सत्यमेव जयते
Ministry of Rural Development,
Government of India

Farm Livelihoods Interventions under DAY-NRLM

(Strategy, Convergence Framework, Models)





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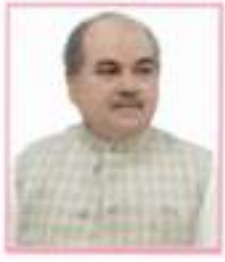
MINISTER OF AGRICULTURE & FARMERS' WELFARE,
RURAL DEVELOPMENT AND PANCHAYATI RAJ
GOVERNMENT OF INDIA
KRISHI BHAWAN, NEW DELHI



MESSAGE

The Deendayal Antyodaya Yojana-National Rural livelihood Mission (DAY-NRLM), the flagship programme of Ministry of Rural Development (MoRD) aims at eliminations rural poverty through promotion of multiple livelihoods for each rural poor household by 2024-25. Efforts are being made by National Rural Livelihood Mission to build the capacity of women through creating community institutions of rural women. There has been a remarkable progress in expanding the coverage of more than 7 crore women households and organizing them into 66 lakh SHGs. Now it is the time to mobilize these women from sustenance activities to higher order economic activities.

For this to be achieved there is a need for strong convergence among Ministry of Rural Development, Ministry of Agriculture, Co-operation and Farmers Welfare, Ministry of Food Processing Industries, Ministry of Tribal Affairs and other Ministries. This will help women Self Help Groups (SHG) members of DAY-NRLM in accessing a wide range of government schemes for productive asset creation, training and marketing support. The convergence will play key role in building livelihood capabilities, creating economic opportunities, enhancing income and improving living standard of the rural women, mostly from small, marginal, landless and tribal communities.

DAY-NRLM has already started working with the concerned ministries for creating an overarching umbrella for SHG women in promotion of their livelihoods. The current effort will augment the existing convergence initiatives and institutionalize the efforts. DAY-NRLM has dedicated implementation support structures at all levels and the Mission is also having partnerships with various organizations which will further strengthen all the stakeholders' efforts towards this endeavor.

This effort of convergence with various Ministries will help in mainstreaming the efforts of rural Self Help Groups in their journey to become leaders of the community and developing them as entrepreneurs. I extend my best wishes to the rural poor women in their journey of comprehensive multi-sect oral approach for their socio-economic development.

(Narendra Singh Tomar)

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सन्देश

दीनदयाल अंत्योदय योजना- राष्ट्रीय ग्रामीण आजीविका मिशन (डी.ए.वाई.-एन.आर.एल.एम.), ग्रामीण विकास मंत्रालय (एम.ओ.आर.डी.) का एक प्रमुख कार्यक्रम है। इसका उद्देश्य प्रत्येक ग्रामीण गरीब परिवार को विविध प्रकार की आजीविका से जोड़कर गरीबी उन्मूलन कार्यक्रम को सफल बनाना है। डी.ए.वाई.-एन.आर.एल.एम का लक्ष्य २०२४-२५ तक सभी ग्रामीण गरीब परिवारों की आजीविका को सार्थक रूप से प्रभावित करना है।

डी.ए.वाई.-एन.आर.एल.एम. अभिसरण के माध्यम से कृषि सहकारिता और किसान कल्याण मंत्रालय, खाद्य प्रसंस्करण उद्योग मंत्रालय, जनजातीय कार्य मंत्रालय और अन्य मंत्रालयों के द्वारा महिला स्वयं सहायता समूहों (S.H.G.) के सदस्यों को सरकारी योजनाओं की एक विस्तृत श्रृंखला जैसे उत्पादक संपत्ति निर्माण, प्रशिक्षण और विपणन सहायता से जोड़ने का प्रयास करेगा।

मुझे यह जानकर अत्यंत खुशी हुई है कि डी.ए.वाई.-एन.आर.एल.एम. ने पहले से ही अपनी आजीविका के प्रचार में स्वयं सहायता समूह की महिलाओं के लाभ के लिए संबंधित मंत्रालयों के साथ काम करना शुरू कर दिया है। वर्तमान प्रयास मौजूदा अभिसरण पहल को बढ़ाएगा और प्रयासों को संस्थागत रूप देगा। डी.ए.वाई.-एन.आर.एल.एम. ने सभी स्तरों पर कार्यान्वयन समर्थन संरचनाओं का निर्माण किया है। इसके अलावा मिशन ने विभिन्न संगठनों के साथ भागीदारी भी की है जो सभी हित धारकों के आधार को और मजबूत करने का प्रयास है।

मंत्रालयों के इस प्रयास से ग्रामीण गरीबों को मुख्य धारा की विकास प्रक्रिया में अधिक प्रभावी रूप से भाग लेने में सक्षम बनाया जा सकता है। मैं आशा करती हूं कि मंत्रालयों के बीच अभिसरण का संस्थागत प्रयास गरीबी उन्मूलन के लिए एक मील का पत्थर साबित होगा।

(साध्वी निरंजन ज्योति)

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Foreword

Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM) aims towards eliminating rural poverty through promotion of multiple and diversified livelihoods for each rural poor household. The Mission seeks to reach out to about nine crore rural poor households by 2023-24 and impact their livelihoods. NRLM has so far organized 7.14 Crore rural women into 66 Lakh Self Help Groups (SHG) and its associated tiers across the country.

Over the last few years the Mahila Kisan Sashktikaran Pariyojana (MKSP) model of integrated approach for promotion of various livelihoods activities like Agro Ecological Practices in agriculture, livestock and Non-Timber Forest Produce (NTFP) Collections for women farmers has taken deep roots in almost all the states, both under MKSP as well as under SRLM Annual Action Plan. The evaluation studies also show significant impact in terms of ensuring higher income by means of diversification of livelihoods and very high acceptability of the model with the women SHG members. The evaluations have also validated the MKSP strategy to give strong emphasis on provisioning of extension services at the doorsteps and promotion of agri-nutri gardens for dietary diversity.

More than 90 Lakh women are now being supported under DAY NRLM through various farm-based livelihoods interventions. About 50 thousand trained SHG members are actively engaged in providing doorstep extensions services as Krishi Sakhi, Pashu Sakhi and Van Sakhi. **Value chain models have been developed** comprising of identification of marketable commodity that is in surplus with small and marginal producers, value addition, capacity building for better post-harvest handling to ensure product quality and linkage with market channels. More than 16,000 Producer Groups and 169 Producer Enterprises have been promoted which are actively engaged in providing market access to women farmers. With this basket of interventions, DAY NRLM has made substantial progress in empowering the women in livelihood activities and helped them build their identity as 'Mahila Kisan'.

DAY NRLM is now planning to deepen as well as expand the existing livelihoods initiatives by promoting Integrated Farming Clusters for livelihood diversification and by further strengthening value chain development initiatives for market linkage through Producer Groups and Producer Enterprises. DAY NRLM will focus more on small and marginal Mahila Kisans particularly in rainfed areas and the focus will be on promotion of diversified, multiple and sustainable livelihoods. DAY NRLM will work on cropping systems in rainfed areas and will promote pulses and oilseeds as intercrops contributing not only to income increase but also to household food and nutrition security. One of the important strategies will be to develop strong convergence and partnerships with various Ministries and Technical Agencies on their schemes aimed at creating economic opportunities in rural India and reducing rural poverty.

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Some of the noteworthy instances of these collaborations have been in setting up of Custom Hiring Centres (CHC) by SHGs, promotion of organic farming, conducting animal health camps for animal vaccinations, minimum support price for NTFPs, awareness generation on soil testing etc. There is emerging need to take these initiatives further through strengthening the convergence efforts.

This effort across the ministries will enable the rural poor to participate more effectively in the mainstream growth processes and is based on the multi dimensional nature of poverty and consequently need for a comprehensive multi-sectoral approach to rural development with added focus on inclusive approaches through appropriate targeting.

I wish these collaboration efforts of DAY-NRLM with other Ministries will be taken up at the state level with much intensity and rigor to implement the government schemes and benefit millions of rural poor and this document will be a guiding document for the SRLMs for years ahead.

(Nagendra Nath Sinha)

Contents

Section 1: Farm Livelihood Strategy under DAY-NRLM

Introduction

Women's role in agriculture is as old as the settled agriculture. It is well known that women toil same as men and in some cases even more though their efforts and time quite often get unrecognized and overlooked.

In the budget announcements of FY 2010-11, Mahila Kisan Shashaktikaran Pariyojana (MKSP) was announced as a sub component of DAY National Rural Livelihoods Mission (NRLM), under Ministry of Rural Development (MoRD) to recognize the role women in agriculture. MKSP was launched as a scheme to make this course correction and to make a significant change in Indian agriculture scenario with the following objectives:

- Empower women farmers
- Recognize women's role in agriculture
- Bring them in the forefront as key participants
- Transfer new farming techniques
- Enhance their decision making ability
- Address the household food and nutrition security

State Rural Livelihoods Missions (SRLM) set up in every state are responsible to implement DAY NRLM, whereas during the time of MKSP launch, except in undivided Andhra Pradesh (presently Telangana and Andhra Pradesh), Bihar and Kerala, SRLMs were in the formative stage. The newly constituted SRLMs were more focused into promoting community institutions, build financial linkages and develop systems and implementation architecture. Therefore, MKSP implementation was started with SRLMs of undivided AP, Bihar and Kerala as Project Implementation agencies (PIA). Few Civil Society Organizations (CSOs) were also identified for MKSP implementation as PIA. It was envisaged that time the over time the learnings from MKSP would be integrated with NRLM and will get mainstreamed. NRLM being a women centric livelihood promotion program it was quite important that the experience of MKSP formed the basis of designs of farm livelihoods initiatives under it.

MKSP has now been universalized in DAY-NRLM since last 5 years as a farm livelihoods promotion component in State Annual Action Plans prepared by SRLM. MKSP in quick span of 10 years has emerged as a unique farm-based livelihood development programme, with 84 projects having an outlay of Rs.1,284 crore. The MKSP intervention lowers cost per unit area, increases productivity, increases disposable income for households, helps strengthening of women interest and confidence in pursuing agriculture as livelihood and getting recognized in their family as equals. Apart from the above, MKSP have made significant change in the use of new scientific knowledge and practices which intended to revive age old traditional knowledge, recycle of biomass, restore soil fertility, seed improvement and sovereignty, plant protection and improved storage practices. , technology intervention which are easy to adopt and scale up. MKSP outcome directly addresses 3 key Sustainable Development Goals (SDGs) namely - Zero Hunger, No Poverty, and Gender equality.

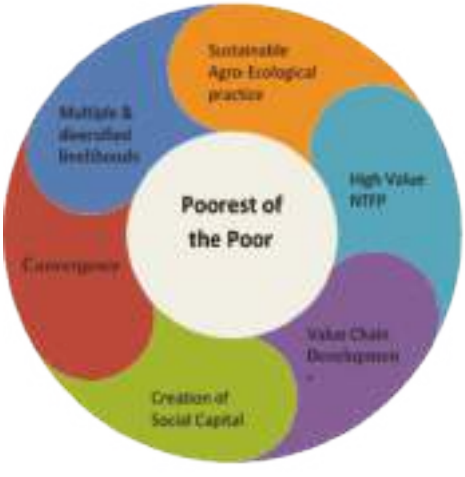
Implementation Approach

Many SRLMs initiated livelihood interventions by taking up MKSP. Initially, only a few blocks were identified where institution-building and financial inclusion interventions have been initiated. MKSP was restricted in some pockets and served as demonstration site and learning ground for the SRLMs.

Significant experience of successful implementation of MKSP and realizing the need to scale up, the SRLMs gained confidence that translated into embedding livelihood programme in many more blocks under State's Annual Action Plans. The approach and components remained aligned with MKSP. With the strong intervention learning and experiences backed by implementation design architecture in the form of Community Resource Persons supported a large pool of State and National Resource Persons established under MKSP, SRLMs could scale up the MKSP program designs rapidly since 2015 and surpassed the MKSP achievements at a rapid pace.

Current Strategy and Approach for Farm Livelihoods

MKSP from the very beginning looked at Households as the unit of interventions and approached the target segment with a strong intervention design focused on diversification of livelihoods through 1) improving the asset quality resulting into increased production and productivity, 2) enhancing the skills of target HH through continuous capacity building on Agro Ecological Practices, Livestock practices and NTFP practices 3) addressing the access related factors like market, credit, entitlements and other government schemes. All these interventions were taken up with income enhancement, ecological sustainability and women empowerment as overarching principles. The intervention framework is explained as below:



- Strengthening existing livelihoods and diversify livelihoods every HH to have a basket of livelihoods
- Promoting Agro Ecological Practice (AEP): Non-pesticide management, seed treatment, in situ water conservation, integration of livestock, reduce cost of cultivation, drudgery reduction tools, Farmer Field School
- Creating Social capital (CRPs- Pashu Sakhi, Krishi Sakhi, Van Sakhi)
- HH level food & nutrition security
- Strengthen high value NTFP livelihoods opportunities- Tasar, Lac, medicinal plant
- Producer Collectives for market linkages, value addition
- (Individual & community asset creation) through convergence with MGNREGA, Agriculture, Animal Husbandry
- Climate Change resilience

Risk Mitigation, Income increase, Cost reduction, Sustainability

Key Components of Farm Livelihoods Interventions

Within the NRLM ecosystem the thrust area of Farm Livelihood Interventions has been two-fold

- To strengthen the existing livelihoods and diversify the household livelihoods portfolio and to address household's food and nutrition security
- Build higher order member owned institutions for value addition, and create market linkages for agriculture produce.

(a) Existing farm based livelihoods falls broadly in three heads, (i) sustainable agriculture (SA) (ii) livestock and (iii) non timber forest produce (NTFP)

i **Sustainable agriculture** includes field crops and plantation through popularisation of agro-ecological principles and practices and popularisation of non-pesticidal management in plant protection. SA covers range of crops grown in different project locations by SHG members. The focus has been to teach and transfer scientific rationale behind each of interventions in soil, water regime management, seed, pest management and storage practices. Training in farmers' field school approach, on field demonstration of a set of agro-ecological practices have been introduced to reduce cost of cultivation, control over resources, enhance productivity and increase production. By design training is on generic line instead of crop specific training or package of practices (PoP) approach. More than two dozen field crops falling under cereals, pulses, oilseeds and vegetables have been covered under MKSP interventions. This MKSP effort has improved household food security and household cash flow, recognition of women as farmers in households and in the society at large.

Nutrition is crosscutting agenda in MKSP which has been adequately addressed, through setting up of (i) kitchen garden and (ii) backyard ruminants and non-ruminants livestock rearing.
Kitchen garden in MKSP supported to grow variety of short and long duration crops and orchard plants for steady supply of greens, vegetables and fruits. Non-pesticidal plant protection approach in MKSP additionally improved quality of food produced, in terms of taste and other phytosanitary indices. Promoting backyard ruminants and non-ruminants practices has increased nutrition intake and additional income to the households.

ii **Livestock** is another important sub-components of MKSP that strongly complements Sustainable Agriculture where , the focus is on better management of livestock including ruminants (dairy, goatary, piggery) and non-ruminants (backyard poultry, duckery) through proper housing, improved feeding practices through balanced and supplementary feeding , preventive animal health care facilities like deworming and vaccination. All these services are made available at door step through the community cadre of Pashu Sakhi. The objective of this intervention is to reduce mortality and morbidity, better body weight gain and all these with well-established market linkages ensure better return to the women and income round the year.

Proper housing and hygiene
Ration balancing and feed management
Regular deworming / vaccination
Regular health camp - convergence with AHD
Breed improvement through selection
Introduction of azolla and hydroponics

iii Non Timber Forest Produce (NTFP) has tremendous potential to increase earnings source of the marginalised tribal community especially during the lean months. Activities like tasar cocoon rearing , lac cultivation are traditional occupations though production of all these declined due to lack of scientific knowledge, lack of credit, and market imperfection. These bottlenecks have been addressed in targeted households with interventions on supply of good quality seed materials, trainings on scientific practices and establishing market linkages. DAY NRLM partnered with various resource institutions and agencies to introduce the improved package of practice and developing "Van Sakhi' as community cadre for sustainability.

Scientific cultivation practices (Host tree-tasar / Lac), Medicinal Plants

Adoption of Sustainable Harvesting & Post-harvesting techniques

Establishing market linkages

(b) Build higher order members owned institutions for value addition, and create market linkages

Access to market is an extremely critical constraint for small and marginal farmers to realize remunerative prices. One of the major issue with market access is primarily due to very low marketable surplus Under MKSP initiatives higher order institutions promoted to address the issues related to value addition and market access for better price realisation. Institutions like producer groups (PG) and producer enterprises (PE) promoted helped producers better access to market

Critical Interventions

(a) **Value chain models developed** under DAY NRLM comprise of identification of marketable commodity that is in surplus with small and marginal producers, formation of producer collectives, value addition, capacity building for better post-harvest handling to ensure product quality and linkage with market channels.

The market facing PGs emerged from the very early stage producer groups like Joint Liability Groups (JLG) focusing more towards productivity enhancement and mutual sharing of best practices in farming. Value Chain Development initiatives were at a very nascent stage in the beginning and DAY NRLM has been promoting Producer Groups (PG) as informal groups with primary focus on reduction in transaction costs of small and marginal producers through economy of scale. The business model has been simpler with village level aggregation, cleaning and grading as the key activities taken up. The PGs mostly concentrated on local markets and dealt in perishable commodities like vegetables and fruits. Subsequently the need to promote large size Producer Enterprise (PE) has been realized and DAY NRLM has actively started promoting producer enterprises (PE) like Producer Company, Cooperative as formal legal entities.

	Producer Groups	Producer Enterprises
Nature of organization	Un-registered, informal entities who take up a common activity for backward and forward linkages	Registered entity (as cooperative, FPC etc.)

Nature of organization	Un-registered, informal entities who take up a common activity for backward and forward linkages	Registered entity (as cooperative, FPC etc.)
Key objective	Better price realization through reduction in costs (overheads) by aggregation, farm gate value addition (sorting, grading etc.), linkage to nearby large markets	Better price realization through value addition, market linkage, economies of scale, higher bargaining power etc.
Area of operation	Limited to a village or cluster of villages	Preferably large scale covering large areas except in NTFP / tribal areas or areas with niche products
Promoting organization	SRLM / CLF / GPLF	SRLM
Scale of operation	Low Village / cluster level activities	High Large scale entities covering large area with value addition, market linkage to big markets
Business Model	Simple business model with limited need for infrastructure and working capital	Robust model and taken up in a project mode

(b) **Farm mechanisation:** Farm mechanisation has been promoted to address the gap of timely availability of tools and implements for farm operations. Custom Hiring Centres (CHC) has been set up initially with small farm tools to address the issue and to reduce women's drudgery from the Community Investment Fund (CIF). In many states the CHC have received support from state agricultural departments in the form of grant and subsidy support for heavy farm machineries like power tillers, tractors, reapers and many such equipment.

(c) **Training architecture:** DAY NRLM strongly believes in capacity building of the rural producers to enable them adopt appropriate practices for better productivity and reduction in cost of farming. Training plays an important role and becomes more intense as the producers move up the value chain. Structured training modules have been developed and rolled out keeping in mind the productivity challenges and knowledge and technology gaps.The training modules are theme based and dynamic while updating takes place periodically keeping close watch on what are the requirements on ground. Training quality was ensured through engagement of development professionals having strong grassroots program implementation experience with demonstrated experience to provide training. Three tier training structure has been adopted under DAY NRLM. At national level there are 109 resource persons who primarily train the state level team (State Resource Persons-SRPs) who in turn train the Mahila Kisans (based on the technical importance) and community cadres of Sakhis/Mitra (*Krishi/Pashu/Van/Matsya*).Trained Sakhis/Mitras provide training to Mahila Kisans, take up on field demonstration and extend support by conducting Farmers Field Schools (FFS) like Krishi pathshala and pashu pathshala. Sakhis/Mitras are deployed through a service charge based model and they receive remuneration from project and farmers against services rendered, thus ensuring sustenance of the cadre.

