list-style-type: none"> 1. State Plan: Programme for Promotion of integrated farming, Special Programme for Promotion of integrated farming in tribal areas 2. NMSA: Cropping systems suitable to bio-physical environment promoted under Climate Change and Sustainable Agriculture Monitoring, Modeling and Networking (CCSAMMN) 3. IWMP and NMSA: Rainfed area and watershed development using mixed cropping patterns. Livelihoods, production system and microenterprise promotion.
	2. Agricultural Production	<ol style="list-style-type: none"> 1. State Plan : Input subsidies (direct benefit transfer) for seed, fertilizer, bio-fertilizer, insecticide, bio-pesticide etc for agriculture and horticulture, production and distribution of quality planting materials, financial subsidy to seed growers 2. National Food Security Mission (NFSM): Demonstrations on hybrid paddy cultivation, SRI, cropping systems, commercial crops. Input subsidy for micronutrients and plant protection. 3. Rashtriya Krishi Vikas Yojana (RKVY): Bringing Green Revolution to Eastern India (BGREI) sub-mission, Foot and Mouth Disease sub-mission, rice fallows for oilseeds and pulses, diversification for tobacco farmers sub-mission - initiatives in modernizaion of inputs, extension, mechanization and irrigation. 4. State Plan: Promotion of improved package of practices, need based plant protection, technology missions for various crops 5. State Plan Schemes for Extension: Intensive extension campaign on agriculture, system development, Information, education and communication for agriculture and horticulture 6. National Mission on Agriculture Extension and Technology (NMAET): Sub-mission on agricultural mechanization, agricultural extension, plant protection and quarantine, seed and planting material 7. Central Schemes for Organic Farming: Paramparagat Krishi Vikas Yojana (PKVY), National Project on Organic Farming, National Mission for Sustainable Agriculture (NMSA) 8. State Plan: Special Programme for KBK districts for soil testing, cropping patterns for watershed

		development, increasing use of best practices, self-employment through farm mechanization and agriculture 9. State Plan: Establishment and operation of Department agriculture farms for experiments, adaptive trials and quality seed production
	3. Biofortification	-
	4. Agricultural Value Chains	1. Food Processing Policy: Fiscal and non-fiscal incentives for value addition and set up of cold chains, primary processing centre. Facilitate continuous flow of credit from banks and skill development for local farmers and entrepreneurs 2. State Plan: Establishment of Krushak Hata, Sale Centers
NON-CORE DOMAINS	5. Nutrition Education and Behaviour Change Communication	1. Integrated Child Development Services 2. Central schemes for adolescent girls: Kishori Shakti Yojana, SABLA Scheme 3. Central schemes for women: Pradhan Mantri Matritva Vandana Yojana/Indira Gandhi Matritva Sahyog Yojana 4. MAMATA conditional cash transfer 5. National Nutrition Mission
	6. Women's Empowerment	1. Biju Krushak Kaylan Yojana, health and accident insurance for farm families 2. Central schemes for adolescent girls: Kishori Shakti Yojana, SABLA Scheme 3. Central schemes for women: National Mission for Empowerment of Women, One Stop Centre, Prevention of violence against women, State Commission for Women, Gender Cell, Anti-human trafficking measures, Pradhan Mantri Matritva Vandana Yojana/Indira Gandhi Matritva Sahyog Yojana 4. MAMATA conditional cash transfer
	7. Natural Resource Management	1.NMSA and State Plan: Soil Health (Integrated nutrient) Management and Soil Health Card, Soil Conservation Training and Demonstration Centres, Soil testing facility (static and mobile) set up and upgradation. Nutrient subsidy based on soil analysis. 2.IWMP/RKVY/Pradhan Mantri Krishi Sinchayi Yojana/Har Khet ko Pani: micro/lift irrigation subsidy programme, micro irrigation for horticulture 3. Jalanidhi/RIDF: Subsidy for the construction of shall tube wells, bores wells, dug wells and river lift

