LEVERAGING COMMUNITY INSTITUTIONS TO SUPPORT AGRI-BUSINESS AND LIVELIHOODS IN JHARKHAND, INDIA

Key findings

Average income at baseline for households targeted under JOHAR was INR 56,430, with household size of 5.34 and average per capita income of INR 10,567.

JOHAR’s high value agriculture (HVA) crops have significantly higher (3.3 times) gross sales per acre compared to non-HVA crops.

Access to irrigation was a major predictor of whether households cultivate HVA crops in multiple seasons. The average net income per acre for irrigated land was 2.67 times that of non-irrigated land.

Context

Jharkhand has the second lowest income level among all states in India despite having the largest share of mineral resources and impressive economic performance during the 12th five-year plan (2012–2017). More than half of Jharkhand’s labor force relies on agriculture and allied sectors, and a large portion of the farming community consists of small and marginal farmers, who practice rain-fed single crop subsistence farming. Access to irrigation is critical and its absence leads to lower income levels since it limits crop choice, yield and cropping intensity. Further, poor market access and an underdeveloped financial sector limit options and incomes for small producers; persistent gender gaps in agriculture limit access and control for women; and skill development in agriculture and allied sectors lags behind the growing demand for agriculture production and enterprise.

The JOHAR project was initiated in 2017 to aid targeted rural producer households to diversify and enhance their household income, and achieve a significant increase in real income till 2023 in selected blocks of rural Jharkhand. JOHAR builds on the work of the National Rural Livelihoods Mission (NRLM) in the state.

The JOHAR project recently completed a baseline for the project evaluation using randomized controlled trial, supplemented with a non-random control group outside the program area that would provide a counterfactual based on an additional quasi-experimental design. The data presented are primarily from surveys of women self help groups (SHGs) and their federations.

The National Rural Livelihoods Mission, supported by the World Bank, has been implemented in Jharkhand over the past several years, and has built a robust platform of community institutions that include women self help groups (SHGs) and their federations. JOHAR’s objective is to use this base of women SHGs and their federations to enhance and diversify household income in select farm and non-farm sectors for targeted beneficiaries in project areas.

1. Jharkhand Opportunities for Harnessing Rural Growth.
2. The average monthly household income in INR 5,854 for Jharkhand. Source: NABARD All India Rural Financial Inclusion Survey (2016-17).
households conducted between August and November 2018. The discussion focuses on 13 program intervention blocks (302 SHGs and 1,568 households) to inform improved implementation and attainment of intended outcomes. The purpose of this note is to present key baseline results and how they validate the project’s theory of change. It summarizes the findings from the baseline, presents the status-quo on potential JOHAR beneficiaries, and outlines how the project can achieve its target of enhancing and diversifying the income of rural producer households.

Interventions

I. **Institutional interventions**, which include the collectivization of producers into producer groups (PGs) and Farmer Producer Organizations (FPOs) that provides the base for the delivery of other interventions.

II. **Input interventions**, which include provision of higher quality seeds or hatchlings and establishment of infrastructure (such as irrigation systems or animal sheds).

III. **Market interventions**, which include supporting farmers to move up the value chain and undertake additional activities, such as sorting and grading or processing, before they sell their produce.

IV. **Credit or finance interventions**, which improve the availability of finance to producers by providing access to credit from community institutions as well as financial institutions.

**JOHAR theory of change showing impact pathways**

- Increased availability and quality of inputs; lower costs of inputs
- Improved market access
- Increased availability and access to credit
- Improvement in farmer knowledge and information and increase in farmer skills
- Increased income
- Increased sales revenue
- Increased production
  - Quantity (productivity + area)
  - Quality
  - Output mix
- Changes in production decisions
  - Use of inputs
  - Diversification

Image Credit: JSLPS

The project has complex impact pathways with multiple intervention components. The theory of change, presented here, describes the project and its strategy to push target households along the impact pathways in a simplified framework, organized as a results chain of inputs, outputs, initial outcomes, intermediate outcomes, final outcomes and impact (discussed below).