Findings from MKSP evaluation

Third party evaluation of ongoing projects is being done at regular interval for MKSP projects and those evaluations have helped DAY NRLM to focus on the most effective components of the program for scaling up. So far, 50 projects have been evaluated by involvement of 10 National Resource Persons. On top of this in 2018 MKSP impact assessment was done by Nielsen. There are several green shoots; the households supported by the project have gained immensely in terms of knowledge transfer, adoption of new technology, reducing cultivation cost, increased food grains, and enhanced nutrition security. Key highlights of these studies are as follows:

(a) **MKSP** assessment by National Resource Person

i. **Mahila Kisan**: Mahila Kisans are now more confident and articulate, and also have a great sense of achievement;

ii. **Crop diversity**: Through Gharbari/Kitchen Gardens crop diversity have been established and it also takes care of household food and nutritional needs. Surplus production is also sold in the market;

ii. **Activity diversity**: Most components of MKSP have been grounded, widely adopted and practiced by the Mahila Kisans;

iv. **Livelihoods CRPs**: They are able to furnish all project information in time

v. **Future Scope**: The community processes started can further be nurtured to attain higher project goals

(b) **A C Nielsen impact assessment finding**

i. Training, Livelihood and income:

- Households with women who received training have higher average annual income from agriculture, animal husbandry and NTFP than HH in control
- Households with women farmers been trained under program report higher annual income from agriculture against control (1.3 times more)

ii. **Nutrition Security**: Dietary diversity was observed to be better in intervention villages

iii. **Agro-ecological practices**: Adoption of Agro Ecological Practices like land preparation, soil and plant nutrition management and plant protection were more in treatment villages (59%)

iv. **Sustainable Agriculture-Livestock**:

- Three major veterinary services received by the mahila kisans for the livestock under the program were medicines, vaccination and de-worming
- In treatment villages, income from livestock was more than control (2.5 times)

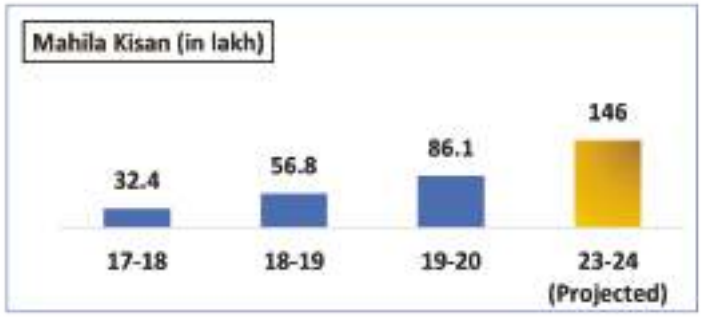
- Households involved in animal husbandry were much higher in treatment areas (73.5 %) as compared to control areas (64.6%)

v. **Livelihood basket…Diversity**:
   - 61% in treatment compared to 49% in control villages engaged in both agriculture and animal husbandry
   - In treatment villages majority of the household are having multiple sources of livelihood

vi. **NTFP (Non-Timber Forest Produce)**: Income from NTFP is more in treatment villages

Progress of Farm Livelihoods Interventions

Over last few years the MKSP model of integrated livelihoods promotion has taken deep roots in almost all the states, both under MKSP as well as under SRLM Annual Action Plan. The evaluation studies also show significant impact in terms of ensuring higher income by means of diversification of livelihoods and very high acceptability of the model with the women SHG members. The evaluations have also validated the MKSP strategy to give strong emphasis on provisioning of extension services at the doorsteps and promotion of agri nutri gardens for dietary diversity.



The number of Mahila Kisan has shown a very rapid progress over last three years and NRLM has set a goal to reach out to **146 Lakh Households by 2023-24,** mainly under Agro Ecological Practices. In addition, **by 2023-24 NRLM will support 26 lakh HH with livestock intervention and 3.5 Lakh HH with NTFP interventions.**

The community cadres have been an indispensable element of program delivery mechanism and community cadres in the form of Krishi Sakhi and Pashu Sakhi have played a critical role in reaching out to such a large number households with extension services 24x7. They conducted Krishi Pathshala and Pashu Pathshala to continuously build the capacity of the mahila kisans. **By 2023-24, their number is expected to cross 1.14 lakhs.**

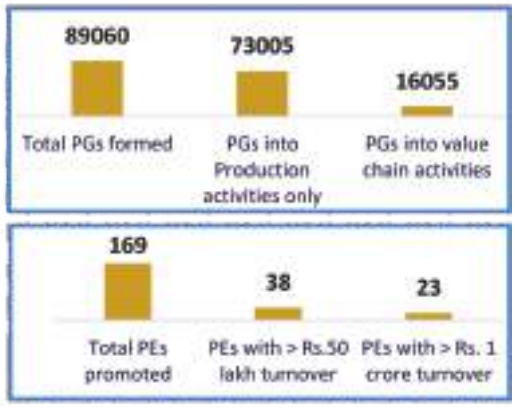
Similar progress has been observed in the number of custom hiring centres established and the households adopting agri nutri gardens.

Besides, quite a few replicable models have also emerged in various states like producer groups around goats in Rajasthan, Jharkhand, Maharshtra. Backyard poultry model in Bihar, Rajasthan; duckery in Jharkhand; piggery in Assam and Mizoram; and JLG model for collective farming on leased land in Kerala to name a few.

Value Chain Development

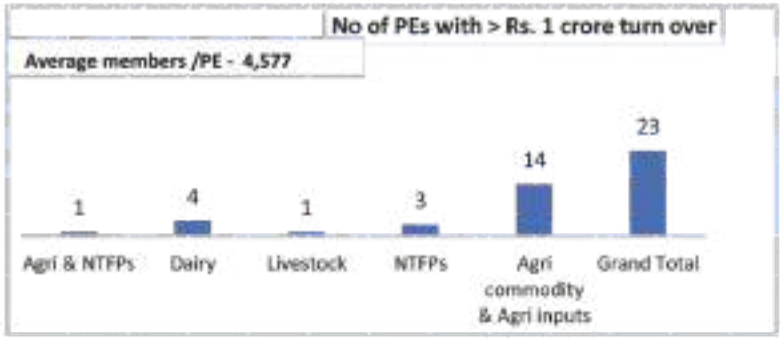
In value chain development, the progress has also been quite remarkable. Core strategy of DAY-NRLM in value chain development has been to initiate large-scale interventions and value addition through promotion of Producers' Enterprises (PE) which are all registered bodies, whereas, Producers' Groups (PG) are promoted to focus on village level aggregation and reduction in transaction costs with targeting of the local markets.

About 9 lakh mahila kisans have been mobilized into more than 89,000 Producer Groups (PG) under NRLM, out of which a little more than 16,000 PGs have now got into market linked value chain activities.



In a very short of period of time the producer enterprises have also gained momentum and 2.78 lakh mahila kisans are now members of 169 producer Enterprises (PE) as on June 2020. Majority of these PEs were promoted by SRLMs under their Annual Action Plans.

Quite a few of these PEs are doing brisk business and 23 of these PEs have been able to generate annual turnover of Rs 1 crore. The PEs promoted are now dealing in wide range of produce including milk, agriculture produce and Non Timber Forest Produce (NTFP).



Looking at the huge scope to promote PEs with women producers, NRLM in 2014-15, under its World Bank supported component, initiated to promote large size FPOs in a project mode where detailed project proposals are prepared by SRLMs and the project is financed for a period of 3 years. One of important aspect of PE promotional activity observed was the need to position quality professional manpower to manage the PE business. Under this initiative under World Bank component provision for Technical Support Agency (TSA) has been made to enable SRLMs to ensure good quality management of the PEs. NDDB Dairy Services is one of such TSAs that supported the Milk Producer Companies with SHG women as shareholders. With this initiative a good number of the PEs grew rapidly in three years' time.

The details of the PEs promoted in the project mode (Amount in lakh Rupees)

State	Name of PE	Commodity	No of members	Amount of Sales turnover (2017-18)	Amount of Sales turnover (2018-19)	Amount of Sales turnover (2019-20)	Amount of Paid up capital
Madhya Pradesh	Muktaa Mahila Milk Producer Company Ltd	Milk	6786	42.68	283.50	1,947.40	42.10
Madhya Pradesh	Maalav Mahila Milk Producer Company Ltd	Milk	9678	167.23	945.81	2,632.37	39.19
Madhya Pradesh	Sahariya Mahila Laghu Vanopaj Porducer Company Ltd.	NTFP	2860	25.86	100.00	36.96	4.29
Maharashtra	Yashwanti Farmer producer Company Ltd.	Paddy, Flower, Vegetable	566	-	40.74	47.50	5.66
Maharashtra	Akkarani Self Reliant Farmer Producer Company Ltd	Cereals,Pulses	505	-	0.48	-	3.03
Odisha	Devagiri Kisan Agro Products Producer Co .Ltd.	Cashew , Mango, Hill Broom	2389	3.26	128.71	7.34	1.00
Odisha	Koraput Agroproducts Producer Company Ltd	Cashew , Mango, Ginger	2156	25.81	40.80	2.00	1.00
Odisha	Dharatipenu Farmers Producer Company ltd.	Mango, Hill Broom, Pineapple	3537	1.66	115.12	137.00	5.00
Assam	Karbi Hills Mohila Farmers Producers Company Limited	Hill Broom, Maize	2162		79.27	33.35	1.00
Jharkhand	Sarayful Mahila Farmers Producer Company Ltd	Agri input (Seed, Fertilizer) agri commodity	1293	-	20.86	66.00	9.05
Jharkhand	Pakur Women Farmers Producer Company Ltd	Agri input (Seed, Fertilizer), agri commodity	972	-	1.51	9.50	3.00
Bihar	Kaushikee Mahila Milk Producer Company Limited	Milk	17223		118.00	1600.00	53.33

Road Ahead – A new approach to scale up

In the last few years, the farm livelihoods interventions have gained a strong momentum primarily driven by the SRLMs integrating the farm livelihoods interventions in their Annual Action Plan. The four pillars of NRLM farm Livelihoods interventions are:

- Agro Ecological Practices
- Livestock
- Non-Timber Forest Produce
- Value chain development

And they are all well entrenched in the farm livelihoods intervention strategy of DAY NRLM having high acceptability among mahila kisans. The building blocks for scaling up of these interventions e.g. community cadres, Farmer Field Schools, Pool of Resource Persons, convergence framework with various departments are being strengthened with vigor.

Despite that there exists a big opportunity in terms of penetration of the intensive blocks with livelihoods interventions and reaching out to SHG households with economic activities. As on July 2020, all SRLMs together have covered more than 6200 blocks as intensive blocks with institution building activities, whereas, the farm livelihoods intervention has been initiated in about 2600 Blocks. Similarly, more than 700 lakhs women have been brought into SHG fold, whereas, farm livelihoods interventions have been initiated with 86 lakh SHG member households.

The challenge is to bridge this gap quickly and in a timebound manner. That requires a strong strategic shift and bringing in an impetus to universalize livelihood interventions across all intensive blocks.
Another challenge is to channelize credit in the form of CIF and SHG Bank Linkages towards livelihood asset creation, which not only requires development of loan products but also making loan available for productive asset creation to individual SHG members especially those who are vulnerable, at an affordable rate keeping in view their ability to pay.

With the opportunities identified and challenges understood and also with a huge learning behind, DAY NRLM is developing an intervention approach that will simultaneously work on deepening the existing intervention in those areas where farm livelihoods initiatives are now 2-3 years old and also expand interventions in new Blocks where farm livelihoods interventions are yet to begin. The focus will also be more on small and marginal farmers and the landless to enable them diversify their livelihoods and having income from multiple sources.

DAY NRLM will focus more on small and marginal Mahila Kisans particularly in rainfed areas and the focus will be on promotion of diversified, multiple and sustainable livelihoods through household centric integrated approach comprising of agro-ecological practices, improved livestock rearing practices, gradual transition to organic farming along with certification and market linkage for better price realization of farm produces. In forest and forest fringe areas sustainable collection / cultivation of NTFP and its collective marketing will be an integral part of diversified livelihood promotion strategy. DAY NRLM will work on cropping systems in rainfed areas and will promote pulses and oilseeds as intercrops contributing not only to income increase but also to household food and nutrition security. And the CRP cadre will be further strengthened and they will be encouraged to become entrepreneurs.

NRLM will deepen the interventions and also strengthen its focus on income increase, increase in credit flow towards livelihood asset creation, value addition and better market linkages through collective enterprises. NRLM will bring renewed focus on cluster based integrated farming model and will give strong impetus on farm-based collective enterprise promotion. Convergence with other departments and Ministries will be one of the key strategies for leveraging resources.

NRLM intervention approach towards farm-based livelihoods will primarily be based on the following key strategies:

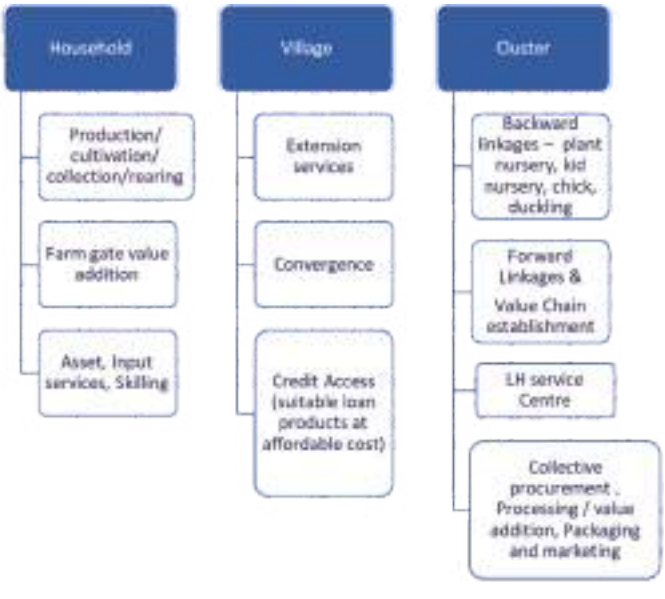
(a) Promotion of Integrated Farming Clusters
(b) Value Chain development through promotion of Producer Enterprises and Producer Groups
(c) Convergence and partnerships for resource optimization
(d) Promotion of technology including IT based solutions

(a) Promotion of Integrated farming Clusters

Poor have multiple livelihoods and an impetus will be brought on promotion of sustainable livelihoods through Cluster based Integrated Farming approach where a cluster comprising of 3-4 adjoining villages covering about 300-350 households, will be developed in the existing intervention areas on the principles of identifying opportunities for (i) improving, (ii) intensifying, (iii) expanding and (iv) integrating the existing Crop (field crops, horticulture, plantation etc.), Livestock (dairy, piggery, goat rearing, poultry, duck etc.), Pisciculture, Apiculture and various NTFP based livelihoods which complement each other. The interventions will not only be aiming at cost reduction, risk mitigation, improved production, productivity sustenance or enhancing the carrying capacity of ecosystem but focus will also be on interventions beyond production that includes farm gate value addition, local level secondary value addition and collective marketing of potential commodities and their value-added products through livelihood institution promotion. A strong market linked production and processing will be the hallmark of each cluster. Here, the emphasis will be on building a strong handholding and support architecture with domain specific CRPs at village level supported by a senior CRP at cluster level and a block level SRLM staff as anchor.

Integrated farming clusters logically would include many more activities that a family practice- "Expanding Family livelihood horizon" and developing local ecosystem support for households in cluster approach. Households would have option to choose different livelihoods as per resource base and societal specific modules. The integrated farming approach would largely benefit poor with a systematic effort to upgrade the natural resource base, land /soil, water, plantation/forest and with establishment of strong market system.

A schematic diagram for the approach



Fulfilling SDG mandate through IFC (Integrated Farming Cluster)

The integrated farming Cluster approach will not only help in addressing SDGs 1, 2 and 5 but will also help in addressing many more SDGs: good health and wellbeing (SDG 3), clean water and sanitation(SDG 6), decent work and economic growth (SDG 8) , responsible production and consumption (SDG 12) and climate action (SDG 13).

Value chain development and enterprise promotion under IFC

Value chain and enterprise promotion is an integral part of integrated farming systems, and not as standalone activity with few select commodities in selected clusters to enterprise with handful of commodity all across the project on thematic line (SA/Livestock/NTFP) in cluster mode. The enterprise may be for produced commodity and service centre enterprise (vegetable nursery, tasar grainage etc.), it may be owned by aspiring Mahila Kisan and/or FPO. Enterprise has potential to create local employment and revive local economy.

Probable list of enterprise: rice mill/dal mill/ vegetable sorting and grading-marketing/small outlets/ agri/livestock/tasar clinic, soil testing centres, vegetable nursery, small hatchery/ poultry brooding centre, milk collection centre and marketing.

(b) **Value Chain development through promotion of Producer Enterprises and Producer Groups**

There is an increased interest in value chain development as a means to enhance farmers' income. Now with the recent introduction of favourable policies and the scheme to promote 10,000 FPO introduced by MoA, the ecosystem for FPOs to grow and thrive is highly conducive. The recent ordinance on APMC Act freeing the farmers from the clutches of APMC will allow the farmers to freely sale their produce anywhere in the country. The Producer Enterprises will immensely benefit from this ordinance. Producer Companies always used to have a cost disadvantage. Procuring from the village has a big cost implication and over and above that they were liable to pay Mandi Tax. Together these two cost items were putting in PE in a disadvantaged position. Now they will expand very rapidly. DAY NRLM has, over the years, gained considerable experience in promotion of FPOs including large size Producer Enterprises which are registered entities and unregistered Producer Groups (PG) which are focused on local market systems and benefit through economy of scale and better bargaining power.

DAY NRLM will continue expanding the value chain development initiatives and will make this an integral part all livelihoods interventions. A dedicated not profit company named Foundation for Development of Rural Value Chains (FDRVC) has also been set up in collaboration with Tata Trusts to bring high quality management professionals having experiences in managing business in corporate environment. With this set up best management practices are being introduced in Producer Enterprises to bring higher efficiency and build strong market systems to ensure profitability and sustainability of the PEs. DAY NRLM will promote more such large size producer enterprises with woman farmers.

DAY NRLM will also have a strategy to promote more PG which will anyway be an essential component of Integrated Farming Cluster promotion. *Producer Groups* (PG's) though are the smallest but are a critical first mile component of a farm value chain. NRLM plans to seed multiple

initiatives to bring in a robust framework through new comprehensive guidelines to drive a clear pathway around PG formations, its good governance, business planning initiatives thereby incubating a "value chain thinking" to harness opportunities for near to farm and rural markets for multiple commodities. The other initiatives to include deployment of E-Learning modules integrated with Training Management System (TMS) investing substantially in training and capacity building of a managerial talent for producer group members for its overall operational sustainability. Deployment of user friendly small digital tools to manage their day to day business operations for producer group members is also planned for better monitoring and evaluation of its processes.

It is typically seen that until the producer groups move up the value chain the economy of price realizations in comparison to yield and margins are substantially lower unless a backward linkage with a dedicated PE/FPO as a sourcing point for producer groups exist or a sufficient scale of independent autonomy in business operations is achieved. To ensure that the price/volume realizations for producer groups remain consistent and increase substantially driving a linear income enhancement, local level value additions for farm produce is recommended. NRLM has signed multiple MoU's to converge inter-ministerial schemes in the recent past and as a bespoke strategy shall continue its focus to drive collaborative efficiency by converging its producer enterprise formation initiatives under new schemes or evolving opportunities presented by convergence. The focal convergence with multiple schemes with Ministry of Agriculture & Farmer Welfare (MoA&FW), Ministry of Food Processing Industries (MoFPI) as an example shall remain an endeavor to promote small women farmer led local value chain enterprises. These initiatives shall be around co-creating and driving strategies for low cost processing facilities with extensions for rural storage, grading, assaying, sorting and setting up of common facilitation centers (CFC's)/Common Service Centers (CSC's) for farm produce. It is envisaged that low cost micro agri produce-micro food processing units to sustain together interlinked with producer group formations shall incubate small women farmers led business enterprises for both farm and non-farm livelihoods. To enhance the access to markets, NRLM also intends to harmonize the various initiatives and deploy a standard package of practices for branding, packaging and marketing of these products as well. This shall also include robust institutional guidelines meeting standards of various regulatory and statutory requirements, certifications and traceability components for both farm and non-farm produce to equally compete with other products in the markets.

To ensure the local value add enterprises also exploit opportunities presented by digital commerce, NRLM shall continue to explore and plan initiatives around omni channel strategies for market penetration in addition to developing or in collaboration with partners, a complete online e-commerce initiatives for select farm and non-farm produce.

(c) Convergence and partnership

Inclusive and integrated farming ecosystem would require leveraging resources, both knowledge and financial, from different sources. Convergence with MGNREGA, Ministry of Agriculture, Ministry of Animal Husbandry and Fisheries, different missions (Horticulture/Apiary etc.), Ministry of Food Processing among others need to be explored. There are 32 different government departments which offer different support and services in rural livelihood landscape. Over the years as per demand DAY-NRLM (Farm Livelihood) has signed MOU with 3 different government departments and also developed partnership with a large number of technical support agencies and CSOs. This strategy to converge with various departments and partnering technical support agencies will be further expanded and deepened.

Convergence with government departments would ensure fund leveraging for large scale

implementation. There is need for conducting large scale training and capacity building of direct target families and staff. Partnership with reputed training institutions or CSOs may be explored.

Detailed framework for convergence is part of this document.

(d) Promotion of technology including IT based solutions

NRLM strategy has evolved from an early focus on productivity growth/subsistence augmentation to more market-linked livelihoods in the form of Producer Enterprises, Producer Groups and Value Chains development for small and marginal farmers. Emerging focus in India for digital technology-enablement of farmer-facing systems and opportunities for SHG platforms 1) Agricultural Advisory Services including agromet, soil health & agronomy and 2) areas are Market Linkages. NRLM is in the process of building integrated, long-term, systems-level approach to digital farmer services, utilizing digital technology to enhance these systems and support them with robust backend data systems and services.