	<p>projects.</p> <p>4.NMSA: Watershed management, Rainfed Area Development, Climate Change and Sustainable Agriculture Monitoring, Modelling and Networking (CCSAMMN)</p> <p>5. World Bank assisted Neeranchal Project</p> <p>6.Biju Krushak Vikash Yojana: Sustainable harnessing of groundwater in deficit areas through construction of deep bore wells, electrification and protective irrigation provision</p> <p>7. Biju KBK Yojana irrigation works</p> <p>8. Renovation and improvement of irrigation infrastructure through World Bank assisted Odisha Community Tanks Management Programme, Asian Development Bank assisted Odisha Integrated Irrigated Agricultural and Water Management Project - Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA) (EAP), Accelerated Irrigation Benefit Programme (AIBP), State Plan: Mukhyamantri Adibandha Tiari Yojana</p> <p>9. State plan: Utilization of crop residue for livestock</p> <p>10. Incentivizing scheme for bridging irrigation gap</p> <p>11. Global Environmental Facility Project</p> <p>12. Organic Farming Policy</p> <p>13. Dredging of river, harbours and landing cetres/jetties for aquaculture</p>
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Part B of Review of Policy Adoption: SCHEMES AND PROGRAMMES EXTRACTED FROM LISTED SOURCES* - FOR MAJOR NUTRITIOUS CROPS/LIVESTOCK (IN CORE DOMAINS)

	Legumes	Nutri-cereals/Millets	Horticulture	Livestock and poultry	Aquaculture
1. On-farm Production Diversity	<p>1. NFSM: Intercropping demonstrations and cropping system demonstrations for rice-rice-pulse and blackgram-greengram</p> <p>2. RKVY: Promotion of pulse cultivation in rice fallows</p>		<p>1. MIDH: Intercropping in fruit orchards</p> <p>2.State Plan: Seedlings of fruit trees, coconut and drumstick at a subsidized rate for backyard plantation</p>	<p>1. Poultry Policy: Supply of chicks from government and private hatcheries, assistance for shelter construction, de-worming and vaccination assistance for rural backyard poultry</p> <p>2. Poultry Policy: Encouragement of backyard duck and duck-fish farming, supply of ducks from government hatcheries</p> <p>3. Poultry Policy: Extension for use of poultry manure as crop fertilizer</p> <p>4. Training of community level poultry vaccinators</p>	<p>1. Poultry Policy: Encouragement of backyard duck-fish farming</p>

				through convergence with OLM, OTELP	
2. Agricultural Production	<p>1.NFSM-Pulses : Demonstrations on HYV seeds, improved varieties</p> <p>2. Technology Mission on pulses and oilseeds</p> <p>3. ISOPOM: State assistance to seed production, plant protection and pest management, micronutrient fertilizers and sprinkler irrigation</p>	<p>1.NFSM-Coarse Cereals and ISOPOM-Maize : Demonstration of improved package for maize and Ragi</p> <p>2. State Plan: Special Programme for Promotion of Millets in Tribal Areas</p> <p>3. State Workplan scheme: Sub-scheme on Ragi development</p>	<p>1.MIDH/NHM: Fruit research and orchard development, Establishment/revival of block level nursery cum sale centre, Seed production programme for vegetables, Subsidy for protected cultivation, mechanization of horticulture, Development of potato, vegetables and spices</p> <p>2. State Potato</p>	<p>1. Rashtriya Pashaudhan Vikash Yojana</p> <p>2. National Livestock Mission</p> <p>3. RIDF: Infrastructure development for livestock services</p> <p>4. National Livestock Health and Diseases Control Programme</p> <p>5. National Project on Cattle and Buffalo Breeding, National Programme for</p>	<p>1.State Plan: Development of brackish water aquaculture,water-logged areas, freshwater aquaculture</p> <p>2. State Plan for Extension: Demonstration and development of inland fisheries, Fisheries extension programme, propaganda and fairs</p> <p>3. State Plan for</p>

		through extension and promotion of best practices	<p>Mission (Generating Advances in Income and Nutrition through Sweet potato currently in 4 districts)</p> <p>3. Implementation of horticulture programmes in non-Horticulture Mission districts</p> <p>4. State Plan: Popularization of agricultural implements, equipments and diesel pump set</p> <p>5. State Plan Schemes for Extension: Strengthening school of Horticulture</p> <p>6. Horticulture Mission Plus</p>	<p>Bovine Breeding and Dairy Development</p> <p>6. RKVY: National Mission for Protein Supplementation, Small Animal Development</p> <p>7. BAIF implemented Kalyani project, Integrated Livestock Development Programme</p> <p>8. State Plan: Strengthening of disease surveillance of Animal Research Institute. Upgradation of livestock health care services.</p> <p>9. State Plan: Genetic upgradation of livestock and small animals through selective and cross breeding, artificial</p>	<p>mechanization: Incentive for small boat users, motorization of traditional craft, Safety of fishermen at sea, popularization of machineries / equipments</p> <p>4. State and Central Schemes for Development of Marine fisheries infrastructure & post-harvest operation</p> <p>5. Mathsyajibi Unnayan Yojana: Livelihoods and social security for fishermen</p> <p>6. Implementation of Fisheries Policy</p> <p>7. Promotion of cage culture through</p>
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				<p>insemination, progeny testing.</p> <p>10. Conservation and improvement of threatened indigenous breeds of livestock</p> <p>11. State Plan for Extension</p> <p>12. Odisha Poultry Policy: Financial assistance for expansion and set up of private commercial broiler, layer poultry and duck farms, feed mixing plants</p> <p>13. Feed and fodder development programme: specific to agro-climatic zone, training and demonstrations</p>	<p>establishment of infrastructure, reservoir fishery</p> <p>8. Blue revolution: Integrated development and management of fisheries</p> <p>9. Maccha Chasa Pain Nua Pokhari Khola Yojana</p> <p>10. Mathsya Sampada Bikash Utsav</p> <p>11. Mathsyajibi Basagruha Yojana</p>
3. Biofortification				NA	NA