This will be critical as we help SHG members access public investments DBT subsidy (PM-Kisan), Ag-Stack and access to women-friendly solutions. Government of India has announced a digital AgriStack, or "digital highway" for India as a key enabler for online marketplaces and "smart agriculture." The AgriStack is envisioned to be an interoperable data exchange with all States that includes core datasets, such as farmer profiles and weather data, on which private sector can build value-added services upon. NRLM has vast database on member side and unlocking data driven linkages with platforms like Agriculture Data Information Dashboard as a Service (ADIDAS) by DISYS Pvt Ltd, System Analysis & Integrated Design (SAID) by BCG, Weather data, Soil Health & Agronomy data etc.

Conclusion

DAY NRLM will bring enhanced focus towards livelihoods promotion and income enhancement for the rural poor. The large network of SHGs and their members may now actively be engaged in various livelihoods activities in farm and non-farm sectors in a more systematic manner. This will help them to access benefits of a large number of government schemes launched recently by various ministries.

Section 2: Convergence Opportunities

Scope for convergence with intra and inter-ministerial schemes

Context

Deendayal Antyodaya Yojana- National Rural Livelihood Mission (DAY-NRLM), a flagship programme of the Ministry of Rural Development (MoRD), Government of India has been focusing towards improvement of social status and economic capabilities of rural women through mobilizing them into women Self Help Groups (SHG), Village Organization and Cluster Level Federations (CLF). DAY NRLM has been working with these women SHG members to promote various livelihoods activities like Agro Ecological Practices in agriculture, improved livestock rearing and Non-Timber Forest Produce (NTFP) Collections and finally linking these small and marginal producers with market through value chain development. At present, DAY-NRLM has organized 7.14 Crore rural women into about 66 Lakh Self Help Groups (SHG) and its associated tiers across the country. More than 90 Lakh women are being supported under DAY NRLM through the above-mentioned livelihoods interventions and market linkages. More than 50 thousand trained SHG members are actively engaged in providing extensions services as Krishi Sakhi and Pashu Sakhi at the doorsteps of these SHG members. DAY NRLM has made substantial progress to empower the women in agriculture and helped them build their identity as 'Mahila Kisan'. DAY NRLM is also planning to promote integrated Farming Clusters, Producer Groups and Producer Enterprises with the SHG members. Many other Ministries are also working towards poverty alleviation and income generation for the poor. All these programs of various Ministries can work in a synergy, complement each other and build on each other's strength to have a multiplier effect. Over the years NRLM has built strength in outreach, strong implementation and capacity building architecture through professionals and community resource persons and has set a stage for convergence with other Ministries and create synergies at households of women farmers. Other ministries can now enhance the outreach of their respective programs by fully utilizing this network of 66 lakh SHGs spread across the entire country. And the number of SHGs will continue to grow till every poor household is covered.

In this context, after thorough examination of various schemes of relevant Ministries, two broad strategies for convergences emerge:

1. Strengthening HH level livelihood activities promoted by DAY-NRLM through (i) Asset augmentation (individual and common), (ii) Access to technology, (iii) Access to credit, (iv) Access to specific knowledge and skill and (v) Access to market

2. Inclusion of Mahila Kisan in the programs of other department in (I) Skilling and knowledge building (extension services), (II) Processing & Market linkage and (III) Complete end to end value chain projects.

Towards this direction, convergence efforts have been initiated with DAC&FW, DAHD, TRIFED and MGNREGA. Some of the concrete outcomes of these collaboration have been the setting up of Custom Hiring Centres (CHC) by SHGs in many states with support from respective state agriculture departments, instructions issued to states by DAC & FW to utilize the services of *Krishi Sakhi,* participation of SHG women in PM Van Dhan Yojana (PMVDY) under TRIFED among others.

To fully exploit the opportunities created and initiatives taken by DAY-NRLM for poverty eradication, doubling farmers' income, creation of more job opportunities in rural areas, a well spelt out strategy needs to be developed to make convergence happen at scale and happen seamlessly. An attempt has been made to outline some of convergence opportunities having very high potential to impact.

The following are the details on relevant schemes that can be useful for convergence with NRLM Farm livelihoods activities and SRLMs may also pursue with respective departments at state level to converge:

Ministry of Rural Development:

MGNREGA: Almost all livelihood assets including individual livelihood assets for the SHG women can be created through MGNREGS. All the SHG members are already participating in the Gram Sabha without fail due to the continuous facilitation taken up NRLM.

Creation / strengthening of individual livelihood asset base of SHG women can be done under MGNREGS which may include Farm pond, all Animal sheds, poultry shed, Compost pits, Agri-nutrition garden, Land development / terracing etc.

Through MGNREGS, creation / improvement of common village infrastructure may also be taken up, for example, sheds for CHCs/Tool banks, godowns for PG/PCs, sheds for Milk collection centers, storage units for Tasar intervention, plantations etc.

Initiatives taken so far with MGNREGA

- Joint letter issued from JS-RD and JS-MGNREGA on creatin of vermi / NADEP compost pit through MGNREGA on 3rd Aug 2016.
- Monitoring sheet was issued to SRLMs by the JS-RL on 06th Dec 2016 to track the progress of asset creation through MGNREGA.
- Letter was issued to all states by the Secretary, RD, GoI on deelopment of community infrastructure through MGNREGA for livelihood activities promoted under DAY-NRLM on 18th Dec 2017.
- Recently, an advisory issued to SRLMs by AS-RD on 1st June 2020 to converge with MGNREGA for creation of individual livelihood assets or SHG women through Individual Beneficiary Schemes (IBS) of MGNREGA.

Ministry of Agriculture, Co-operation and Farmers' Welfare:

Department of Agriculture Cooperation and Farmers Welfare (DAC&FW), Ministry of Agriculture and Framers Welfare has set an ambitious goal of 'oubling Farmers Income'and launched various programs to achieve the goal by addressing production and productivity challenges as well as to ensure market access to farmers to get remunerative prices for the farmers.

There is a strong complementarity between the programs of DAC & FW and DAY NRLM and a big opportunity to leverage on each other' strength by developing a comprehensive and convergent approach to address the rural poverty. The following schemes of MoA & FW has been identified with high convergence potential. For a large number of schemes of DAC &FW at least 30% of the budgetary allocation is set aside for women farmers and NRLM, with a strong outreach with women farmers by virtue of its program Mahila Kisan Sashaktikaran Pariyojana (MKSP), can explore convergence opportunities along with DAC&FW to benefit the women farmers.

Jaivik Krishi Protsahan Yojna (JKPY):
It is an Organic Agriculture Promotion Scheme under Ministry of Agriculture & Farmers Welfare, Department of Agriculture, Cooperation & Farmers Welfare. Duration of the scheme is five years from 2020-21 with a total allocation of Rs. 300 crore. Small farmer groups having 25-50 farmers can avail assistance for certification under National Program for Organic Production (NPOP). Under the scheme the farmers will get assistance of Rs. 1000 per ha per year for up to 5 years against certification fee

reimbursement. The scheme will also support in creation of marketing infrastructure for FPO/FPC in marketing of organic produces.

DAY NRLM is promoting organic farming with women farmers since 2018 and a convergence can be extremely beneficial for the SHG members to get support for organic farming.

National Centre for Organic Farming (NCOF):

This is a central sector scheme under Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India. Main objective is to promote organic farming in the country through technical capacity building of all the stakeholders including human resource development, transfer of technology, promotion and production of quality organic and biological inputs. National projects are being implemented by the National Centre of Organic Farming at Ghaziabad and its eight Regional Centres (for further details https://ncof.dacnet.nic.in). PGS certified organic produce has high marketability in Indian market and NCOF is the nodal agency for issuing the certificate. DAY NRLM and DAC&FW has initiated convergence process and now the Organic Local Groups promoted under NRLM will be listed separately as NCOF has included NRLM in their PGS portal as a scheme. This will help NRLM to see the progress of organic groups from the PGS portal.

Mission Organic Value Chain Development for NE region (MoVCD-NER):
It is a Central Sector Scheme and a sub-mission under National Mission for Sustainable Agriculture (NMSA), launched by the Ministry of Agriculture and Farmers Welfare for promotion of organic farming in all the northeastern states. The scheme aims at development of certified organic production in a value chain mode to link growers with consumers and to support the development of the entire value chain starting from inputs, seeds, certification, to the creation of facilities for collection, aggregation, processing, marketing and brand building initiative.

Scope for convergence: NRLM ad DAC & FW may explore more convergence opportunities in promotion of organic farming.

National Beekeeping and Honey Mission (NBHM):
It is a separate Mission carved out of National Horticulture Mission and started in 2020-21 with allocation of about Rs 500 cr.

Scope for convergence: There is a specific component of the mission 'Empowerment of Women through Beekeeping (EWB)' which focuses on women for bee keeping. The SRLMs may be considered as one of the implementing agencies especially for this component. This will help SHG women members to take up this economic activity with the support available from the mission.

National Horticulture Mission (NHM): Mission is for promotion of horticulture across the country.

Scope for convergence: SHG women can take up horticulture as an economic activity. Nursery infrastructure, compost pit, saplings of fruits can be made available to them from the mission. Besides there is a scope for assistance for horticulture mechanization and asset development like irrigation facility, polyhouse, skilling of farmers, subsidy for various equipment that can also be made available to SHG members.

Sub-Mission on Agricultural Mechanization (SMAM):
This scheme is for promotion of farm machineries. There are subsidies as well as loan facilities for establishing CHC by individual entrepreneur as well as SHG.

Krishi Vigyan Kendra (KVK):
These are operated under Department of Agriculture Research and Education (DARE), Ministry of Agriculture and Farmers'Welfare.

Scope for convergence: KVKs have proven capacity to train farmers with appropriate crop production technology and NRLM may utilize their services for:

- Inclusion of Mahila Kisan in training programs organized by KVKs.
- Dissemination of new technologies and seed varieties throughKrishi Sakhis.

National Initiative on Climate Resilient Agriculture (NICRA): his is also under DARE, Ministry of Agriculture and Farmers'Welfare.

Scope for convergence: DAY NRLM has been promoting Agro Ecological Practices with more 90 Lakh mahila kisans. Being small and marginal farmers, they are most vulnerable against climate change and NRLM promotes climate change resilient agriculture with these mahila kisans. Whereas, NICRA is the nodal agency for Climate Resilient Agriculture with high quality technical expertise. A convergence between NICRA and DAY NRLM can be extremely useful in training and capacity building of mahila kisans and Krishi sakhis on climate resilient agriculture practices. NICRA centres can also act as good immersion site for agricultural practices.

Financing facility under Agri-infrastructure Fund: This is a newly lunched scheme to create agricultural infrastructure in rural areas.

Scope for convergence: This scheme may be explored by SRLMs for creation of processing unit, ripening chamber, sorting grading unit, warehouse for PGs and PEs. Besides, SRLM may encourage explore possibilities to set up Organic input production unit, Bio-stimulus production unit, infra for precision agriculture with FPOs or with individual SHG members as entrepreneurs.

National Mission for Sustainable Agriculture (NMSA): Recently it has launched a scheme in entrepreneurship mode to promote Mini Digital Soil Testing Lab where 75% of the cost comes as subsidy from the scheme. BRLPS has converged for setting up of such units in Bihar.

Scope for convergence: SRLMs may explore possibilities to establish such soil testing facilities with PG, VO or SHG promoted under DAY-NRLM.

Initiatives taken by DAY-NRLM with DoAC&FW: The initiatives taken by DAY-NRLM to draw support from the schemes of MoA &FW are:

- A joint letter on convergence with various schemes / programmes / missions of Department of Agriculture, cooperation and Farmers Welfare under MoA &FW was issued to all states jointly sgned by the Secretary, RD and Secretary, DoAC&FW on 28th October 2015.
- A joint letter was issued to all states on convergence with Paramparagat Krishi Vikas Yojana (PKVY) by the Secretary, RD and the Secretary, DoAC&FW, GoI on 9th January 2018.
- A letter hs been issued to states by DAC&FW to utilize the services of Krishi Sakhi promoted under NRLM for awareness generation for soil testing. They have also advised the states that a monthly service charge of Rs 1000/- may be paid to the Krishi Sakhi for the rvice rendered.

Scope for convergence: DAY-NRLM and DAC&FW has converged in several states where the subsidy under this scheme has been made available to SHGs to set up CHC. This convergence initiative can be scaled up rapidly.

Small Farmers Agribusiness Consortium (SFAC):
SFAC is an exclusive Society focused on increasing incomes of small and marginal farmers through aggregation and development of agribusiness. SFAC has pioneered the formation and growth of Farmer Producer Organizations/Farmer Producer Companies, which is now being implemented across the length and breadth of the country. SFAC offers Schemes like Equity Grant and Credit Guarantee Fund Scheme to FPCs to improve availability of working capital and development of business activities. SFAC is also implementing the National Agriculture Market Electronic Trading (e-Nam) platform.

Scope for convergence: Under DAY-NRLM about 169 FPOs have been promoted out of which 119 are registered as Producer Company. These existing Producers Enterprises can also get support through this scheme.

National Mission on Agri extension & Technology (NMAET):
Areas of convergence:

- Support for Women Food security groups
- Representation of Women Farmers in decision making bodies
- Capacity building, skill development and support services to SHG wmen

National Mission on Oilseeds and Oil Palm (NMOOP): The scheme is for promotion of oil seed crops.

Scope for convergence: (a) establishment of Seed Gardens and (b) distribution of Pre Processing, processing and oil extraction equipment to SHGs

Integrated Scheme for Agri Marketing (ISAM):
ISAM is a Central Sector scheme (CS) and is in operation since 2018-19 (in restructured form). The scheme is being implemented throughout the country including Union Territories. The main components under the scheme are (i) Agricultural Marketing Infrastructure (AMI) (ii) Marketing Research Information Network (MRIN) (iii) Strengthening of Agmark Grading Facilities (SAGF). (iv) Agri-Business Development (ABD) (Venture Capital Assistance) (VCA) (v) Choudhary Charan Singh National Institute of Agricultural Marketing (NIAM).

Scope for convergence: SRLMs can leverage ISAM for support from State Agriculture Universities for improving market prospects of agriculture produce of SHG women. In addition storage Infrastructure can also be made available for the PGs and PEs promoted under DAY NRLM.

National Food Security Mission (NFSM):
Scope for convergence:
DAY NRLM works with Mahila Kisans, mostly in rainfed areas, and this scheme will be highly suitable to train them for cultivation of pulses, millets and oilseeds

- Field level demonstration on production technologies/inter cropping for rice / wheat / pulses with SHG members can be taken up with the support of this scheme.
- Cropping System Based Training for wheat, rice, pulses, millets may also be taken up with SHG

Ministry of Food Processing Industries:

The following are the potential schemes for convergence:
Pradhan Mantri Kisan SAMPADA Yojana: (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters): With an allocation of Rs. 6,000 crore, the scheme is implemented by Ministry of Food Processing Industries (MoFPI). It is a comprehensive package for creation of modern infrastructure with efficient supply chain management from farm gate to retail outlet.

Scope for convergence: The components for which convergence opportunities can be explored are:

1. Infrastructure for Agro-processing Clusters: Development of modern infrastructure and common facilities to link groups of producers/ farmers to the processors and markets through well-equipped supply chain with modern infrastructure

2. Creation of Backward and Forward Linkages: Provide backward and forward integration in supply chain in terms of availability of raw material and linkages with the market.

3. Operation Greens: Announced in Union Budget 2018-19 to promote Farmer Producers Organizations (FPOs #), agri-logistics, processing facilities and professional management.

Existing FPOs under NRLM can explore availing the support.
MoFPI has recently launched "PM Formalization of Micro Food Processing Enterprises' scheme. Under 'Support to food processing units' component of this scheme SHGs and FPOs are eligible. SRLMs may explore convergence opportunities from this scheme component.

Ministry of Animal Husbandry Dairying and Fisheries:

Department of Animal Husbandry (DAHD) under Ministry of Animal Husbandry Dairying and Fisheries has launched several schemes to support the livestock sector with the primary objectives to reduce animal mortality, breed improvement, animal productivity, fodder management etc. Even with a large number of veterinary doctors and paraprofessionals engaged, the task taken up by DAHD is very challenging especially when the positioning of qualified Veterinary doctors is not adequate

Initiatives taken by DAY-NRLM with Department of Animal husbandry, Dairying and Fisheries

- A MoU was signed between the Department of Rural Development and Department of Animal Husbandry, Dairying and Fisheries signed by the Secretary, Rural Development and the Secretary, DAHD on 21t March 2017 on convergence of various schemes of the two Ministries.
- A letter was issued to all states by the JS-RL following up on the above MoU on 1st may 2017.

- There is a convergence opportunity where ashu Sakhiscan be considered by the DAHD for ther vaccination and AI services. The list of ashu Sakhihas been submitted to the DAHD.

National Animal Disease Control Program: It is a very important scheme for preventive disease control through vaccination.
Scope for convergence: Pashu sakhi can be utilized for achieving the target of vaccination and ear tagging.

National program for dairy development:
This sub-scheme focuses on creating/strengthening infrastructure for production of quality milk, procurement, processing and marketing of milk and milk products by state implementing agencies i.e. State cooperative dairy federation.

Scope for convergence: Under NPDD, DAHD may ensure coverage of SHG members of NRLM during formation of Dairy Cooperative Societies.

Supporting Dairy Cooperatives and Farmers Producers Organization engaged in dairy activity (SDCFPO):
The sub scheme aims to support the dairy cooperative and Farmer Producer Organization by providing loan in form of working capital.

Scope for convergence: Support may be drawn for Farmers Producers Organization engaged in dairy activity (SDCFPO) promoted under NRLM.

Rashtriya Gokul Mission:
This sub scheme aims at development and conservation of indigenous breeds. The aim of the sub scheme is genetic upgradation of bovine population through delivery of quality breeding inputs at the doorstep of farmers.

Scope for convergence: Pashu sakhis may be trained and deployed for providing Artificial Insemination (AI) services.

PPR Eradication Programme:
The objective of PPR Eradication Programme (PPR-EP) is to cover all sheep and goats under vaccination with the sole objective of eradicating PPR by 2023-2024.

Scope for convergence: Pashu sakhi network promoted under DAY-NRLM may be utilized for achieving the target of vaccination. As majority of SHG women rear goats and sheep, SRLMs may seek convergence to ensure the vaccination of sheep and goats owned by SHG members.

CSF Control Programme:
The objective is to implement Classical Swine Fever Control Programme in all States/ UTs so as to cover the entire pig population under vaccination against Classical Swine Fever (CSF).

Scope for convergence: Pashu sakhi network promoted under DAY-NRLM may be utilized for achieving the target of vaccination. As majority of SHG women in north east region rear pig and SRLMs may seek convergence to ensure the vaccination of pigs owned by SHG members.

Mobile Veterinary Units (non-recurring expenditure):
It provides veterinary services at the farmers' doorstep through Mobile Veterinary Units (MVUs).

Scope for vaccination: SRLM may explore convergence possibilities to introduce such mobile units to deliver veterinary services to SHG members.

Sub-mission on Rural Poultry Entrepreneurship programme:
It has been conceptualized with the objective of bringing unorganized rural poultry farming sector into organized sector by promoting entrepreneurship through establishment of rural poultry hatchery for

production of free range poultry eggs and chicks and develop private entrepreneurs in the field of rural poultry in a sustainable manner.

Scope for convergence: SRLMs may explore opportunities to set up poultry units under this scheme.

Sub-mission on Livestock insurance, assistance for Research & Development and Extension and innovation:
The sub-mission has been aimed at extension, innovation, research and development and to incentivize the Livestock Insurance.

Scope for convergence: Under this Sub-mission, the services of Pashu sakhis may be utilized for insurance of livestock of SHG women.

PM Matsya Sampada Mission
The PMMSY is an umbrella scheme with two separate Components namely (a) Central Sector Scheme (CS) and (b) Centrally Sponsored Scheme (CSS). The Centrally Sponsored Scheme (CSS) Component is further segregated into Non-beneficiary oriented and beneficiary orientated subcomponents/activities under the following three broad heads: (i) Enhancement of Production and Productivity (ii) Infrastructure and Post-harvest Management (iii) Fisheries Management and Regulatory Framework.

Scope for convergence: The scheme may be explored for promotion of fishery based livelihoods and fishery based FPOs under DAY NRLM.

Ministry of Tribal Affairs:

Initiative taken by DAY-NRLM

- A joint communique is going to be issued for convergence with MoTA in (a) Gap funding through Article 275 (1), (b) PMVDY, (c) supporting PVTG and (d) marketing support.

- A MoU was signed between JS-RD and MD, TRIFED on 10th February 2018 for collaboration in implementation of the scheme `MSP for MFP' implemented by TRIFED. The JS, MoRD issued a letter to all SRLMs to implement the provisions of MoU on 12th March 2018.

Pradhan Mantri Van Dhan Yojana (PMVDY):
PMVDY is implemented by Tribal Cooperative Marketing Development Federation of India (TRIFED) under the Ministry of Tribal Affairs, Government of India. Main objective is training and capacity building of Minor Forest Produce (MFP) gatherers and encouraging their participation by organizing them around FPOs to improve their bargaining power.

Scope for convergence: Mahila Kisans involved in NTFP may be benefitted through the scheme.It is also involved in NTFP storage and processing infrastructure.

Programmes / Activities under Proviso to Article 275 (1) of the Constitution of India:
Gap funding for Tribal SHG members in augmentation of individual and common livelihood assets.