<p>4. Agricultural Value Chains</p>		<ol style="list-style-type: none"> 1. Support to Farmer Producer Organizations 2. Setting up of company for marketing of fruits and vegetables 3. Integrated post harvest management, Development of post-harvest infrastructure, Infrastructure development of Sale Centre 	<ol style="list-style-type: none"> 1. Strengthening of dairy marketing federation (OMFED) 2. Promotion of Dairy Entrepreneurship through capital and interest subsidy 3. Updragation of skill in self-employment for animal resources development 	<ol style="list-style-type: none"> 1. State and Central Schemes for Development of Marine fisheries infrastructure & post-harvest operation 2. Reactivation of Fisheries Co-operative Societies 3. Establishment of fisheries hub at kaushalyaganga
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See References – List of sources of *Policy documents

APPENDIX C

COMPREHENSIVE LIST OF POLICIES AND SOURCES: ODISHA

Sl. No:	Scheme Name	Source	Category
1.	MIDH: Fruit research and orchard development	Agriculture budget 2016-17, 2017-18	Production
2.	MIDH: National Horticulture Mission (NHM)	Agriculture budget 2016-17, 2017-18	Production
3.	Implementation of horticulture programmes in non-Horticulture Mission districts	Agriculture budget 2016-17, 2017-18, Activity Report 2016-17	Production
4.	Input subsidy on seed fertilizer, bio-fertilizer, insecticide, bio-pesticide etc for agriculture and horticulture	Agriculture budget 2016-17, 2017-18	Production
5.	Development of potato, vegetables and spices	Agriculture budget 2016-17, 2017-18	Production
6.	Popularization of agricultural implements, equipments and diesel pump set	Agriculture budget 2016-17, 2017-18	Production
7.	Strengthening school of Horticulture	Agriculture budget 2016-17, 2017-18	Production
8.	MIDH: Intercropping in fruit orchards	Agriculture budget 2016-17, 2017-18, Activity Report 2016-17	Production Diversity
9.	Production and distribution of quality planting materials	Agriculture budget 2016-17	Production
10.	National Food Security Mission (NFSM)	Agriculture budget 2016-17, 2017-18	Production
11.	Establishment/revival of block level nursery cum sale centre	Agriculture budget 2016-17, 2017-18	Production
12.	Promotion of SRI	Agriculture budget 2016-17, 2017-18	Production
13.	Subsidy under Agriculture Policy	Agriculture budget 2016-17, 2017-18	Production
14.	Rashtriya Krishi Vikas Yojana (RKVY)	Agriculture budget 2016-17, 2017-18	Production
15.	Promotion of integrated farming	Agriculture budget 2016-17, 2017-18	Production Diversity
16.	Promotion of improved package of practices	Agriculture budget 2016-17, 2017-18	Production
17.	National Project on Promotion of Organic	Agriculture budget	Production

	Farming - agriculture and horticulture	2016-17, 2017-18	
18.	Intensive extension campaign for agriculture	Agriculture budget 2016-17, 2017-18	Production
19.	Technology Mission on pulses and oilseeds	Agriculture budget 2016-17, 2017-18	Production
20.	Horticulture mission plus	Agriculture budget 2016-17, 2017-18	Production
21.	National Mission on Agriculture Extension and Technology (NMAET): Sub-mission on agricultural mechanization, seed and planting material, plant protection and quarantine	Agriculture budget 2016-17, 2017-18, Activity Report 2016-17	Production
22.	National Mission for Sustainable Agriculture (NMSA)	Agriculture budget 2016-17, 2017-18	Production
23.	State Potato Mission	Agriculture budget 2016-17, 2017-18	Production
24.	Paramparagat Krishi Vikas Yojana (PKVY)	Agriculture budget 2016-17, 2017-18	Production
25.	Promotion of integrated farming in tribal areas	Agriculture budget 2016-17, 2017-18	Production Diversity
26.	Development of brackish water aquaculture, water-logged areas, freshwater aquaculture through FFDA	Agriculture budget 2016-17	Production
27.	Demonstration and development of inland fisheries	Agriculture budget 2016-17, 2017-18	Production
28.	Fisheries extension programme, fishery propaganda and fairs	Agriculture budget 2016-17	Production
29.	Fodder seed farm	Agriculture budget 2016-17, 2017-18	Production
30.	Establishment of fishing harbour and fish landing centre	Agriculture budget 2016-17	Production
31.	Integrated development of inland capture resource	Agriculture budget 2016-17	Production
32.	Establishment of livestock aid centres	Agriculture budget 2016-17, 2017-18	Production
33.	Establishment of livestock breeding cum dairy farms	Agriculture budget 2016-17, 2017-18	Production
34.	Development of off-shore fisheries	Agriculture budget 2016-17, 2017-18	Production
35.	Poultry breeding farm	Agriculture budget 2016-17, 2017-18	Production
36.	Incentive for small boat users, motorization of traditional craft	Agriculture budget 2016-17	Production
37.	Training and demonstration in fodder	Agriculture budget	Production

	cultivation and pasture development	2016-17, 2017-18	
38.	Infrastructure development for livestock services	Agriculture budget 2016-17, 2017-18	Production
39.	Development of know-how for animal welfare	Agriculture budget 2016-17, 2017-18	Production
40.	Safety of fishermen at sea	Agriculture budget 2016-17	Production
41.	Upgradation of livestock health care services	Agriculture budget 2016-17, 2017-18	Production
42.	Strengthening of disease surveillance of Animal Research Institute	Agriculture budget 2016-17, 2017-18	Production
43.	Encouragement of backyard poultry	Agriculture budget 2016-17, 2017-18	Production Diversity
44.	Genetic upgradation of small animals	Agriculture budget 2016-17, 2017-18	Production
45.	Conservation and improvement of threatened indigenous breeds of livestock, small animals and poultry	Agriculture budget 2016-17, 2017-18, Odisha Poultry Policy 2015	Production
46.	Information, education and communication programme for fisheries and animal resources, skill development and training	Agriculture budget 2016-17, 2017-18	Production
47.	Development of shore base facilities	Agriculture budget 2016-17	Production
48.	Implementation of Kalyani project through BAIF	Agriculture budget 2016-17, 2017-18	Production
49.	Mathsyajibi Unnayan Yojana	Agriculture budget 2016-17, 2017-18	Production
50.	Infrastructure for cage culture	Agriculture budget 2016-17, 2017-18	Production
51.	Implementation of Fisheries Policy	Agriculture budget 2016-17, 2017-18	Production
52.	Promotion of reservoir fishery production	Agriculture budget 2016-17, 2017-18	Production
53.	Blue revolution - Integrated development and management of fisheries	Agriculture budget 2016-17, 2017-18	Production
54.	White revolution - Rashtriya Pashaudhan Vikash Yojana	Agriculture budget 2016-17	Production
55.	Assistance to fishermen for development of livelihood (B&N)	Agriculture budget 2016-17, 2017-18	Production
56.	Promotion of intensive aquaculture	Agriculture budget 2016-17, 2017-18	Production
57.	Empowering fishermen through mobile	Agriculture budget	Production