Scope for convergence: This is a gap funding scheme, through this scheme Tribal SHG member can get individual livelihood assets like cattle shed, farm pond, plantation, animals like goat, pigs etc.as well as common assets for benefit of tribal communities.

Challenges faced in convergences:

Despite various advisories and guidelines issued, the implementation of schemes in a convergence mode is yet to pick up speed. A comprehensive strategy may be developed to hasten convergence to happen in the ground at a faster and comprehensive way.

Some of the suggestive actions to take it forward:

To the take the convergence approach forward an intra and inter-Ministerial committee may be constituted at national, state, district and block level comprising of NRLM / SRLM and participating line departments / agencies implementing the scheme to plement the joint guidelines, advisories issued from the Ministries related to convergences

- Set targets for convergence on mutually agreed terms
- Facilitate convergence with specific state government schemes
- Its periodic meeting and follow up
- Resolve implementation bottlenecks
- Issue necessary joint advisories, guidelines, and communications
- Track and monitor the progress of convergent schemes / number of SHG members benefitted by the schemes

Section 3: Farm Livelihoods Models
models, economics, convergence opportunities.

1. Duck farming: a useful tool for socio-economic development in rural India

Introduction: Duck raising is a lucrative livestock industry in the world. At the same time, it is an income-generating occupation for the small, marginal and even for the landless for its egg, meat and feathers.

Duck eggs are relatively larger than chicken, and weigh about 4.5% of the duck's body weight. Duck has a higher red muscle fiber in its breast compared to chicken and is considered as red meat. It grows faster than chicken, is costly and is easy to rear. Duck farming is an essential component for the integrated farming system, such as:

- Duck keeping and paddy cultivation: Ducks feeds on insects, snails and stir soil surface. It benefits from paddy. At the same time, it gets nutritious feed from paddy field.

- Duck keeping combined with fish ponds: Ducks get the nutritious feed from the pond, and oxygenates pond water by swimming. Duck droppings also act as feed for the fishes.

Breeds of Ducks: In addition to non-descriptive breeds, ducks available in India are of three types, namely, egg type (Khaki Campbell and Indian Runner); meat type (White Pekin, Muscovy and Aylesbury) and ornamental (Crested white). Among the egg-laying breeds, Khaki Campbell is found to be the best (240 to 280 egg/bird/year with egg size of 65g to 75g) whereas White Pekin' is the most popular duck in the world, known for table purpose (attains about 2.2 to 2.5 Kg of body weight in 42 days, with FCR of 2.3 to 2.7).

Feeding: Between hatching and four weeks of age duckling feeds mostly on farm wastes like broken rice, rice bran, coconuts stem powder or similar products. Post hatching, it also feeds on insects, snails, kitchen waste, paddy grains and weeds in addition to foraging. Thus the cost of production is low.

Water for Ducks: Water for swimming is not essential at any stage of duck rearing. However, water in drinkers or water channels should be sufficiently deep enough so that a duck can immerse up to its eyes; otherwise, the eyes will get scaly and crusty, blindness may follow, and in some cases.

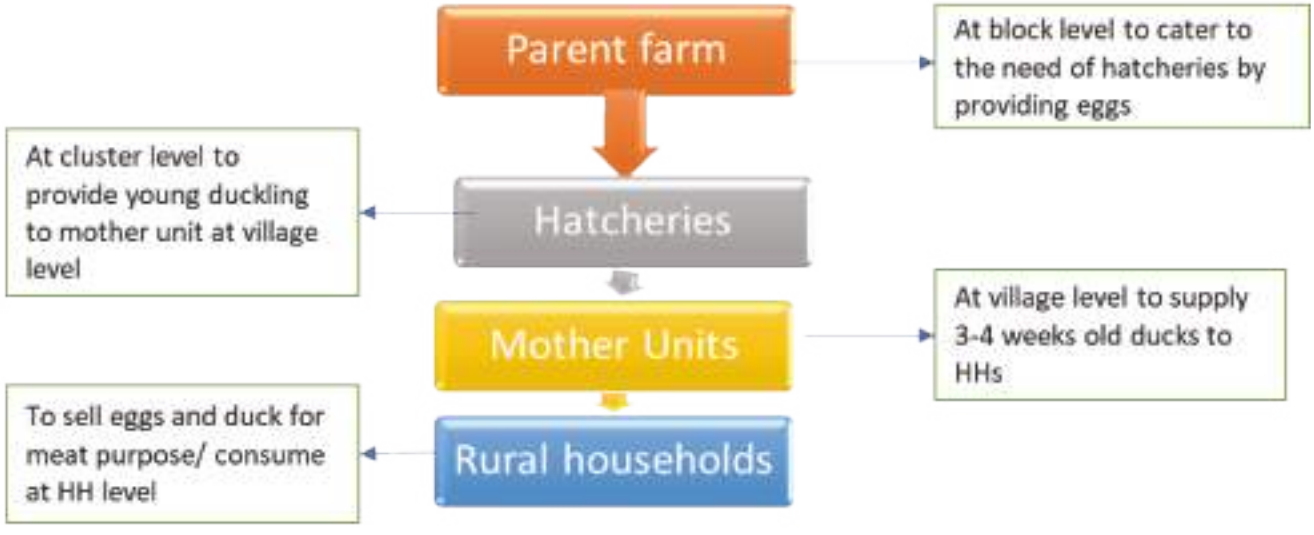
Space for Rearing: Under the intensive system, a floor space of 4 ft2 to 5 ft2 per duck is essential, whereas, in a semi-intensive system, a floor space of 3 ft2 in the night shelter and 10 ft2 to 15 ft2 as the outside run bird would be adequate.

Housing: Ducks do not require elaborate houses. The house should be well ventilated, dry and rat proof. The roof may be of shed type, gable or half-round. It may have solid or wire floors. Although, wire floors are not popular with breeders.

Brooding of Ducklings: Ducklings may be brooded on the wire floor and litter. Brooding period of layer ducklings is 3-4 weeks, which is 2-3 weeks for the meat type. In general, in the colder season, the brooding period may extend up to 1-2 weeks longer than the regular period. The ducks are allowed to swim in the water after the brooding period is over.

Breeding Management: The desirable sex ratio for excellent fertility and hatchability for ducks is 1:6 for intensive rearing and 1:15 to 1: -20 for an extensive rearing system. A comprehensive system of rearing of rural ducks, farmers keep a wide sex ratio of 1:20 to 1:25. However, they get reasonable good fertility of 70-80 percent.

A typical supply chain under backyard duck rearing system to be promoted under Integrated Farming Clusters:



The model can be explained as shown below:

LH services	Service area	Particulars	Possible Ownership
Parent farm	Block	At the parent farm, Drake and Duck are kept for supplying eggs to hatcheries.	An individual entrepreneur at the block level
Hatcheries	Cluster	At cluster level, hatcheries are units for supplying young ducklings to the mother unit	Producers Group at cluster level attached with LSC
Mother unit	Village	The existence of a small scale "mother unit" spread at the village level serves as a brooding unit where young ducklings are kept for 3-4	Individual entrepreneur / Pashu

LH services	Service area	Particulars	Possible Ownership
		weeks under good heat and light conditions and are appropriately fed and vaccinated. This is critical because after three weeks, the ducklings weigh around 250 grams and can live and thrive in the open range, scavenging rearing system	Sakhi

Risks mitigation (diseases and their control): Duck plague, Aflatoxicosis, Botulism, Aspergillosis, Colibacillosis, Ornithosis, Duck viral hepatitis, Duck cholera etc. Besides this, there are many Parasites, such as internal parasites (flukes, tapeworm, and roundworm) and external parasites (lice, mite ticks etc.). Regular vaccination with Ranikhet may reduce the mortality drastically.

Economics of raising backyard duck (Comparative statement of Khaki Campbell and desi variety): The economics of rearing 15 Khaki Campbell and 15 Desi birds has shown net earnings of about Rs. 6500 and Rs. 3500 respectively in a year. (Detail in Annexure 1) The economics of the mother unit, hatchery and parent farm is attached as Annexure-II, III and IV.

Conclusion: Duck farming in India is an emerging sector and can serve as a critical livelihood intervention if the supply of quality ducklings is ensured, farmers are appropriately trained, and disease prevention services become accessible. Duck farming can be promoted to a rural enterprise. The need of the hour is to industrialize the production system of duck in the same way as the chicken industry has revolutionized.

Annexure 1

Performance of Khaki Campbell and Desi duck under backyard system of rearing					
		Performance			
		Khaki Campbell		Desi	
s no	Traits	Male	female	Male	Female
1	Body weight in grams				
1a	Day old chick	36	31	28	25
1b	8 weeks	380	288	330	242
1c	20 weeks	1209	1176	1122	989
2	Age at first egg (days)		172		196
3	Mortality up to 10 weeks	6%	6%	4%	4%
4	Mortality after 20 weeks	12%	12%	7%	7%
5	Mortality after 21 weeks (Laying stage)	15%	15%	9%	9%
6	Average annual egg production		193		79
7	Egg color		Light brown		Light brown

Estimated Rearing cost of 15 Khaki Campbell and 15 Desi Ducks under backyard system			
		Cost of rearing (Rs)	
Sl	Particular	Khaki Camp bell (KC)	Desi
I	Variable cost		
1	Cost of a day old ducklings @ Rs. 21 for Khaki Campbell @ Rs. 16 for desi duck	315	240
2	Cost of feed up to 42 days of age		
2a	For Khaki Campbell ducklings 1.2 kg of standard starter ration/ducklings, i.e. 18 kg @ 30/ per kg	540	
2b	For desi ducklings 8 kg of broken rice, rice bran & wheat flour @ Rs. 15 kg		120
3	Cost of medicine, feed supplement @ Rs 3.2 for KC and Rs. 2 for Desi	48	30
4	Cost of labour @ 20 hrs/month= 2.5 mandays *18 months = 45 mandays * Rs. 150 /manday = Rs.6750	3,375	3,375
	Total variable cost	4,278	3,765
II	*Fixed Cost*		
1	Land	Available with the farmers	Available with the farmers
2	Low-cost duck shed made with locally available material	1,500	1500
3	Depreciation cost @ 33.33%	499.95	499.95
4	Drinker/Feeder	Locally made	Locally made
5	Total fixed cost	499.95	499.95
6	Total cost of production	5,278	4,765
7	Cost of production/bird	351.86	317.66

Estimated Return from Khaki Campbell and Desi Duck Rearing					
Sl no	Particulars	Khaki Campbell (n=15)	Amount(Rs.)	Desi (n=15)	Amount (Rs.)
1	Income from sale of eggs (from 7 no of Campbell & 8 no of desi ducks)	Average annual egg production 170 eggs/duck i.e. 1190 no of eggs @ Rs. 8 per eggs	9520	Average annual egg production 73 eggs/duck i.e. 584 no of eggs @ Rs. 10 per eggs	5,840
2	Sale of drakes (6 Cambell and 6 Desi)	Average wt 1.47 kg Total wt 8.82 kg @ Rs.110/kg	970.2	Average wt 1.29 kg Total wt 87.74 kg @ Rs.140/kg	1,083.6
3	Sale of spent ducks (7 no of Campbell & 8 desi)	Rs 100/duck	700	Rs. 115/duck	920
4	Total gross income		11190.2		7,843
5	Income per year (after depreciation)		5912		3,078.05

NB_ Assuming one mortality in desi and two in Campbell

Source:

(1) *https://www.pashudhanpraharee.com/modern-duck-farming-practices-in-india/#:~:text=Duck%20farming%20occupy%20an%20important,by%20about%2018%2D20%20g.*

(2) *https://www.indiaagronet.com/indiaagronet/poultry_management/CONTENTS/duck.html*

Annexure II

Business plan of Mother unit/ Hardening centre of Ducklings
Unit Size 2000 Birds

Sr. No.	Particulars	Unit description	Unit Cost	No. of Units	Total Cost
A.	Fixed cost				
1	New building construction	Sq Ft	300	667	200,000
2	Drinker, Feeder and other accessories	Lumpsum	180	40	7,200
	Total A				207,200
B.	Recurring cost				
1	Cost of day old ducklings	No.	35	2000	70,000
2	Feed Cost	Kg	32	600	19,200
3	Medicine etc.	Lumpsum	0.75	2000	1,500
4	Cost of In charge- Mother Unit	Per cycle/ Month	1	7000	7,000
5	Incentive to APS	per bird	5	1800	9,000
	Total B				106,700
C.	Other costs				
1	Depreciation on fixed cost	25% per annum			51,800
	Total C				51,800
D	Receipts				
1	Sale of 15 days old birds	Kg	65	1800	117,000
	Gross Receipts				117,000
	Gross profit per cycle (D-B)				10,300
	Gross profit for 1 year	9 cycle in year			92,700
	Net profit after deduction of depreciation				40,900

Source: Jharkhand SRLM

Annexure III

Economics of an Hatchery unit of Ducklings (24960 eggs)

Particulars		Unit	Year 1		
			No. of Units	Unit Cost (INR)	Value (INR)
Capital Expenditure					
	Hatchery unit with other machinery & accessories (2080 eggs)	Number	1	200,000	200,000
	2 KVA inverter with solar support	Number	1	150,000	150,000
	Platform & other establishment	Number	1	50,000	50,000
	Construction of Building for Hatchery (20X10 Sqft)	Number	200	1,000	200,000
	Total capital expenditure				600,000
Output (Revenue)					
	Sale of ducklings	Number	17,472	35.0	6,11,520
Total Revenue					6,11,520
Expenditure					
1. HR Costs					
	Hatchery Operator	Person months	12	7,000	84,000
	Hatchery assistant	Person months	12	4,000	48,000
2. Recurring Costs					
	Rent/ Maintenance	months	12	2,000	24,000
	Electricity	months	12	1,000	12,000
	Purchase of eggs	Number	24,960	12.0	2,99,520
	Transportation	Number	17,472	1.5	26,208
	Cartoon for packaging	Number	349	20.0	6,989
					-
Total recurring Costs					5,00,717
Gross Profit					1,10,803
Depreciation (machinery/equipment/tools)					60,000
Net Profit					50,803

Source : Jharkhand SRLM

References:

(1) https://www.hilarispublisher.com/open-access/duck-farming-fascinating-option-in-india-2157-7579.1000181.pdf\
(2) http://dadf.gov.in/sites/default/filess/20th%20Livestock%20census-2019%20All%20India%20Report.pdf
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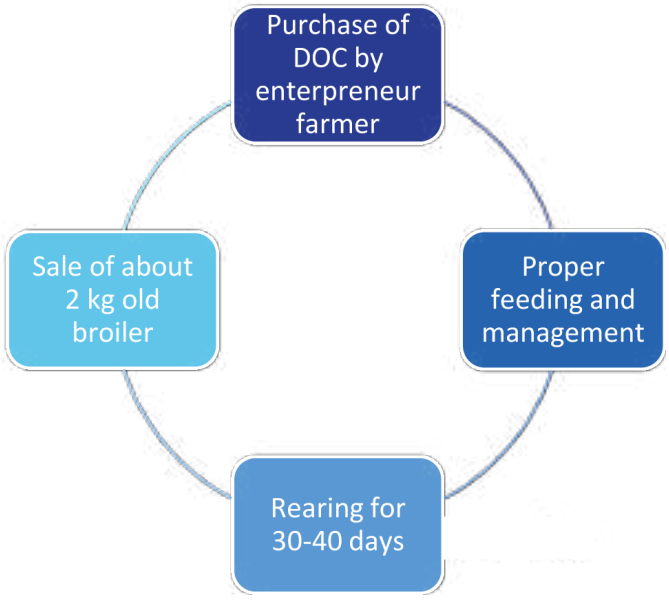
(11) Jharkhand SRLM

2. Small scale broiler under the intensive system for entrepreneurs

Introduction: Small scale broiler poultry farming is quite distinct from medium to large-scale commercial poultry farming, particularly in terms of investment, flock size and income. It is rarely the sole means of livelihood for a family. Still, it is one of the numbers of integrated and complementary farming activities contributing to the overall well-being of a household. The litters can be converted good manure, whereas agricultural producers can be converted into poultry feeds. It generates income from the sale of poultry birds, which provides a more flexible source of cash. Occasional consumption of chicken meat offers a valuable source of protein in the household diet. They are reared for the chicken meat alone and are slaughtered when they attain 6-8 weeks of age. There are genetically modified commercial broiler breeds available. These are modified genetically to produce meat rather than egg. Such breeds have increased meat production and a higher conversion rate. The chicken can be of either sex. Some examples of broiler chicken that are bred commercially are Hubbard, Cobb, Caribro, Avian, Krishibro, Varna, Vencobb, Hy-Cobb, etc.

Objective: The objectives of intensive small scale broiler farming may be either or both of (a) Income generation only or (b) Income and home consumption.



Intensive Systems: ntensive systems are used by medium to large-scale commercial enterprises, and are also used at the household level. Birds are totaly confined either in houses or cages. Capital outlay is higher, and the birds are dependent on their owners for all their requirements; production, however, is higher. Exotic birds, raised by industrial, commercial farms and integrators, are hybrid broiler or commercial broilers. There are three types of intensive systems:

- Deep litter system: Birds are entirely confined (with floor space allowance of 3 to 4 birds/m2 within a house, but can move around freely. The floor is covered with a deep litter (a 5 to 10 cm deep layer) of grain husks (maize or rice), straw, wood shavings or a similarly absorbent (but non-toxic) material. The fully enclosed system protects the birds from thieves and predators and is suitable for specially selected commercial breeds for egg or meat-producing poultry (layers, breeder flocks and broilers).

- Slatted floor system: Wire or wooden slatted floors are used instead of deep litter, which allows stocking rates to be increased to five birds/m2 of floor space. Birds have reduced contact with feces and are allowed some freedom of movement.

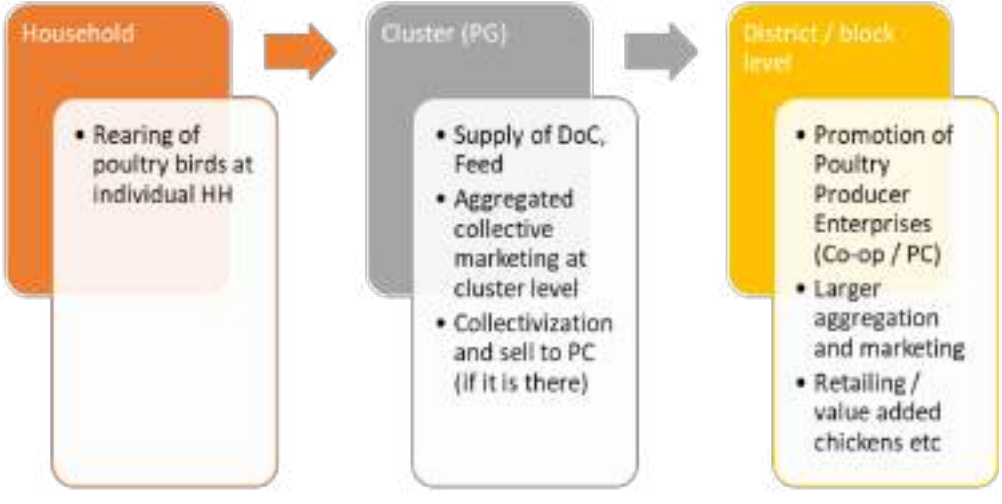
- Battery cage system: This is usually used for laying birds, which are kept throughout their productive life in cages. There is a high initial capital investment, and the system is mostly confined to large-scale commercial egg layer operations.

Small scale broiler under the intensive system for entrepreneurs: Small scale broiler farms represent good investment opportunities, with average returns definitely above 100 percent. In this system technical knowledge is also required for proper feeding, management of these birds. This intervention may be initiated through some entrepreneur farmers who are willing to invest and also have some risk-taking abilities.

Feeding: Food plays a significant role in poultry farming since the birds have a high conversion rate. For efficient poultry management on a commercial scale, feed management is an important aspect. The feed must be healthy in terms of nutrition, and it must contain adequate amounts of vital nutrients. An insufficient amount of nutrients would lead to poor performance in terms of productivity. Apart from the regular fats, proteins, carbohydrates, vitamins and minerals, they must also be provided with micronutrients in adequate amounts. In backyard broiler farming farm produces like maize, broken rice etc are used for preparation of feed supplemented by purchased feed.

Economics: The economic calculation of a 400 poultry bird batch size model has been discussed in Annexure 1 & 2, with assumption of 300 sq. ft area has been assumed for the calculations and 5% mortality for the chicks. It is found that a household can earn about Rs 83,000 per year in 6 batches.

Marketing: Access to a regular and assured market is of crucial importance for this model because only a constant flow of cash can ensure the profitability of "all-in all-out" poultry system.



Risks and its mitigation: Production, financial, marketing, technological and human risks are the primary sources of risks encountered by the poultry farmers. Disease outbreak, high cost of medication and vaccines, insufficient funds, the lack of quality feed and fragility of poultry products are some of the risk situations in small scale broiler farming. Risk management practices among the farmers are enterprise diversification, marketing and production strategies. For disease control, the focus should be on timely vaccination and hygienic practices through proper training and capacity building.