	advisory and toll-free call centre	2016-17, 2017-18	
58.	National Livestock Health and Diseases Control Programme	Agriculture budget 2016-17, 2017-18	Production
59.	National Scheme for Welfare of Fishermen	Agriculture budget 2016-17	Production
60.	Animal husbandry extension service through mobile advisory	Agriculture budget 2016-17, 2017-18	Production
61.	Feed and fodder production in different agro-climatic zones for livestock	Agriculture budget 2016-17, 2017-18	Production Diversity
62.	Small animal breeding farm	Agriculture budget 2016-17, 2017-18	Production
63.	Information, education and communication for agriculture and horticulture	Agriculture budget 2017-18	Production
64.	Special Programme for Promotion of Millets in Tribal Areas	Agriculture budget 2017-18	Production
65.	Mobile veterinary unit, animal helpline facility with ambulance service	Agriculture budget 2017-18	Production
66.	National Livestock Management Programme	Agriculture budget 2017-18	Production
67.	Maccha Chasa Pain Nua Pokhari Khola Yojana	Agriculture budget 2017-18	Production
68.	Mathsya Sampada Bikash Utsav	Agriculture budget 2017-18	Production
69.	Popularization of fisheries machineries / equipments	Agriculture budget 2017-18	Production
70.	Mathsyajibi Basagraha Yojana	Agriculture budget 2017-18	Production
71.	ISOPOM	Agriculture budget 2017-18	Production
72.	Workplan scheme: Ragi development	Agriculture budget 2017-18	Production
73.	Financial assistance to seed growers	Citizen's charter	Production
74.	Special Programme for KBK districts	Citizen's charter	Production
75.	Agriculture farms for experiments, adaptive trials and quality seed production	Citizen's charter	Production
76.	NMSA: Climate Change and Sustainable Agriculture Monitoring, Modeling and Networking (CCSAMMN)	Activity Report 2016-17	Production Diversity
77.	Bringing Green Revolution to Eastern India (BGREI)	Activity Report 2016-17	Production
78.	MIDH: Seed production programme for vegetables, Subsidy for protected cultivation, mechanization of horticulture, Establishment	Activity Report 2016-17	Production

	and revival of block level nurseries		
79.	Livelihoods, production system and microenterprise promotion.	Activity Report 2016-17	Production Diversity
80.	IWMP and NMSA: Rainfed area and watershed development using mixed cropping patterns	Activity Report 2016-17	Production Diversity
81.	Financial assistance for expansion and set up of private commercial broiler, layer poultry and duck farms, feed mixing plants by entrepreneurs	Odisha Poultry Policy 2015	Production
82.	Supply of chicks from government and private hatcheries, assistance for shelter construction, deworming and vaccination assistance for rural backyard poultry	Odisha Poultry Policy 2015	Production Diversity
83.	Encouragement of backyard duck and duck-fish farming, supply of ducks from government hatcheries	Odisha Poultry Policy 2015	Production Diversity
84.	Extension for use of poultry manure as crop fertilizer	Odisha Poultry Policy 2015	Production Diversity
85.	Training of community level poultry vaccinators through convergence with OLM, OTELP	Odisha Poultry Policy 2015	Production
86.	Soil Conservation and Training, Demonstration Centres	Agriculture budget 2016-17, 2017-18	Natural resource management
87.	Soil Testing Laboratory	Agriculture budget 2016-17, 2017-18	Natural resource management
88.	Watershed management unit	Agriculture budget 2016-17, 2017-18	Natural resource management
89.	RIDF	Agriculture budget 2016-17, 2017-18	Natural resource management
90.	Integrated Watershed Management Program (IWMP)	Agriculture budget 2016-17, 2017-18	Natural resource management
91.	Management of acidic soil	Agriculture budget 2016-17, 2017-18	Natural resource management
92.	Sustainable harnessing of groundwater in deficit areas - Biju Krushak Vikash Yojana	Agriculture budget 2016-17, 2017-18	Natural resource management

93.	Establishment of Krushak Hata	Agriculture budget 2016-17	Nutrition sensitive value chains
94.	Integrated post harvest managment, Development of post-harvest infrastructure, Infrastructure development of Sale Centre	Agriculture budget 2016-17, 2017-18	Nutrition sensitive value chains
95.	World Bank assisted Neeranchal project	Agriculture budget 2016-17, 2017-18	Natural resource management
96.	Pradhan Mantri Krishi Sinchayi Yojana (PMKSY) - Har khet ko pani (HKP)	Agriculture budget 2016-17, 2017-18	Natural resource management
97.	Support to Farmer Producer Organizations	Agriculture budget 2016-17	Nutrition sensitive value chains
98.	Setting up of company for marketing of fruits and vegetables	Agriculture budget 2016-17	Nutrition sensitive value chains
99.	Management of soil health	Agriculture budget 2016-17, 2017-18	Natural resource management
100.	Biju KBK Yojana	Agriculture budget 2016-17, 2017-18	Natural resource management
101.	Odisha Community Tanks Management Project	Agriculture budget 2016-17	Natural resource management
102.	Command Area Development: Crop demonstration and farmers training	Agriculture budget 2016-17, 2017-18	Natural resource management
103.	Odisha Integrated Irrigated Agricultural and Water Management Project - Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA) (EAP)	Agriculture budget 2016-17, 2017-18	Natural resource management
104.	Accelerated Irrigation Benefit Programme (AIBP)	Agriculture budget 2016-17, 2017-18	Natural resource management
105.	Development of fisheries post harvest infrastructure	Agriculture budget 2016-17	Nutrition sensitive value chains
106.	Extension of fisheries cooperatives	Agriculture budget 2016-17	Nutrition sensitive value chains