Convergence opportunities:

Purpose	Extend support through the Program / Scheme	Benefits and targeted segment
Promotion of mother unit, hatchery and parent farm for poultry	Sub-Mission on rural poultry entrepreneurship program	Support the identified PGs/SHGs/Mahila Kisan /CRPs identified by SRLM for the program. Under this scheme, the beneficiary is entitled to the 50 % subsidy of the project cost
Meat Processing	Animal Husbandry Infrastructure Development Fund	Under this activity, private companies, individual private entrepreneurs, FPOs, Section 8 companies, can take 90% loan from the scheduled bank for the establishment of small, medium, large integrated mechanized meat processing plant for sheep, goat, pig and poultry for hygienic handling, establishment of value addition chain for the manufacturing of meat products, transportation of meat through cold chain establishment. The Central Government will provide interest subvention up to 3% (including 0.6% of the corpus handling and risk management charge of the market borrower). The beneficiary will get a two-year moratorium during which the recipient not to re-pay any loan amount. The entire loan amount needs to be paid within five years after the moratorium period.

Reference:
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2. Jharkhand SRLM
3. Maharashtra SRLM

Annexure 1 : Assumptions for Economics

Assumptions:	
Size of the batch	400 birds
The period for raising birds:	45 days raising period and seven days maintenance
Bird mortality rate	5%
Thus the size of the batch	380
Cost of 1-day broiler chicken	Rs. 20
Average cost of chicken feed	Rs. 32/kg
Cost of feed and waterer per bird	Rs 30/bird
Feed required by the chicken to attain 2 kg weight	3.5 kg
Batch of chicken produced in one year	6
Batch sold in one year	6
The weight of the bird when mature (Kg)	2
Age of chicken when sold	40 days
The sale price of live broiler	Rs. 90/kg
The space required by a single bird	1 sq ft.
The cost of construction of house for birds	Rs. 300 per sq ft.

Annexure 2: Cost Estimates (400 bird batch size)

One Time Investment

Particulars	Amount (Rs)
Cost of shed for 400 birds	120,000
Cos of feeder equipment	12,000
Cost of installing lights	6,000
Total Investment	1,38,000

Recurring expenses per year (6 cysles per year)

Particulars	Amount (Rs)
Total DOC 2400 @ Rs 20 / DoC	48,000
Feeding cost	255,360
Other expenses including labour, medicine etc	24,000
Total variable cost (A)	327,360

Incomes per year (6 cycles / year)

Particulars	Amount (Rs)
Total chicken sold (Kg)	4560
Sale value	410,400
Total Revenue (B)	410,400
Total earnings/income / year (B-A)	83,040

Source : Jharkhand

3. Pig rearing for smallholders Securing livelihoods: enhancing food security and nutrition

Significance of pig farming: Intending to enhance the incomes of farmers, it is essential to facilitate capital accumulation under the livestock rearing sector. One of the significant challenges faced in India is to ensure food and nutritional security in a fast-growing population. One of the options is to have an integrated approach to livestock farming.

Piggery is one of the most potent sources of animal protein production as they are more efficient feed to meat converters after the broiler poultry. Apart from providing meat, it is also a source of bristles and manure. Pig farming has the potential to provide regular employment opportunities to rural farmers along with additional income, thereby improving their living standards.

The advantages of pig farming are:

1. Pigs have the highest feed conversion efficiency, i.e. they gain more weight from the same amount of feed than any other meat-producing animals.

2. They can utilize a wide variety of feed viz. Grains, forages, damaged feeds, and kitchen waste and convert it into valuable nutritious meat. Generally, pigs are given concentrated feed with other locally available ago by-products, tuber crops like sweet potato, tapioca, vegetables and kitchen waste.

3. They are prolific breeders with a shorter gestation period. A sow can be bred as early at the age of eight to nine months and can farrow twice a year (about six to 12 piglets in each farrowing).

4. Pig rearing requires a small investment in buildings and equipment.

5. Pigs are known for their meat yield, and the dressing meat ranges from 65%-80% compared to other livestock species (may not exceed 65%).

6. Pork is one of the most nutritious meats with high fat and low water content and has got better energy value compared to other meats. It is rich in vitamins like Thiamine, Niacin and Riboflavin.

7. Pig manure is widely used as fertilizer for agriculture farms and fish ponds.

8. Pigs store fat rapidly for which there is an increasing demand from poultry feed, soap, paints and other chemical industries.

9. Pig farming provides quick returns since the marketable weight of fatteners can be achieved within a period of six to eight months.

10. There is good demand from domestic as well as export markets for pig products such as pork, bacon, ham, sausages, and lard, among others.

Scope for pig farming and its contribution to the national economy

The majority of the pig population in India is of indigenous breeds (~76%) though the population of crossbred and exotic pigs increased by 12.7% from the year 2003 to 2012. The exotic breeds mainly comprise of Hampshire, Large White York Shire, Duroc, Landrace, and Tamworth. The popular indigenous pig breeds include Ghungroo, Niang Megha, Ankamali, Agonda Goan and Tany-Vo. The indigenous breeds are small-sized, slow-growing, produce a small number of litters and have low-quality pork. The average meat yield of indigenous breeds is around 35 kg/animal, which is quite low in comparison to the world average of approximately 78 kg/animal. India imports exotic pigs and crossbred animals to augment the piggery production and overcome the poor performance of indigenous pig production. Research institutes also developed different crossbred pigs by crossing local pigs with exotic breeds to produce animals of significantly higher productivity and better characteristics.

The eastern and north-eastern regions of the country comprise around 63% of the pig population. The highest pig population is in the state of Assam (16. 3 lakh), followed by Uttar Pradesh (13.3 lakh), Jharkhand (9.6 lakh), Bihar and West Bengal (6.5 lakh each).

The per capita pork consumption in India is negligible, while the main pork consuming states, mainly are concentrated in the north-eastern region (Assam, Nagaland, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, and Tripura). Other Indian states with high pork consumption include Bihar, Jharkhand, West Bengal, Goa and Kerala

Risk Factors

The significant challenges that affect the growth of the piggery sector include

(a) Lack of sufficient breeder farms,

(b) Inadequate feed and fodder resources,

(c) Lack of preparedness to tackle diseases like classical swine fever, porcine reproductive and respiratory syndrome (PRRS), and porcine rotavirus,

(d) Limited availability of vaccines,

(e) and insufficient slaughter and processing facilities across the country.

The pig farming constitutes the livelihood of rural poor belonging to the lowest socioeconomic strata, and they have no means to undertake scientific pig farming with improved foundation stock, proper housing, feeding and management. Therefore, suitable schemes to popularize the scientific pig breeding cum rearing of meat-producing animals with adequate financial provisions are necessary to modernize the Indian pig industry and to improve the productivity of small-sized rural pig farms.

Package of management practices recommended for commercial pig farming

Modern and well-established scientific principles, practices and skills should be used to obtain maximum economic benefits from pig farming. Some of the major norms and recommended practices are given hereunder:

Housing management

i. Construct shed on dry and properly raised ground.
ii. Avoid water-logging, marshy and heavy rainfall areas.
iii. The sidewalls of the sheds should be four to five feet high, and the remaining height should be fitted with GI pipes or wooden poles.
iv. The walls should be plastered to make them damp proof.
v. The roof should be at least eight to ten feet high.
vi. The pigsties should be well ventilated.
vii. The floor should be pucca/hard, even, non-slippery, impervious, well sloped (3 cm per metre) and properly drained to remain dry and clean.
viii. A feed trough space of 6-12 inches per pig should be provided.
ix. The corners of feed troughs, drains and walls should be rounded for easy cleaning.
x. Provide adequate open space for each animal, i.e. double the covered area
xi. Provide proper shed and fresh drinking water in summer.
xii. Dispose of dung and urine properly.
xiii. Individual pens for boars/lactating sows should be constructed.
xiv. The dry sows/fatteners can be housed in group pens.
xv. Give adequate space for the animals.

Selection of breeding stock

i. Immediately after the release of the loan, purchase the stock from a reliable breeder or the nearest livestock market.
ii. For commercial pig farming, upgraded/crossbred or exotic stock in good health should be selected.
iii. While selecting a gilt or sow primary aim should be to secure a female that will produce a sizeable survivable litter and which can attain marketable weight at the age of six months or less. This can be done with the help of pedigree records/Veterinarian / Bank's technical officer.
iv. Purchase animals that are ready to be bred.
v. Identify the newly purchased animal by giving a suitable identification mark (ear notching or tattooing).
vi. Vaccinate the newly purchased animals against diseases.
vii. Keep the newly purchased animal under observations for about two weeks and then mix with the other animals.
viii. Purchase a minimum economic unit, as suggested.
ix. Purchase animals in two batches at an interval of three months.
x. Follow judicious culling and replacement of animals in a herd.
xi. Cull the old animals after four to five farrowing.

Feeding management

i. Provide animals with quality feed and fodder.
ii. Give adequate concentrates in the ration.
iii. Provide adequate vitamins and minerals.

iv. Provide adequate clean water.
v. Give adequate exercise to the animals.
vi. The feeding of the piglets is more critical, and high quality and more fortified diets are needed for feeding them.
vii. Feeding of the sows during pregnancy is of utmost importance for increased litter size.
viii. The feed requirements of lactating sow vary with the size of the litter, weight, size and age of sow.
ix. Commercial pig farming should aim at the exploitation of non-conventional feed resources viz., waste from the Kitchen / hotel/ cold storage/warehouses, in replacing the balanced rations to minimize the cost of production.
x. The feeding regime adopted should take care of all the nutrient requirements of various categories of pigs.

Protection against Diseases

i. Be on the alert for signs of illness such as reduced feed intake, fever, abnormal discharge or unusual behaviour.
ii. Consult the nearest veterinary aid centre for help if an illness is suspected.
iii. Protect animals against common diseases.
iv. In case of an outbreak of contagious diseases, immediately segregate the sick and the healthy animals and take necessary disease control measures.
v. Deworm the animals regularly.
vi. Examine the faeces of adult animals to detect eggs of internal parasites and treat the animals with suitable drugs.
vii. Wash the animals from time to time to promote sanitation.
viii. Strictly follow the recommended vaccine schedule.

Breeding care

i. Pigs are highly prolific and give two farrowing in a year should be planned by adopting optimal management conditions
ii. For every ten sows, one boar must be maintained for maximum fertility.
iii. Breed the animals when it is in a peak heat period (i.e. 12 to 24 hours of heat).

Care during Pregnancy

Give special attention to pregnant sows one week before farrowing by providing adequate space, feed, water, etc. The sows, as well as farrowing pens, should be disinfected 3-4 days before the expected date of farrowing, and the sows should be placed in the farrowing enclosure after bedding it properly.

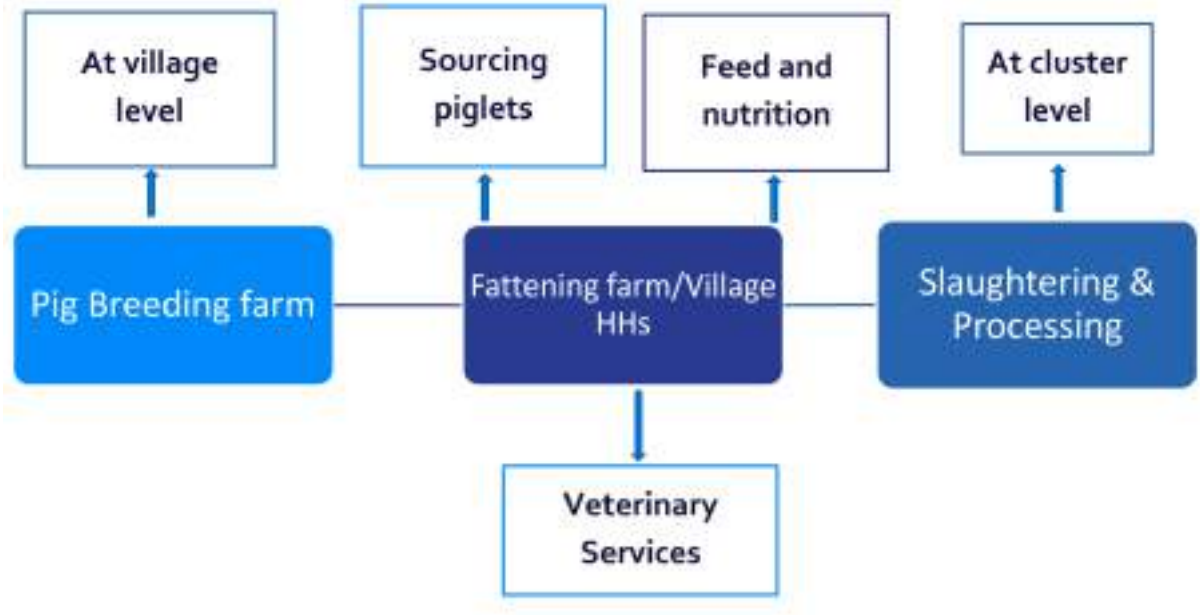
Care of Piglets

i. Take care of newborn piglets by providing guard rails.
ii. Treat/disinfect the navel cord with a tincture of iodine as soon as it is cut with a sharp knife.
iii. Feed on mother's milk for the first 6-8 weeks along with creep feed.
iv. Protect the piglets against extreme weather conditions, particularly during the first two months.
v. Needle teeth should be clipped shortly after birth.
vi. Vaccinate the piglets as per the recommended vaccination schedule.
vii. Supplementation of Iron to prevent piglet anaemia is necessary.
viii. The piglets meant for sale as breeder stock must be appropriately reared.
ix. Male piglets not selected for breeding should be castrated, preferably at the age of 3-4 weeks, which will prevent the boar odour in the cooked meat; thus, it enables the production of quality meat.
x. Additional feed requirements of lactating sow must be ensured for proper nursing of all the piglets born.

Marketing

The marketable products of the pig farms include the piglets as breeding stock, piglets as fatteners, marketable fatteners and culls. The marketing avenues for the above products are like satellite fattening farms/breeding cum rearing farms and pork consumption centres. To promote the consumption of pork, it should be supplied to the consumers in an attractive form. Therefore, the availability of slaughtering facilities has to be ensured to convert the fatteners into wholesome pork and their products. The sale of piglets at 2-3 months of age will yield quick returns and enables the pig farmer to concentrate their efforts on maximizing the productivity of breeder stock. The other marketing strategy can be rearing of piglets up to marketing age for their sale as fatteners. These pigs can then be sold to the slaughterhouse for further processing. Based on the market demand appropriate marketing strategy must be adopted in consultation with the local animal husbandry department officials.

Proposed Model



Pig breeding farm

The marketable products of the pig farms include the piglets as breeding stock, piglets as fatteners, marketable fatteners and culls. The marketing avenues for the above products are like satellite fattening farms / breeding cum rearing farms and pork consumption centres. To promote the consumption of pork, it should be supplied to the consumers in an attractive form. The sale of piglets at 2-3 months of age will yield quick returns and enables the pig farmer to concentrate their efforts on maximizing the productivity of breeder stock. Pashu Sakhi trained in the purpose of breeding the pigs can be promoted as a breeder. Generally, one male and three females are used for initiating the pig breeding farm. The cost economics of the same is given below:

Some of the suggestive actions to take it forward:

Particulars of expense	Unit	Unit cost	Total	Remarks	Return	Unit	Total	Remarks
Unit Size	3+1				One farrowing only with litter size 7	7		
Unit cost			20,000		Total piglet produced 7X3	21		
Fixed cost								
Space requirements	500 sq. ft				Sale of piglet with average weight 10 kg @ Rs. 3,000 per piglet	3,000	63,000	
Construction cost @ Rs. 250 per square ft			1,25,000	Total space required 500 sq. ft	Income during 1st year	16,200		
Variable cost								
Concentrate requirement: 12 qt (1st year)	12 qt.	Rs. 3,000/qt	36,000	Feed: 75% concentrate+25 % agricultural by-product	Total piglets produced: 3x8x2 = 48 piglets per year from 2nd year	Rs. 3,000/ piglet	1,44,000	Two farrowing per year with 8 piglets per farrowing per sow
Actual concentrate requirement (75%) from 2nd year= 30 qt	30 qt	Rs. 3000/qt	90,000		Income from piglet's sale = Return- contingency cost =	42,200		From 2nd year onwards
Other agriculture by-product constituting rest 25%			10,000					
Insurance cost: 5% of stock cost= Rs. 1000/year			1,000					
Medicine, labour and vaccine cost: Rs. 200 per pig			800					

Value of Breeding stock in hand: 3 sow and 1 boar @ Rs.15,000 each= Rs.60,000 If we adopt 50 % concentrate feed the income will increase to 1.5 times approx.

Source:

http://agritech.tnau.ac.in/banking/nabard_pdf/Animal%20husbandry/2.Pig_Farming.pdf

Fattening Farms

The piglets received from the pig breeding farm should be provided feed and nutrition and household level for fattening purposes and then sold at the slaughterhouse for further processing.

Economic benefit /Household:	Unit (Rs.)
Cost /piglet	2,000
Cost of feed/pig/year	1,500
Labour cost/year	500
Treatment cost/pig/year	150
Transportation cost/pig/year	50
Miscellaneous expenses	150
Total cost of production	4,350
Sales price / pig	8,500
Economic benefit	4,150

Source: https://www.agrifarming.in/pig-farming-project-report-cost-profit-guide

Slaughter and meat processing

Slaughterhouse and meat processing unit may be set up at cluster level in convergence with Animal husbandry department scheme (Animal Husbandry Infrastructure Development Fund) for value addition to the pig value chain post their fattening at the household level.

Challenges

The main Challenges of Swine Production in India are summarised as follows:

I. Absence of a sufficient number of breeder farmers throughout the country is a major constraint, leading to lesser availability of quality pigs for fattener farmers and market.

II. The tendency of the pig grower to raise pigs to marketable age of zero to negligible inputs and lesser preference of the consumers for pork from the local pigs etc.

III. Religious taboos attached to pork consumption is also a weakness for which marketing of pork has to be confined to a select group.

IV. Over 20% of the pigs kept in India are crossed with exotic breeds, but with a large amount of inbreeding because of non-systematic breeding and selection.

Convergence:

Purpose	Program/Scheme	An initiative that can be taken
Promotion of pig breeders	Sub-mission on piggery breed improvement and entrepreneurship development	Setting up of the Pig breeding farm
Livestock vaccination	CSF Control Programme	Vaccination of Pigs
Meat processing	Animal husbandry Infrastructure Fund	Setting up of a slaughterhouse and meat processing plant

References:

1. https://www.agrifarming.in/pig-farming-project-report-cost-profit-guide

2. http://agritech.tnau.ac.in/banking/nabard_pdf/Animal%20husbandry/2.Pig_Farming.pdf

3. http://dahd.nic.in/sites/default/filess/NAP%200n%20Pig%20.pdf

4. Birsa agriculture university, Ranchi

4. Goat rearing

Goats are known as 'poor man's cow. Goats contribute to the livelihoods of millions of rural poor. Small and marginal farmers as well as landless, particularly women, are increasingly relying on goat keeping for their socio-economic upliftment. Goat is well integrated into the farming systems of the small and marginal farmers due to low capital requirement, secure handling and ability to adapt to versatile environmental conditions. For the small and marginal farmers, including landless agricultural labourers, the goat is an ideal animal species for farming, particularly in rainfed regions where crop production is uncertain, and rearing large ruminants is difficult because of acute feed and fodder scarcity. Goat rearing has distinct economic and managerial advantages over other livestock species because of its less initial investment requirement, low input requirement, higher prolificacy, early sexual maturity and ease in selling without a price fluctuation, unlike the poultry industry. Goats can efficiently survive on available shrubs and trees in an unfavourable environment.

Region-wise distribution of goat breeds in India

Region	States	Breeds
North Temperate Region	Jammu & Kashmir, Ladakh, Himachal Pradesh, hilly region of Uttarakhand and Uttar Pradesh	Chegu, Changthangi, Gaddi and Kashmiri Pashmina
North-west and semi-arid region	Rajasthan, Haryana, Punjab, plains of Uttar Pradesh, Madhya Pradesh and Chhattisgarh	Sirohi, Jhakrana, Beetal, Barbari, Jamunapari, Surti, Zalawadi, Marwari, and Kutchi
Southern Peninsular region	Andhra Pradesh, Karnataka, Tamil Nadu, Telangana, Goa, Puducherry, Kerala, Maharashtra and other central parts of India.	Osmanabadi, Sangamneri, Malabari, Kannaiadu
Eastern and North Eastern region	Bihar, Jharkhand, Odisha, West Bengal, Sikkim and NE states	Black Bengal, Assam hills, and Gunjam etc.

Goat production system

1. **Tethering:** This is common in the sub-humid and humid zones, where probably because of intensive cropping, it is a convenient means of rearing goats from the standpoint of control, minimum labour input and utilization of feed in situ. It is thus a sedentary system. A variation of this method is combining tethering with grazing up to 5 goats at a time, led by ropes held by women.
2. **Extensive production:** This involves the low carrying capacity in situations where land is marginal and is plentiful. It is characterized by low rainfall and various browse plants.

The system is used by nomadic people, usually in shallow rainfall areas or during winter months, when crop residues available.