107.	Strengthening of dairy organization	Agriculture budget 2016-17, 2017-18	Nutrition sensitive value chains
108.	Establishment of fisheries hub at kaushalyaganga	Agriculture budget 2016-17, 2017-18	Nutrition sensitive value chains
109.	Utilization of crop residue for livestock	Agriculture budget 2016-17, 2017-18	Natural resource management
110.	Reactivation of Fisheries Co-operative Societies	Agriculture budget 2016-17, 2017-18	Nutrition sensitive value chains
111.	Promotion of Dairy Entrepreneurship	Agriculture budget 2016-17, 2017-18	Nutrition sensitive value chains
112.	Dredging of river, harbours and landing cetres/jetties	Agriculture budget 2016-17, 2017-18	Natural resource management
113.	Microirrigation for horticulture	Agriculture budget 2017-18	Natural resource management
114.	Global Environmental Facility Project	Agriculture budget 2017-18	Natural resource management
115.	Incentivizing scheme for bridging irrigation gap	Agriculture budget 2017-18	Natural resource management
116.	Mukhyamantri Adibandha Tiari Yojana (MATY)	Agriculture budget 2017-18	Natural resource management
117.	Updragation of skill in self-employment for animal resources development	Agriculture budget 2017-18	Nutrition sensitive value chains
118.	Jalanidhi	Citizen's Charter	Natural resource management
119.	NMSA: Climate Change and Sustainable Agriculture Monitoring, Modeling and Networking (CCSAMMN)	Activity Report	Natural resource management
120.	Promotion of need-based plant protection	Activity Report, Agriculture budget 2016-17, 2017-18	Natural resource management
121.	Subsidy for agri-enterprises under	Activity Report	Nutrition

	agricultural policy 2008		sensitive value chains
122.	Biju Krushak Kaylan Yojana - health and accident insurance for farm families	Activity Report	Women's empowerment
123.	MIDH: Establishment of marketing infrastructure for horticulture produce	Activity Report	Nutrition sensitive value chains
124.	Livelihoods, production system and microenterprise promotion.	Activity Report	Nutrition sensitive value chains
125.	ICDS	Budget 16-17, 17-18	BCC
126.	Kishori Shakti Yojana	Budget 16-17, 17-18	Women's empowerment, BCC
127.	SABLA Scheme	Budget 16-17, 17-18	Women's empowerment, BCC
128.	National Mission for Empowerment of Women	Budget 16-17, 17-18	Women's empowerment
129.	Biju Kanya Ratna/Biju Ananya Yojana	Budget 16-17, 17-18	Women's empowerment
130.	One Stop Centre	Budget 16-17, 17-18	Women's empowerment
131.	Prevention of violence against women	Budget 16-17, 17-18	Women's empowerment
132.	Mahila Vikas Samabaya Nigam	Budget 16-17, 17-18	Women's empowerment
133.	State Commission for Women	Budget 16-17, 17-18	Women's empowerment
134.	Support to SHGs and federations under Mission Shakti	Budget 16-17, 17-18	Women's empowerment
135.	Gender Cell	Budget 16-17, 17-18	Women's empowerment
136.	Anti-human trafficking measures	Budget 16-17, 17-18	Women's empowerment
137.	Pradhan Mantri Matritva Vandana Yojana/Indira Gandhi Matritva Sahyog Yojana	Budget 16-17, 17-18	women's empowerment, BCC
138.	MAMATA conditional cash transfer	Budget 16-17, 17-18	women's empowerment, BCC
139.	Mukhyamantri Mahila Sashaktikaran Pariyojana	Budget 16-17, 17-18	Women's empowerment

140.	National Nutrition Mission	Budget 16-17, 17-18	women's empowerment, BCC
141.	Food Processing Policy: Fiscal and non-fiscal incentives for value addition and set up of cold chains, primary processing centre. Facilitate continuous flow of credit from banks and skill development for local farmers and entrepreneurs	Food Processing Policy 2016	Nutrition sensitive value chains

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