3. **Intensive production:** The goats are fed in confinement with limited access to land. It involves high labour and cash inputs. Cultivated grasses and agro-industrial by-products are fed in situ. This system also has the advantage of allowing control over the animals.

4. **Semi-intensive production:** This system is practiced to some degree in most of the situations, but the nature and extent of integration depend on the type of crops grown and their suitability to goats. The advantages of this system increase the fertility of land via the return of dung and urine, control of waste herbage growth, reduced fertilizer usage, easier crop management and better yield.

Management practices:

a. **Housing:** The goat house should always be protected from the hot and cold wind, humidity, direct solar radiation, rain and predators. The house should have an east-west orientation.

A goat shed should be at elevated land and away from the marshy area. The house should be well ventilated. The buck should be provided individuall space of 2.4 X 1.8 sq. mt. Group housing for Does may be provided with at least 1.8 X1.8 sq. mt. area/doe, and for ten kids and area of 1.8X1.8 sq. mt. is sufficient. Elevated wooden or concrete floor with 1.2 m side wall and bamboo netting may be provided for good ventilation and direct sunlight. The sick animal should be housed separated with a space of 3 X3 sq. mt.

b. **Feeding:** Goats have fastidious eating and browsing habits. They can thrive on feed, including those avoided by other livestock. They can even withstand the bitter taste than other animals. This is the reason for their survival in all-weather conditions across India. Due to prehensile tongue and mobile upper lip, the goat can graze on very short grasses and can also browse on trees, shrubs and bushes. At least 2/3rd of their energy comes from the roughages, and at least half of these roughages should be leguminous fodder. The remaining 1/3rd is from concentrate, which should 14-16% protein and other essential minerals. On average, a goat can consume 5-7 kg of green fodder per day. Some critical points in goat feeding:

i. Immediately after birth kid should be given colostrum
ii. Up to 2 months, kids should be provided does milk @1/10th of their body weight
iii. For growers, concentrate ration should be given @ 100 gm per day. For an adult, it should be around 250 gm
iv. Before giving birth, a pregnant doe must be given concentrate @ 250 gm, and before 7-10 days of parturition, the concentrate should be reduced, and fodder increased for easy delivery
v. Goat can consume up to 1 litre of water per day.

c. **Breeding management:** Successful breeding of goats depends on the right selection of doe and buck. Generally, female goats become mature at the age of 6-10 months, depending on the breed, size and weight. Male goats become mature at the age of 12 months. Two kidding in three years is ideal for a goat farm.

At the interval of 8 to 9 months, the doe may be bred for optimum production.

Among goats, there is two peak breeding seasons, i.e. from March to May and September to November. Oestrus cycle is repeated every 17 to 21 days, and doe remains in the heat for 18 to 36 hours. The doe should be met with buck after 10 to 15 hours of the onset of heat for a better conception rate.

The gestation period in the goat is 145 to 155 days. The male can be utilized for breeding purposes for up to 8 to 10 years and females 5 to 7 years. A teaser buck may be used for heat detection in does.

d. Selection of breeding stock: Ready to breed at the prime stage of production may be considered ideal for breeding stock. The pedigree of the animal may be ascertained during the purchase of new stock. Good health and vigour may only be considered during the selection of breeding stock. The newly purchased animal may be vaccinated against diseases, particularly for infectious diseases.

The stock may be kept under observation in an isolated place, at least for 15 days. During peak summer and winters, kidding may be avoided to prevent mortality. After six years of age, animals may be culled from breeding stock and newly purchase or own farm stock may be used as a replacement. Always an optimum number of males, the female ratio should be maintained on the farm.

Inbreeding should be strictly avoided after every 2 to 3 years' male may be replaced with a new one for best production performance. A breeding register may be maintained on the farm for a day to day record.

e. **Care for newborn kids:** Immediately after birth, the mucus may be cleaned with a cloth from nose, mouth etc. for easy respiration. Kids may be allowed to lick by doe for future identification by mother and to develop mother-offspring instinct. The navel cord should be served at 2.5 cm away from kids' body, and antiseptic like tincture of iodine may be applied to prevent navel infection. After successful delivery, the udder of the doe may be cleaned with antiseptic lotion and immediately after birth, kids should be provided colostrum and may be continued for 4 to 5 days. Overfeeding must be avoided to prevent kid's scour. If kids are born more than 2, extra goats /cows/powder milk may be provided by a nipple fitted with a bottle for at least 1 ½ to 2 months. In winter, gunny bags, straw, wheat husk, or sawdust may be provided as bedding materials for kids. In summer months, energy drinks like glucose water may be provided to prevent sunstroke.

f. **Castration of male kid:** Male kid may be castrated at the age of 1-2 months for better meat quality, higher market price and unwanted breeding in the flock.

g. Health care management: The goat should be vaccinated for PPR, Goat pox, FMs etc. Deworming should be done at least twice a year. For ticks and mites, dipping or spraying with a powder is recommended.

Strategy Proposed under DAY-NRLM for Goat Intervention:

The broader strategy consists of creating a one-stop support centre or Goat Resource Centre to be nested in Livelihood Service Centre (LSC) of the cluster for small livestock farmer which aims to provide input services, facilitate cooperation between stakeholders to develop integrated value chain by leveraging financial resources from various agencies and also through policy advocacy. The details of the model are as follows:

The model proposed under goat intervention consists of:

Goat Resource Centre: Goat Resource centre (GRC) is a goat business facilitation centre to facilitate input linkage, enhance access to knowledge and skills for improved goat farming through training and demonstration and provide goat business linkages on a cost-recovery basis to rearers. The goat resource centre is a cluster-level association formed with the Goat rearers' of the cluster village level Goat clubs.

Goat club: The basic unit in the village is the goat clubs. The goat clubs comprise of a minimum of all the goat rearers of a village. The members of the goat club are Mahila Kisan.

The income of GRC: Goat/Small ruminant Loan, breeding services, medical service, selling concentrated feed, providing services of consultants (vet-doctors), kid nursery training, visitors, marketing, will work as treating centre, will purchase an unhealthy goat, will be cured and sold at a higher price, purchasing (all forward and backward linkages). Based on the functions mentioned, small fees may be charged to the beneficiary.

Pashu Sakhi: Pashu Sakhi is a practicing goat rearer from the community (mostly an SHG member) is promoted as a para vet in the villages who give service to the small ruminant farmers at the village itself through GRC (Goat Resource centre). Pashu Sakhi works on the business model, charges a service fee for pre-defined goat services provided to the goat farming household. The core area of their work is identifying goat rearers through SHGs / VO, providing preventive and curing health services. They also provide training in the management of goat rearing, managing kid nursery, providing community insurance, breeding buck service and handling all kinds of forward and backward linkages. Initially, to promote these Pashu Sakhi, the project (NRLM) would provide support/honorarium on a task-based assignment basis after that. They would work with GRC. They will work on:

Responsibilities of the Pashu Sakhi	
Awareness and cattle census Provide input in the best practices of goat rearing, keep a healthy goat and buck and remove unhealthy one. Promoting green fodder Promoting mineral salts (animal licking) Goat yard with all facilities Promote right Feed and fodder practices Method of feeding pure water (Using Water Tub) Preserve and protect them from the weather Protect from cold	Timely weight check-up to get the weight gain or loss. Protect from worms in the body Timely Cutting of Hooves of cattle Use the right way of Milking Deworming of goat – twice in a year (before rainy and after the rainy season) Shaving leg side hair Timely vaccination of goat. Insurance Service Breeding Buck service Provide Goat Concentrate feed

Community Insurance: GRC will be responsible for executing community-based insurance among the goat club members. Insurance will be done with the help of Pashu Sakhi of community members. The GRC would be responsible for insurance and settling the claims.

Kid Nursery: GRC will propagate good quality kids, will nurture in a controlled environment with regular feed practices, medicines, deworming, vaccination for breed improvement purposes in the area. Progeny (Kids, children, descendants) of the best goats from the local area are the best seeds to be propagated to enhance the productivity of domestic goats. Selective breeding and conservation of promising progeny ensure the availability of quality goats at a reasonable price in the cluster. This also saves such promising male and female goats from slaughter at an early age. The GRC will have an infrastructure in an area allocated for Kid nursery. GRC will purchase 3-4-month kids. On average, 12 ft2 space is required for one kid. So, to have a readily available kid in 5-10 numbers and 120 ft2 would be necessary. The housing structure will have 1/4 shed, 3/4th open space, green fodder stands, stall-feeding manger, water tub.

The kid would be provided with concentrated feed, and they would be regularly monitored at a 15-day interval. These kids would be insured. Pashu Sakhi would usually watch and monitor its growth.

The infrastructure of GRC: One-acre land would be identified in the project village to start GRC. Space would preferably be within reach of the community. The property should be taken on lease, and an agreement should be done between the landlord land and the GRC. A minimum rental amount would be fixed, which would initially be paid for the project for 1-2 years, and after that, GRC would pay the rental. The experimental design is as listed below:

Particulars	Nos/unit	Specification
One-acre land on lease for ten years	Acres	Rs. 10,000 to Rs.15, 000 per year (an increase of 5% annual rent)
Office of GRC (Two Room and one Veranda)	Two rooms & one Veranda	25 Feet x 30 feet
Office Equipment and Furniture: Almirah, Fridge, Desktop computer, printer.		
Incubator	1	500 egg capacity
Water Resource (Tube well/Open Well) with Submersible / Monoblock pump	1	200 to 400 ft. Depth
Training Hall	1	25 x 30 feet
Kitchen	1	10 x 16 feet
Store for training hall	1	8 x 10 feet
Goat Shed	8	10 x 15 feet
Water Turf	8	Made of iron (For ten goats
Green fodder stand	8	Wooden (For ten goats)
Fodder Stand	16	Wooden (For five goats)
Fodder Store	1	12 x 16 feet

Source:JSLPS

Financial source to Establish Goat Resource Centre/Small ruminant:
To establish the Goat Resource Centre, there will be an initial requirement of Rs. 8.5 lakh (details are at Annexure-I), which will include the cost towards building construction, as mentioned above, besides management for the GRC. The GRC would find other sources of funding arrangements like convergence from the line department and other agencies, NABARD etc.

SWOT Analysis of Goat Farming Sector:

Income potential at the household level: With a herd size of 10 goats and in a cycle of 24 months, it has been found that the household can earn about Rs 23,000 per year from goat rearing. The detail calculation is annexed as Annexure-II.

Convergence opportunities: There is ample scope for convergence with the department of animal husbandry for the animal vaccinated, vet-medicine, subsidies for kids, animal feeds and support of vet-doctors. Under the IBS of MGNREGA, goat shed, and common livelihood assets of MGNREGA, the building for GRC can be constructed. KVK may be roped in for the training of goat rearers and Pashu Sakhi.

Annexure-I: Details of estimated expenditure on basic infrastructure

Particulars	Area/Unit	Unit Cost (Rs.)	Unit Amount (Rs.)
One-acre land on lease for ten years	1 acre	10,000	10,000
Office of GRC (Two Room and one Veranda)	Two rooms & 1 Veranda		
Infrastructure Development- Building Cost (Office of GRC (Two rooms, Veranda, Training Hall, Kitchen, Store, Toilet)	1		450,000
Office Equipment and Furniture: Almirah, Fridge, Desktop computer, printer.			100,000
Goat Shed	8	9,000	72,000
Water Turf	8	300	2,400
Green fodder stand	10	100	1,000
Fodder Stand	16	600	9,600
Warden and Watchman (12 month)	1	8,000	96,000
Sign Board	1	4,000	4,000
Gate	1	15,000	15,000
Water Resource (Tube well/Open Well) with Submersible / Mono block pump	1	70,000	70,000
Miscellaneous etc. as per requirement			20,000
Revolving fund			1,50,000
Total			10,00,000

Source: JSLPS & Umed (Maharashtra SRLM)

Annexure-II (Income from goat rearing)

Estimated Economics for 10 improved goats in 24 Months
Assumption: - 1.5 Kidding per year and 1.5 Kids per kidding for goats reared for meat purpose

Sr. No	Particulars	Unit description	Unit cost	No of units	Cost
A	Recurring Cost				
1	Cost of goat	Age 1 to 2 years, 1 to 2 pair of permanent teeth	4,000	9	36,000
2	Cost of buck	Age 1 to 2 years, well-developed testicles	5,000	1	5,000
3	Transport	Lump sum	2,000	1	2,000
4	Feeding manger, Water turf	As per requirement	200	10	2,000
5	Feeding cost of adult goats	150 gm concentrate feed per day	22	972	21,384
6	Feeding cost of kids (For the first six months)	Nine goats will provide 14 kids in each parturition in 2 years, a total of 40 kids, 75 gm concentrate feed per kid	22	540	11,880
7	Feeding cost of new adults (for the next seven months)	Kids of 1st & 2nd parturition will be sold at 13 months of age and kids of 3rd parturition will be sold at six months of age; 150 gm concentrate feed for 27 kids	22	851	18,711
8	Feeding cost of Buck	250 gm per day concentrate feed	22	180	3,960
9	Vaccination, Dewormer, Health care & insurance cost	PPR, ET, quarterly deworming & 3 years insurance cost	500	10	5,000
10	Fodder cost	Napier grass & other	1,000	1	1,000
	Total A				106,935
B	Other costs				
1	Interest on capital	12% per year for two years			25,664
	Total B				25,664
C	Receipts				
1	Sale of 13-Month-old 27 goats	The average weight of 16 Kg	4,000	27	108,000
2	Sale of 6-month-old kids	The average weight of 9 Kg	2,250	13	29,250
3	Rate of adult goat & buck	Goats & buck purchase initial can be used for one more year	4,000	10	40,000
4	Sale of manure	Approx. 2 tons	1,200	2	2,400
	Gross Receipts				179,650
	Net profit in 24 Months				47,051
	Yearly Income				23,525

Source: JSLPS

References:

1. *Jharkhand SRLM*
2. *Maharashtra SRLM*
3. *https://icar.org.in/node/8040*
4. *https://krishijagran.com/animal-husbandry/want-to-become-a-successful-goat-farmer-here-are-the-excellent-tips-benefits-of-rearing-goats-making-maximum-profit/*
5. *http://dahd.nic.in/sites/default/filess/NAP%200n%20Goat.pdf*

5. Backyard Poultry model

Introduction: Backyard poultry is defined as small-scale rearing of poultry birds (chicken) by women in poor households for dietary improvement, income generation, investment and security against risk. The birds are fed with locally available feed sources. Here, the poultry birds may range freely in the household compound and find much of their food, get additional amounts from the household. Backyard poultry is rarely the sole means of livelihood for a family but is one of the numbers of integrated and complementary farming activities contributing to the overall well-being of the household. It generates income from the sale of poultry birds and eggs. Eggs can provide a regular, albeit small, income while the sale of live birds provides a more flexible source of cash. Occasional consumption of chicken meat and egg offers a valuable source of protein in the household diet. Poultry also plays an essential socio-cultural role in many societies. Backyard poultry is the smallest livestock investment a rural household can make. Yet the poverty-stricken farmer may need credit assistance, even to manage this first investment step on the ladder out of poverty.

Objective: The objectives of backyard poultry may be any or more of the following:

a. Income generation only.
b. Income and home consumption.
c. Home consumption and cultural reasons.
d. Home consumption only.

Production Systems: Backyard poultry is kept under a wide range of conditions, which can be classified into one of three large production systems as mentioned below:

- Free-range extension
- Backyard.
- Semi-intensive

Free-Range Extensive: Eighty percent of farmers keep poultry in the above first two extensive systems. Under free-range conditions, the birds are not confined and can scavenge for food over a wide area. Rudimentary night shelters may be provided, and these may or may not be used. The birds may roost outside, usually in trees, and nest in the bush. The flock contains birds of different species and varying ages.

In free-range production systems, non-descript native breeds are usually reared. These birds possess genes that are well adapted to local conditions, that is well resistant to diseases and stress conditions, but their production performance is low (for example, they lay about 40-60 brown eggs per year).

Backyard Poultry:

Indigenous pure breeds such as Kadaknath, Vanraj, Kuroiler, Aseel, naked necks, etc. are also raised in backyard production systems and are relatively well resistant to diseases. These reasonably productive breeds are raised both because they fetch a higher market price than local birds (the meat is about better texture and the eggs are tastier) and for socio-cultural reasons like cockfights. Poultry is housed at night, but allowed free-range during the day. They are usually fed a handful of grain in the morning and evening to supplement scavenging. in 5-10 numbers and 120 ft2 would be necessary. The housing structure will have 1/4 shed, 3/4th open space, green fodder stands, stall-feeding manger, water tub.

Semi-Intensive Systems

These are a combination of the extensive and intensive systems where birds are confined to a specific area with access to shelter. They are commonly found in urban and peri-urban as well as rural situations. In the "run" system, the birds are confined in an enclosed area outside during the day and housed at night. Feed and water are available in the house to avoid wastage by rain, wind and wild animals.

Comparative analysis:

In backyard poultry production systems, investment in non-descript and indigenous birds, such as Aseel and Kadaknath, provide a higher return than investment in exotic ones because of the high cost of feed of exotic breeds (Not excellent scavengers) and the lower market price of exotic meat and eggs.

The larger the flock size, the smaller the return on investments and the profit per bird, most likely because of the growing feed and animal health costs, which are minimal if anyone is in a backyard poultry farming system. In effect, commercial and semi-commercial enterprises are characterized by `high volumes and low-profit margin' per bird. The implication is that backyard, and small-scale poultry farms are viable enterprises only as far as the scavenging base is efficient to feed the birds.

Keeping a few exotic birds makes little economic sense because it is more profitable to raise a few non-descript or indigenous breeds of birds that can thrive almost on their own. At the same time, when the scavenging base is limited, it is better to keep just one or a few local birds rather than a flock of saying local hens because the cost of additional feed will be higher than the returns from the hens.

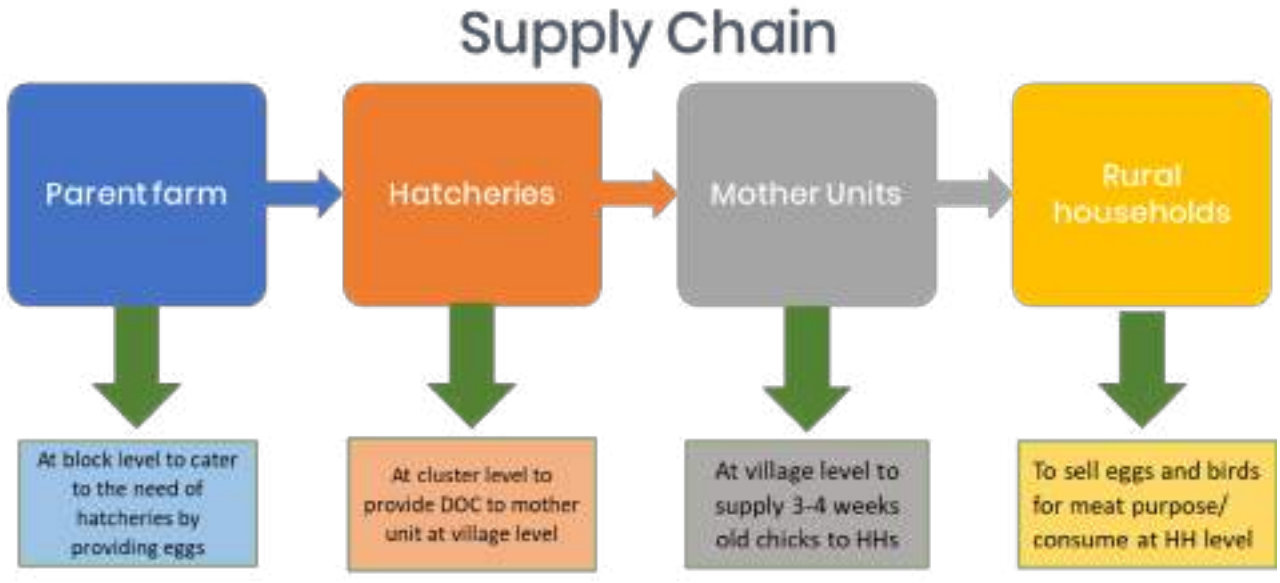
Integrated cluster farming approach regarding backyard poultry intervention:

Based on the introduction mentioned above and comparative analysis, under poultry intervention, the following two approaches are advocated:

- Backyard system
- Semi-intensive system

Backyard system: Backyard poultry is a vital livelihood intervention for poor rural households, including landless or small landholders. It is more suited for poor households as it requires a low level of investment and skill. Under this system, the pure indigenous breed is promoted as a source of livelihood for the poor. The system consists of the following supply chain:

Supply chain system under backyard poultry: The functional smallholder supply chain can be established to supply chicks/pullets to small rural households even in the remote area through "mother units." The units which raise the birds for 3-4 weeks and sell the grown-up birds to the rural households. There are some critical elements in such a supply chain:



A typical supply chain under the backyard poultry system:

The model can be explained, as stated below:

LH services	Service area	Particulars	Ownership
Parent farm	Block	At parent farm pullet and cockerels are kept for supplying eggs to hatcheries.	An individual entrepreneur at the block level
Hatcheries	Cluster	At cluster level hatcheries are units for supplying day-old chicks to the mother unit	Producers Group at cluster level attached with LSC
Mother unit	Village	The existence of a small scale "mother unit" spread at the village level serves as a brooding unit where DOCs are kept for 3-4 weeks under good heat and light conditions and are appropriately fed and vaccinated. This is critical because after three weeks the brooded chicks weigh around 250 grams and can live and thrive in the open range, scavenging rearing system	Individual entrepreneur / Pashu Sakhi

Economics of parent farm:

Sl	Particulars	Unit description	Unit cost (Rs)	No of units	Cost (Rs)
A.	Fixed cost				
A1.	Poultry Shed	Sq. Ft	300	2,400	720,000
A2.	Drinker, Feeder, Nest and other accessories	Lump sum	510	19.2	9,792
	Total A				729,792
B.	Recurring cost				
B1.	Cost of 16-week old pullets & Cockerel	No.	300	960	288,000
B2.	Feed cost (for 16 to 19 weeks)	Kg	30	2,419	72,576
	Feed cost (for 20 weeks to 72-week age)	Kg	25	42,739	1,068,480
B3.	Vaccination, Deworming & other Medicine	Lump sum	50	960	48,000
	Packaging & transportation	No.	0.5	148,400	74,200
	Labour cost	Month	13	10,000	130,000
	Total B				1,393,256
C.	Other costs				
C1.	Depreciation on the fixed cost	10% per annum			72,979
	Interest on Capital cost	10% per annum			109,517
	Total C				182,496
D	Receipts				
D1.	Sale of eggs	No.	12	148,400	1,780,800
	Sale of culled birds	Kg	130	960	124,800
	Gross Receipts				1,905,600
	Gross profit per cycle (D-B)				512,344
	Net profit after deduction of depreciation				329,848
	Return on Investment				15.54%
	Egg production in 25 days			10,000	
	Initial investment required	Per unit			10,95,168

Source: Jharkhand SRLM

Economics of hatchery (2080 eggs): the economics of hatchery under backyard poultry system:

Particulars		Unit	No. of Units	Year 1 Unit Cost (INR)	Year 1 Value (INR)
Capital Expenditure					
Hatchery unit with other machinery & accessories (2080 eggs)		Number	1	200,000	200,000
2 KVA inverter with solar support		Number	1	150,000	150,000
Platform & Platform & another establishment		Number	1	50,000	50,000
Construction of Building for Hatchery (20X10 Sq. ft)		Number	200	1,000	200,000
	Total capital expenditure				6,00,000
Output (Revenue)					
	Sale of chicks	Number	23,296	30.0	6,98,880
Total Revenue					6,98,880
Expenditure					
1. HR Costs					
	Hatchery Operator	Person months	12	7,000	84,000
	Hatchery assistant	Person months	12	4,000	48,000
2. Recurring Costs					
	Rent/ Maintenance	Months	12	2,000	24,000
	Electricity	Months	12	1,000	12,000
	Purchase of eggs	Number	29,120	12.0	3,49,440
	Transportation	Number	23,296	1.5	34,944
	Cartoon for packaging	Number	466	20.0	9,318
Total Expenditure Costs					5,61,702
Gross Profit					1,37,178
Depreciation (machinery/equipment/tools)					60,000
Net Profit					77,178

The business plan of Mother unit/ Hardening centre of Chicks (Unit: 2000 birds)

Sr. No.	Particulars	Unit description	Unit Cost	No. of Units	Total Cost
A.	Fixed cost				
A1.	New building construction	Sq. Ft	300	667	2,00,000
A2.	Drinker, Feeder and other accessories	Lump sum	180	40	7,200
	Total A				2,07,200
B.	Recurring cost				
B1.	Cost of day-old chicks	No.	30	2,000	60,000
B2.	Feed Cost	Kg	32	500	16,000
B3.	Vaccination & other medicine etc.	Lump sum	1	2,000	2,000
B4.	Cost of In-charge- Mother Unit	Per cycle/ Month	1	7,000	7,000
B5.	Incentive to APS	per bird	5	1,800	9,000
	Total B				94,000
C.	C. Other costs				
C1.	C1. Depreciation on the fixed cost	25% per annum			51,800
	Total C				51,800
D	Receipts				
D1.	Sale of 25 days old birds	Kg	60	1,800	108,000
	Gross Receipts				108,000
	Gross profit per cycle (D-B)				14,000
	Gross profit for 1 year	12 cycle in year			168,000
	Net profit after deduction of depreciation				1,16,200

Source: Jharkhand and Bihar SRLM

Income at HH level: A total of 50 birds can be reared per household, and per year six cycles can be completed.

Estimated cost of 50 Vanaraja/Kuroiler and 50 Kadaknath under backyard poultry system

Sl	Particulars	Vanaraja/ kuroiler	Indigenous breed
I	Variable cost		
A	Cost of a day-old chicks @Rs. 40/- for Vanaraja and @Rs. 25/- for local chicken	2,000	1,250
II	Cost of feed up to 42 days of age		
A	For Vanaraja/Kuroiler chick 1.2 kg of broiler starter/bird i.e. 60 kg @ Rs 40 per kg	2,400	
B	For local chicks, 10 kg of broken rice @ Rs. 25/- per kg for 50 nos. chicks		1125
Ii	Cost of vaccine @ Rs. 1.60/ chick	80	80
C	For Vanaraja chick cost of medicine, feed supplement @ Rs.3.75 per chick	187.5	
D	For the local chicken cost of medicine, feed supplement @ Rs. 2.40 per chicks		120

Sl	Particulars	Vanaraja/ kuroiler	Indigenous breed
E	For both the flock (Kuroiler and local) cost of labour @ 20 hrs. / month = 2.5 Man-days x 18 months = 45 man-days x Rs. 150/- per Man-day = Rs. 6750.00	3,375	3,375
	Total variable cost	8042.5	5,950
III	Fixed cost		
A	Land	with farmer	with farmer
B	Low-cost poultry shed made with locally available material	1,000	1,000
	Depreciation	500	500
K	Drinker/ Feeder	Local made	local made
L	Total fixed cost		
M	Total cost/value of production	8,543	6450
N	Cost of production per bird	170.85	129
IV	Income		
A	105 eggs per bird @ Rs 8 each		42,000
B	120 eggs per bird @ Rs. 5 each	30,000	
C	Sale of birds @ Rs 400 per birds		20,000
D	Sale of birds@ Rs 300 per birds	15,000	
E	Total income	45,000	62,000
	Net income	36,458	55,550

Source: Jharkhand and Bihar SRLM

Semi-intensive system: Improved breeds of birds such as Sonali, Giriraj and the Kuroiler are often found in semi-scavenging/semi-intensive systems. These breeds have been developed by private companies or public research institute. Most of these have many of the desirable characteristics of local birds. For example, these birds have multi-coloured plumage, long legs to escape predators and then lay tan coloured eggs, but are more productive in terms of laid eggs, rate of growth and weight gain.

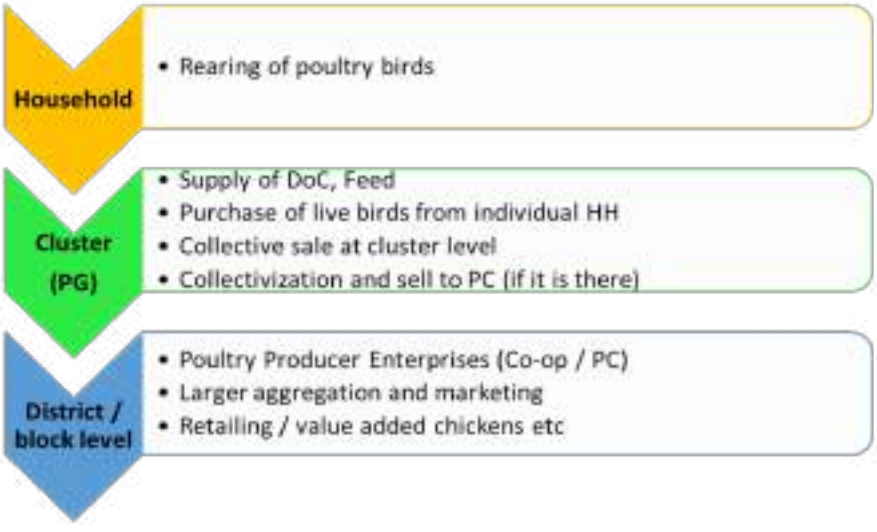
This model is similar to the backyard system except for that parent farm, and hatchery interventions are not included. Day-old chicks are supplied directly to Mother Units, who, in turn, provide it to rural households. Thus, the flow chart of the model will be as follows:

LH services	Service area	Particulars	Ownership
Mother unit	Village	The existence of a small scale "mother unit" spread at the village level serves as a brooding unit where DOCs are kept for 3-4 weeks under good heat and light conditions and are appropriately fed and vaccinated. This is critical because after three weeks the brooded chicks weigh around 250 grams and can live and thrive in the open range, scavenging rearing system	Individual entrepreneur / Pashu Sakhi

Poultry intervention under semi-intensive system

Marketing: Marketing is not an issue for backyard poultry producers. Non-descript and indigenous birds have a ready market available locally, and both live birds and eggs receive a higher price than exotic eggs and broilers.

For improved breeds like Vanraja and Kuroiler, market availability is an issue if the production is high in a particular geography. The following marketing channel is proposed.



Risks and its mitigation

Production, financial, marketing, technological and human risks are the primary sources of risks encountered by the poultry farmers. Disease outbreak, high cost of medication and vaccines, insufficient funds, lack of quality feed and fragility of poultry products are some of the risk situations in small scale broiler farming. Risk management practices among the farmers are enterprise diversification, marketing and production strategies. For disease control, the focus should be on timely vaccination and hygienic practices through proper training and capacity building.

Convergence opportunities:

Purpose	Extend support through the Program / Scheme	Benefits and targeted segment
Promotion of mother unit, hatchery and parent farm for poultry	Sub-Mission on rural poultry entrepreneurship program	Support the identified PGs/SHGs/Mahila Kisan /CRPs identified by SRLM for the program. Under this scheme, the beneficiary is entitled to a 50% subsidy of the project cost

Purpose	Extend support through the Program / Scheme	Benefits and targeted segment
Meat Processing	Animal Husbandry Infrastructure Development Fund	Under this activity, private companies, individual private entrepreneurs, FPOs, Section 8 companies, can take 90% loan from the scheduled bank for the establishment of small, medium, large integrated mechanized meat processing plant for sheep, goat, pig and poultry for hygienic handling, establishment of value addition chain for the manufacturing of meat products, transportation of meat through cold chain establishment. The Central Government will provide interest subvention up to 3% (including 0.6% of the corpus handling and risk management charge by the market borrower). The beneficiary will get a two-year moratorium during which the beneficiary not to re-pay any loan amount. The entire loan amount needs to be paid within five years after the moratorium period.

Reference:

I. *JharkhandSRLM*
II. *BiharSRLM*
III. *MaharashtraSRLM*
IV. *https://krishijagran.com/featured/backyard-poultry-farming-a-low-input-business-with-high-economic-returns/#:~:text=Backyard%20Poultry%20Farming%3B%20a%20low%20input%20business%20with%20high%20economic%20returns,-Balwinder%20Singh%20Dhillon&text=Rural%20population%20living%20in%20India,of%20rural%20families%20of%20India*
V. *http://www.fao.org/3/a-y5169e.pdf*
VI. *http://www.sapplpp.org/files-repository/smallscalepoultryfarmingandpovertyreductioninsa*

6. Honey beekeeping-based livelihood promotion

Introduction[1]**:** The collection of honey from the forests has been in existence for a long time. Honey bees convert nectar of flowers into honey and store them in the combs of the hive. The growing market potential for honey and its products has resulted in beekeeping emerging as a viable enterprise. Honey and wax are the two economically essential products of beekeeping. The Honey bee does not compete for resources with any other agricultural enterprise. Beekeeping has positive ecological consequences. Bees play a vital role in the pollination of many flowering plants, thus increasing the yield of certain crops such as sunflowers and various fruits. It is generally preferred that the value of pollination service of the bees is ten times more money value that contributed from the honey and beeswax, honey is delicious and highly nutritious food. By the traditional method of honey hunting, many wild colonies of bees are destroyed. This can be prevented by raising bees in boxes and producing honey at home. The market potential for honey and wax is high.

Following are the different types of honey bees:

- **Rok bee (Apis dorsata):** They are good honey gathers with an average yield of 50-80 kg per colony.
- **Indian bee (Apis cerana indica):** They yield an average honey yield of 6-8 kg per colony per year.
- **European bee [Italian bee] (Apis mellifera):** The average production per colony is 25-40 kg.

The vitamins present in honey are B6, thiamin, niacin, riboflavin, pantothenic acid and certain amino acids. The minerals found in honey include calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium and zinc. China is the world's largest producer of honey. Honey has been linked to health benefits like improved heart health, wound healing, and blood antioxidant status. According to KVIC, the Indian honey industry is growing at a compounded annual growth rate (CAGR) of 10.9% from 2012 to 2019. The market is further projected to reach a value of Rs 2,806 crore by 2024. In 12 years, India's honey production has grown by 200%, and exports by 207%. Punjab is the leading state in beekeeping in the country, with about 35,000 beekeepers producing about 15,000 metric tons of honey.

2. **The intervention model:** Honeybee keeping in the bee box is an integral part of the Integrated Farming System (IFS) in a cluster or as a separate honey bee cluster. It is highly suitable for organic clusters, as heavy use of chemicals in agriculture and horticulture crops restrict its movement for honey collection. Besides, areas with Horticultural crops (Mango, litchi etc.) or field crops and in forest fringe areas where round the year some flowering plants/crops are present. The honey bee needs shade, water and source of honey (flower) for its survival.

[1]Source of photo: Field photo supplied by MPSRLM

At IFS/honeybee cluster villages, the rearing will take place at the individual household level. At the village level, there will have a honey extraction cum collection centre, and at the cluster[2] level, there will be testing, filtering, bottling, and branding, labelling and market linkages. Promotion of a Producers Group (PG) may be thought of. The details are as below:

2.1. Household-level Honeybee Rearing: Rearing of the honey bee in 50 bee box unit per household with suitable honey bee spices, placed near the plantation/ orchard/agriculture field, under the shade. Collection: Collection of wild honey from the natural forest.

2.2. Village level: Honey procurement centre: It will have a honey extraction machine and will procure honey from all the honey bee rearers/collectors and collectively send it to the cluster.

2.3. Cluster level: Aggregation of honey from all village level procurement centres, its purity testing, bottling[3], labelling and marketing through the PG or further aggregation into FPO.

3. Convergence opportunities: National Beekeeping and Honey Mission (NBHM) under its Mini Mission-I and Mini Mission-II can get support for training, supply Bee box, equipment, purity testing equipment etc.

[2] Cluster of 2-3 adjoining villages supported with honeybee rearing
[3] https://cdn.shopify.com/s/files/1/0252/8097/0829/products/Organic_Certified_Honey_1_2_900x.jpg?v=1575443535

4. Economics of Beekeeping[4] (For a unit of 50 bee box colony)

Sl	Particulars	Costs (Rs)
A.	Nonrecurring costs (Rs.)	
	Cost of hives (Newton's Bee hive of teak wood) Rs.400/hive	20,000
	Cost of 10 nucleus box @ Rs.300/hive	3,000
	Hive stand @ Rs.50 for 60 boxes	3,000
	Honey extractor, smoker and other appliances	1,000
	Total nonrecurring cost (Rs)	27,500
B.	Recurring cost (Rs.)	
	The cost of sugar @2 kg/colony during death period @Rs. 15/kg	1,500
	Comb foundation sheet 2kg@ 100/kg	200
	Interest for non-recurring amount @10%	1,650
	Depreciation @ 10%	2,750
	Cost of colonies @ Rs.100/colony	5,000
	Miscellaneous	1,000
	Total Recurring Cost (Rs)	12,100
C.	Income (Rs.)	
	Realization through honey yield @ 3.5 kg/ colony and Rs.150/kg	26,250
	Realization through bees wax @ 5kg/50 colony and Rs.200/kg	1,000
	Total Income (Rs)	27,250

Cash Income to Bee keeper per year:

1. In case of convergence with NBHM (nonrecurring costs are subsidized 75% rest farmers' own contribution. Thus, no credit is required)

   Total non-recurring cost : Rs 7700
   Total income : Rs 27,250
   Cash income : Rs 19,550

2. In case of without any convergence (nonrecurring cost as loan from SHG):
   Total non-recurring costs (less depreciation) : Rs 9350

   Total income : Rs 27,250
   Cash income : Rs 17,900

It is pertinent to mention here that the income enhancement through a higher level of pollination and yield increase in the crop is much more than the direct cash income.

[4] Source: http://agritech.tnau.ac.in/farm_enterprises/fe_api_economics.html

7. Black Gram

Introduction: Black gram (Vigna mungo L.) is popularly known as Urad, is one of the most important pulse crops, grown across India. It is consumed in the form of 'dal' (whole or split, husked and de-husked) or perched. Urd differs from other pulses in its peculiarity of attaining a mucilaginous pasty character when soaked in water. In the southern part of India, it is consumed in a variety of ways across the form of different regular and popular dishes like vada, idli, dosa, halwa, imarti in combination with other food grains. The vegetative part of black gram is also used as a nutritive fodder for milch cattle. Black gram is a short duration and photo insensitive crop, fit well in different cropping situations, especially intensive crop rotations. This pulse legume is used as a green manuring after picking the pods and with its characteristics to fix the atmospheric nitrogen in the soil. The plant with deep tap roots binds soil particles and helps in conservation of soil.

Soil requirement in Black Gram Cultivation: Soil in black gram cultivation should have a neutral pH. Loam or clay loam soils are best suited soils for it's cultivation. Adding higher organic matter in soil will result in vigorous seed production.

Selection of land and its preparation: In black gram cultivation, the field selected for seed production, must not have been sown with black gram in the previous years. This is being done to avoid volunteer plants that cause admixture. Fields continuously cultivated with black gram may harbour root rot or wilt pathogen.

Harvesting of black gram crop: The ripened pods can be collected from the plants in one or two pickings and dried on the floor. In case, if the whole plants come to harvest, then the crop should be cut and the spread over the floor to dry. The plants become dry and turn into black and pods may start splitting. The plants should be beaten using pliable sticks to prevent damage to seeds. Then seeds are separated from pods. These plants after harvesting can be used as fodder for animals.

Income estimates: Cultivation of black gram can generate net income of about Rs 10500 per acre following agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scope
Integrated Scheme of Oil Seeds, Pulses	Supports for quality seed
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
NICRA	Training on climate resilient agriculture

Annexure-1

(Cost estimates per acre)

Particulars[5]	(Rs/ha)
Operational Cost (I)	21106
Human Labour	12659
Machine Power	5014
Seed and inoculation	2740
Interest on working capital	693
Fixed Cost (II)	1340
Sub Total (I+II)	22446
Managerial cost @ 10%	2751
Total Cost	25197
Estimated yield (Q)	5.55
Revenue	35750
Profit	10553

References:

- E-Portal, ICAR-CCARI
- TNAU, Agri-Tech Portal

[5] Since the whole cultivation process is non-chemical following agro-ecological practices, cost on fertilizer and pesticide is nil.

8. Green Gram

Introduction: Green gram is an excellent source of high-quality protein with easy digestibility. It can be consumed as whole grains, dal and sprouted in variety of ways. As value addition, split and de-husked, fried in fat, fetch good value as snacks. After harvesting the pods, the vegetative parts are fed to the cattle. The husk of the seeds also used as cattle feed. Green gram is popularly known as "Moong Dal" in. Green gram is one of the main pulse crops in India. It is widely cultivated throughout Asian continent, including India. Green gram provides protein requirement for vegetarian population of the country. In India, it is consumed in the form of whole pulse as well as split pulse. "Kitchidi" made with moong dal or green gram is recommended to the aged or ill people as it is easily digestible diet. In Indian average diet, roti with Moong dal, chawal and Moong dal is considered as important ingredient.

Soil requirement in green gram cultivation: Green gram can be cultivated in wide range of soils, from black cotton soils in North India, red laterite soils in South India and sandy soils in Rajasthan. For the best production of green gram the soil like well drained loamy to sandy loam soil should be selected. Avoid water logging soils and saline soils as they are not suitable for green gram cultivation.

Selection of land and its preparation: The main field selected for green gram cultivation must not have been sown with moong or green gram in the previous seasons to avoid volunteer plants that may cause admixture. Inoculation of seeds with Rhizobium sp is very important.

Harvesting: The best time to harvest the crop is when 85% of the pods are fully matured. Bad weather condition are generally avoided for harvesting. The harvested stack are kept for drying in the field after cutting on the threshing floor. The admixtures are removed before start of harvesting.

Income Estimates: Cultivation of green gram can generate net income of about Rs 15000 per hectare following the agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scope
Integrated Scheme of Oil Seeds, Pulses	Supports for quality seed
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
NICRA	Training of SHG members on climate resilient agriculture.

Annexure-1
(Cost estimate per hectare)

Particulars6	(Rs/ha)
Operational Cost (I)	16768
Human Labour	10388
Machine Power	3150
Seed and seed inoculation	2740
Interest on working capital	490
Other Cost (II)	1340
Sub Total (I+II)	18108
Managerial cost @ 10%	1810
Total Cost	19918
Estimated yield (Q)	5.55
Revenue	35750
Profit	15382

References:

- E-Portal, ICAR-CCARI
- TNAU, Agri-Tech Portal

[6]Since the whole cultivation process is non-chemical following agro-ecological practices, cost on fertilizer and pesticide is nil.

9 Groundnut

Introduction: Groundnut is one of the important oilseed crops, grown mostly in five states in India namely Andhra Pradesh, Gujarat, Tamil Nadu, Karnataka, and Maharashtra. These states together account for about 90 per cent of the crop's total area. Two of these states (Andhra Pradesh and Gujarat) account for more than half of the cultivated area. In India, it has the largest share among the oil seeds with regard to area and production. Groundnuts are immensely rich in potassium, calcium, phosphorus and B vitamins which supplies with a host of health benefits. Groundnuts are a great blend of healthy fats, protein and fibre.

Soil requirements for groundnut: Groundnut can be cultivated in different types of soils such as sandy, sandy loam & loam soils. Soil with high clay content may be avoided. It thrives best on sandy loams. Most suitable soils for groundnut production are well-drained light sandy loams with an ample supply of calcium and moderate organic matter.

Selection of land and its Preparation: As this crop can not withstand waterlogging, the medium to uppland is best suited for this crop. The soil should be very well prepared to provide an ideal seedbed. Earthening up should be taken up simultaneously with intercultural operations (40 days) before pegging starts. It facilitates maximum penetration of pegs and provides a larger spreading area.

Harvesting of Groundnut: Harvesting usually consists of a series of operations – digging, lifting, stocking and separation of nuts.

Income Estimates: Cultivation of ground nut can generate net income of about Rs 21825 per acre following the agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scope
Integrated Scheme of Oil Seeds, Pulses	Supports for quality seed
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
MSME	Oil mill setting- infrastructure
NICRA	Training on climate resilient agriculture

Annexure-1
(Income per acre)

Item	Unit	Quantity	Price(Rs)
Seed:			
Ground nut pods (seed)	Kg	75	2625
Manures			
FYM/ Vermicompost	Cartload	4	1000
Lime	Kg	400	1600
Plant protection:			
Neemastra / Agniastra / Bhramastra etc. applications	Gm	100	150
Total			5375
Labour:			
Weeding, Hoeing	Person days	6	600
Sowing	Person days	3	300
Harvesting	Person days	8	800
Thrashing & storing	Person days	6	600
Earthing Up	Person days	5	500
Cost total:			8175
Revenue:			
Pod Yield	Kg	1000	30000
Revenue total:			30000
Return			21825

10 Maize

Introduction: Maize (Zea mays L.) is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions. Globally, maize is known as queen of cereals because it has the highest genetic yield potential among the cereals. Maize, in India is an important cereal, and both its area and production have steadily increased during the past two decades. In terms of area and production, it ranks only next to rice and wheat. Maize is highly used for preparation of cattle and poultry feed.

Soil requirement in Maize Cultivation: Maize can grow on a wide range of soils but performs the best on well-drained, well-aerated, deep soils containing adequate organic matter and well supplied with nutrients. A fertile, well-drained (no water logging) sandy loam or loamy soil for maize cultivation should be selected. Avoid planting maize after another cereal crop.

Selection of land and its Preparation: It must be ensured that the site selected is cleared of any debris or stubble from previous crop before the onset of rains. If the previous crop is pest or disease infested; the debris must be gathered and destroyed to avoid carry-over of pests and diseases. The soil should be tilted into smaller crumbs and in the process the soil is turned over to cover the weeds for decomposition. Land preparation involves three steps i.e. ploughing, harrowing and ridging.

Harvesting of Maize crop: Time of harvesting depends on the variety. Harvest maize as soon is ripe for the purpose desired, undue delay in harvesting increases damage due to diseases and pests. Rain in harvesting can completely damage the crop. The cobs are bended downward at maturity to hasten drying and to minimize spoilage. The cobs are dried properly on a tarpaulin before storage in a dry place. Grains can be separated from cob by hand held / semi-mechanized Sheller.

Income estimates: Cultivation of maize can generate net income of about Rs 23000 per acre following the agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scope
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
MSME	Infrastructure support for mini flour mill.
Minimum support scheme	Procurement
NICRA	Training on climate resilient agriculture

Annexure-1
Cost economics per acre

Name of crop:	Maize		
Economics:			
Costs:			
Item	Unit	Quantity	Amount (Rs)
Seed:			
	Kg	8	800
Manures:			
FYM/ Vermi-compost		2 cartload/1Q	500
Plant protection treatment:			
Neemastra/Agniastra/Bhramastra etc. applications	kg	2	150
Sub-total			1450
Ploughing(Tractor)	Man-days	3	2100
Seeding	Man-days	10	1000
First earthing up	Man-days	15	1500
Harvesting	Man-days	6	600
Thrashing	Man-days	10	1000
Cost total:			7650
Revenue:			
Yield (grain)	Kg	1200	
Price	Kg	10	12000
Fodder/Fuel			2000
Yield (Green cob)	No	25000	
Price (green cob)	Rs/Cob	1	25000
Revenue total:			
Grain			14000
Green cob			25000
Return			
Grain			6350
Green Cob			17350

References

1. IIMR website, ICAR

11 Mustard

Introduction: Matured mustard seed is an oilseed as well as condiment. Mustard plant (Brassica spp.) is an herbaceous annual plant grown for its seeds. Mustard plants are thin herbs with bright yellow flowers. Mustard is an annual, cool-season economic cash crop that has a short growing season and is commonly grown as sole crop as well as mixed crop.

Soil requirement in Mustard Cultivation: Mustard can be grown in wide ranges of soils that ranges from light to heavy loamy soils. Medium to deep soils with good drainage is the best suited soil for mustard cultivation. The most favourable soil pH range for mustard crop is 6.0 to 7.5

Selection of land and its Preparation: A mustard seedbed should be with good tilth, moist, and uniform which allows good seed-to-soil contact, uniform planting depth and quick moisture absorption leading to uniform germination. Zero tillage is also practiced in mustard. A well-drained land is preferred for mustard cultivation.

Harvesting of Mustard: Tender mustard plants, before flowering are thinned and used as vegetable. Even individual leaves when they are young and tender with 3 to 4 inches long are plucked to use as vegetable. For seeds, mature plants when start turning yellow, it is cut and kept for drying, seeds can be separated easily from dried plants. Care should be taken to avoid shattering of seeds and admixture.

Income estimates: Cultivation of mustard can generate net income of about Rs 7550 per hectare following agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scopes
Integrated Scheme of Oil Seeds, Pulses	Supports for quality seed
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
NICRA	For training of MKs on climate resilient agriculture
MSME	For Oil mill infrastructure support

Annexure-1
Income Estimates per Hectare

Item	Unit	Quantity	Price(Rs)
Seed:	**Kg**	**10**	**600**
Plant protection Treatment:			
Neemastra /Agniastra / Bhramastra etc.	**Gram**	**50**	**250**
Irrigation:	**hours**	**20**	**1000**
Labour:			
Tractor for 2 plough	**Hours**	**4**	**2800**
Sowing	**Person days**	**5**	**500**
Harvesting	**Person days**	**10**	**1000**
Thrashing & storing	**Person days**	**10**	**1,000**
Interest @ 12% and miscellaneous	**4 months**		**300**
Cost total:			**7450**
Revenue:			
Grain Yield	**Kg**	**1000**	**1000**
Total revenue @ Rs 15/Kg			**15000**
Income			**7550**

References:
Directorate of Rapeseed & Mustard, ICAR
SRMR, Bharatpur

12 Paddy

Introduction: Paddy is the major cereal crop grown in about 44.6 million hectares in India. India represents all kinds of diversity under which Paddy is grown across the globe. No other crop is as versatile as Paddy. Paddy crop is interwoven in the cultural, social and economic life of millions of Indian and it holds the key for food security of the country. Paddy production scenario in the country during the past decade presents a gloomy picture of compound growth rate of just 1.7 per cent7. To meet a production target of 125 million tonnes by 2025, productivity in irrigated area needs to be enhanced by 1.5 tons/ha and in rain-fed lowlands by about 1 ton/ha. With the adoption of improved practices like SRI, yield of paddy is found to be increased, but due to high labour requirement and lack of control over irrigation, the practice has not spread as desired. Mechanization in paddy cultivation is taking place rapidly through use of transplanter, harvester, power tiller, thresher etc.

Soil requirement in Paddy Cultivation: Paddy can grow on a wide range of soils but performs best on clay soils containing adequate organic matter and well supplied with nutrients.

Figure 1 Fish - Duck farming

Selection of land and its Preparation: Paddy is widely grown under flooded conditions, it is best produced on land that is nearly level with gentle slope to facilitate adequate drainage. Generally slopes of less than 1 % are necessary for proper water management.

Harvesting of Paddy crop: Harvesting is largely done manually, recently uses of harvester and reaper is increasing fast. This is followed by threshing. Use of thresher has increased many folds. Water is to be drained out from the field when grains in the lowest portion of the panicle are in the dough stage (about 20 days from 50% flowering). The grains are to be allowed to harden. Harvesting is to be done when stalks still remain green to avoid grain shedding. Moisture content of paddy should be 20-24% at harvest.

Threshing is to be done as early as possible preferably a day after harvest. Drying is to be gradually done under shade until the moisture content is brought down to 12-14%, which ensures better milling quality and storage.

[7]https://vikaspedia.in/agriculture/crop-production/package-of-practices/cereals-and-millets/rice

Income estimates: Cultivation of Paddy can generate net income of about Rs 8000 per acre following agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scope
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
Minimum support scheme	Price support
MSME	De-husking infrastructure, machineries
Integrated Scheme for Agriculture Marketing & E-NAM	Market support

Annexure-1

Economics of Paddy per Acre			
Items	Unit	Quantity	Amount(Rs)
Seed:			
HYV seed	Kg	15	450
Manures:			
FYM/ Vermicompost	Kg		
Plant protection:			
NPM materials		50	150
Labour:			
One plough by tractor	Hour	3	2100
3 times with country plough ; Once acre require 3 sets / plough	Person days	9	900
Field bunds mending to plug leakage; require 3 person days/ acre	Person days	3	300
Including land preparation, seed sowing etc	Person days	2	200
Transplanting	Person days	18	1800
Intercultural operations two times	Person days	36	3600
Harvesting	Person days	18	1800
Threshing & storing	Person days	10	1000
Bio-Pesticide application	Person days	2	200
Total cost of cultivation			12500
Revenue:			
Grain Yield	Kg	2000	18000
Straw Yield	Kg	2500	2500
Revenue total:			20500
Income			8000

References:

- *Jharkhand SRLM*
- *E-Portal, ICAR-CCARI*
- *TNAU, Agri-Tech Portal*
- *Paddy Knowledge Mangement Portal, NIAP*

13 Pigeon Pea

Introduction: Pigeon pea, a rainfed kharif season pulse crop is also commonly known as Red Gram, Arhar or Tur. It is the second most important pulse crop after Gram and one of the major kharif crop in the country. India ranks first in area and production in the world with 80% and 67% of world's acreage and production respectively. In India, Pigeon Pea is more popular as split pigeon peas (tur dal) which is one of the most popular pulses and an important source of protein in vegetarian diet. In regions where it grows, fresh young pods are eaten as vegetable.

Figure 1 Fish - Duck farming

Soil requirement in Pegion Pea Cultivation: This crop grows well on all types of soils but deep loam to sandy loam soil is suitable. This crop also does well in sloppy lands in the mid-hills. It can be grown successfully on neutral soils having a pH range of 6.5 to 7.5. Water logging cause havoc on the crop, thus farmers need to make sure that there won't be any water logging in the field to avoid complete crop loss.

Selection of land and its Preparation: Red gram or Tur being a deep rooted crop responds well to proper tilth. So land is prepared by at least one ploughing during the dry season followed by 2 or 3 harrowing and disc ploughing.

Harvesting of Pegion Pea crop: Green pigeon pea pods are harvested for different purposes. Fully developed, bright green seed is preferred for use as a vegetable. Hence, pods should be harvested just before they start loosing their green color. For this normally hand picking is followed.

Pigeon pea leaves, unlike other crops, remain green when the pods are mature and turn brown, ready for harvest. This may confuse decision on optimum harvest time. Pigeon pea should be harvested when 75-80% of the pods turn brown and are dry. Delayed harvesting, during bad-weather, may increase the risk of damage of mature seeds though shattering.

Income estimates: Cultivation of Arhar can generate net income of about Rs 26177 per hectare following agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the above model:

Schemes	Scope for convergence
Integrated Scheme of Oil Seeds, Pulses	Supports for quality seed
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
NICRA	Training on climate resilient agriculture
MSME	Support for dal mil

Annexure-1
(Cost estimate per hectare)

Particulars	(Rs./ha.)
Cost of cultivation	
Human Labour	12383
Machine Power	2560
Seed	2060
Organic Manures	3289
Bio- pesticides	979
Interest on working capital @ 12%	2552
Total cost	23823
Yield (Qtl)	1000
Revenue	50000
Profit	26177

References:

E-Portal, ICAR-CCARI
TNAU, Agri-Tech Portal

14 Wheat:

Introduction: Wheat is the second most important cereal after rice consumed by 65% of the population in India and is likely to increase further due to changes in food habits. Wheat is mostly consumed in the form of 'chapati' in our country for which bread-wheat is cultivated in nearly 95 per cent of the cropped area. Durum wheat, which is most suitable for making macaroni, noodles, semolina and pasta products, occupies about 4% to 5% of the area, and is predominantly grown in Central and Peninsular parts of India.

Soil requirement in Wheat Cultivation: Loam soil is the best for wheat cultivation. Clay and sandy loam soils can also used for wheat cultivation provided there is proper system of drainage and these soils should not either be acidic or sodic.

Selection of land and its Preparation: Wheat field should be free from weeds. With a soil of average fertility, the preparation of the seed-bed by proper tillage and cultivation methods largely determines the yield of the crop. Three general methods of tillage for preparing the land for wheat are practiced namely, ploughing, listing, and disking.

Harvesting and Threshing: Harvesting and threshing of wheat is done as soon as it is fully ripe (yellowing of panicle), to avoid grain shattering. Delayed harvesting results in high grain losses. Use of combine harvesters has increased in India for simultaneous harvesting and threshing of wheat. Stubbles can be bruised as fine wheat straw by using wheat straw combine. Straw recovery is about 60%. Wheat can be harvested manually or by tractor-operated vertical conveyer reaper windrowers also. For threshing, use of power thresher fitted with proper safety devices to prevent accidents is increasing.

Income estimates: Cultivation of wheat can generate net income of about Rs 6500 per acre following agro ecological practices. The details of cost estimate is shown in annexure-1.

The integrated cluster model: The interventions at different level has been shown below:

Scope for convergence: The following scheme may be explored to draw support to promote the model:

Schemes	Scope
Financing facility under Agri-infrastructure Fund	Storage infrastructure
Formation and Promotion of 10,000 Farmers Producers Organization (FPO)	Promotion of FPO for market linkage at cluster / aggregates of clusters
Krishi Vigyan Kendra (KVK)	Training of farmers, CRPs
NICRA	For training on climate resilient agriculture
Minimum support scheme	Price support
MSME	De-husking infrastructure, machineries
Integrated Scheme for Agriculture Marketing & E-NAM	Market support

Annexure-1
Income Estimates per Acre of wheat

Item	Quantity	Unit	Rate (Rs)	Cost (Rs)
HYV seed	10	Kg	35	350
Vermicompost	400	Kg	5	2000
Jaggery (seed treatment)	4	Kg	35	140
Manual Weeder (1 weeder shared by 5 farmers)	0.2	Unit	1000	200
Lime/Dolomite (need based)	400	Kg	5	2000
Labour:				
Ploughing & levelling 3 times	3	Ploughing	500	1500
Field preparation, seed sowing etc	20	Person day	100	2000
Irrigation	15	Pumping hours	80	1200
Intercultural operation two times	8	Person day	100	800
Harvesting	7	Person day	100	700
Threshing & storing using tractor	3	hours	500	1500
Total Expenditure (Rs)				12390
Grain Yield	1400	Kg		
Price		Rs / Kg	12	
Value of the grain		Rs		16800
Straw Yield	2100	Kg		
Price of Straw		Rs / Kg	1	
Value of the Straw		Rs		2100
Revenue		Rs		18900
Net Income/acre		Rs		6510

References:

- Jharkhand SRLM
- E-Portal, ICAR-CCARI
- TNAU, Agri-Tech Portal
- Package of Practice, Crops of Punjab, Punjab Agriculture University

List of Abbreviation

Abbreviations	Full Form
MKSP	Mahila Kisan Shashaktikaran Pariyojana
NRLM	National Rural Livelihoods Mission
DAY-NRLM	Deendayal Antyodaya Yojana – national Rural Livelihoods Mission
MoRD	Ministry of Rural Development
SRLM	State Rural Livelihoods Mission
PIA	Project Implementing Agency
CSO	Civil Society Organization
SDG	Sustainable Development Goal
HH	Household
NTFP	Non-Timber Forest Produce
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
AEP	Agro-ecological Practice
CRP	Community Resource Person
SA	Sustainable Agriculture
PoP	Package of Practice
AHD	Animal Husbandry Department
PG	Producers' Group
PE	Producers Enterprise
PC	Producer Company
JLG	Joint Liability Group
FPC	Farmer Producer Company
CLF	Cluster Level Federation
GPLF	Gram Panchayat Level Federation
CHC	Custom Hiring Centre
CIF	Community Investment Fund
FFS	Farmer Field School
TSA	Technical Support Agency
IFC	Integrated Farming Cluster
MoA	Ministry of Agriculture
FPO	Farmer Producer organization
APMC	Agricultural Produce Market Committee
FDRVC	Foundation for Development of Rural Value Chain
TMS	Training Management System
MoA&FW	Ministry of Agriculture and Farmers' Welfare
MoFPI	Ministry of Food Processing Industries
CFC	Common Facility Centre
MoU	Memorandum of Understanding
ADIDAS	Agriculture Data Information Dashboard
PMVDY	Pradhan Mantri Van Dhan Yojana
TRIFED	Tribal Co-operative Marketing Development Federation
IBS	Individual beneficiaries Scheme

List of Abbreviation

AS-RD	Additional Secretary – Rural Development
DAC&FW	Department of Agriculture Co-operation and Farmers' Welfare
JKPY	Jaivik Kheti Protsahan Yojana
NPOP	National Programme for Organic Production
NCOF	National Council of Organic Farming
MOVCD-NER	Movement for Organic Value Chain Development – Northeast Region
NBHM	National Beekeeping & Honey Mission
EWB	Empowerment of Women Beneficiaries
NHM	National Horticulture Mission
SMAM	Sub-Mission on Agriculture Mechanization
SFAC	Small farmers' Agribusiness Consortium
NMAET	National Mission on Agriculture extension & Technology
NMOOP	National Mission on Oilseeds and Oil Palm
ISAM	Integrated Scheme for Agri Marketing
AMI	Agricultural Marketing Infrastructure
SAGF	Strengthening of Agmark Grading Facilities
ABD	Agri-Business Development
VCA	Venture Capital Assistance
NIAM	National Institute of Agricultural Marketing
NFSM	National Food Security Mission
KVK	Krishi Vigyan Kendra
DARE	Department of Agriculture Research and Extension
NICRA	National Initiative on Climate Resilient Agriculture
NMSA	National Mission on Sustainable Agriculture
BRLPS	Bihar Rural Livelihoods Promotion Society
PKVY	Paramparagat Krishi Vikas Yojana
SAMPADA	Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters
DAHD	Department of Animal Husbandry and Dairying
NPDD	National Program for Dairy Development
SDCFO	Supporting Dairy Cooperatives and Farmers Producers Organization
AI	Artificial Insemination
PPR-EP	PPR Eradication Programme
CSF	Classical Swine Fever
MVU	Mobile Veterinary Units
PMMSY	Pradhan Mantri Matsya Sampada Yojana
CSS	Centrally Sponsored Scheme
MoTA	Ministry of Tribal Affairs
JS-RL	Joint Secretary – Rural Livelihoods
MD	Managing Director
MFP	Minor Forest Produce
FCR	Feed Conversion Ration
SHG	Self Help Group
DoC	Day-old Chicks

List of Abbreviation

GRC	Goat Resource Centre
VO	Village Organization
HR	Human Resource
CAGR	Compounded Annual Growth Rate
KVIC	Khadi and Village Industries Commission
IFS	Integrated Farming System
TNAU	Tamil Nadu Agriculture University
ICAR	Indian Council of Agricultural Research
CCARI	Central Coastal Agricultural Research Institute
FYM	Farm Yard Manure
MSME	Ministry of Micro Small and Medium Enterprises
SRMR	Society for Rapeseed Mustard Research
e-NAM	National Agriculture Market
LSC	Livelihood Service Centre

सत्यमेव जयते

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