- There are five types of intervention inputs:
V. **Skills and knowledge interventions**, such as trainings on the prescribed package of practices, capacity building, and the provision of climate information and market intelligence.

- The above inputs are expected to lead to four related outputs:
  
  I. Increased and improved availability of inputs, as well as lower cost of inputs.
  II. Improved market access.
  III. Improved access and increased availability of finance.
  IV. Improved knowledge and increase in skills.

- The above outputs would enable producers to change their production decisions (initial outcome), such as through diversification or increased use of inputs; which in turn would lead to increased production and/or productivity (intermediate outcome) and increased sales revenue (final outcome).

- The above outcomes, in turn, are expected to lead to an impact in terms of meeting the program targets of increased household income of targeted producer households.

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**Key Learnings**

This section summarizes key learnings from the recently completed baseline for the project evaluation⁴.

**Enhancing incomes from agriculture requires shifting to production of HVA crops and increasing cropping intensity through multi-season cropping.** HVA cultivation has the potential to yield higher returns, given that HVA crops have significantly higher average gross sales per acre (3.3 times) than non-HVA crops. However, data shows that only 67 percent of households cultivate (any) HVA crops, that too allocated in fragmented and small landholdings (on average 0.08 acres per household).

HVA production is strongly correlated with the ownership of midland and upland, and the use of irrigation. It is not correlated with landholding size or other independent variables. This validates the emphasis on providing irrigation to households to facilitate HVA cultivation and suggests that the project should focus on upland and midland. This is further supported by the fact that 82.9 percent of households who have access to irrigation undertake HVA cultivation compared to 56.6 percent of households without irrigation.

Furthermore, HVA crops allow cultivation in multiple seasons. While 99 percent of the JOHAR target households cultivate in the kharif (monsoon) season, 47 percent cultivate in the rabi (winter) season and only 14 percent cultivate in the zaid (summer) season. The average cultivated areas are quite low during rabi (0.14 acres) and zaid (0.03 acres) seasons leading to a low cropping intensity of 110 percent.

To enhance rural incomes, JOHAR would need to focus on increasing the total area under HVA cultivation, primarily through three potential pathways. First, by nudging and incentivizing existing HVA farmers to expand their land allocation to HVA cultivation. Second, by supporting traditional non-HVA farmers to undertake HVA cultivation. Third, by enabling both HVA and non-HVA farmers to cultivate HVA in more seasons than they currently do.

**Increasing irrigation coverage is key to increasing land use and multi-season cropping.** The average net income per acre for irrigated land is 2.67 times that of non-irrigated land due to multi-season use. Only 41 percent of households have access to some form of irrigation on their land, mainly as private wells. Of these, only half and two-thirds of households use it during kharif and rabi seasons (with variation by topography) respectively, which falls to a quarter or less during the summer season. This could be due to lack of availability of water, such as wells drying up. This and other barriers to using irrigation need to be overcome. Findings from the baseline survey suggest that irrigation could increase the current average cropping intensity from 110 percent to 193 percent.

**Adopting new practices holds potential to reduce costs and improve productivity.** The baseline data suggest a huge potential to increase

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5. It is presumed that irrigation used in kharif is low because people are relying on rainfall.
productivity, as there are significant productivity differentials across households, with the most productive households producing 10 times more per acre than the least productive households.

This suggests that many farmers have the potential to increase productivity through adoption of new practices already being practiced by their neighbors.

Most farmer households suffered from lower net income owing to high cost of inputs (up to 45 percent of gross income) and low sales prices, primarily due to market inefficiencies (such as poor market linkages, multiple dealers and middlemen). The low degree of collectivization further created an impediment to leveraging the benefits of economies of scale in input procurement, as well as the sale of the final produce.

Further, there is potential for income gains through collectively selling produce at higher level markets by reducing market inefficiencies. The table below shows an example of tomato price differentials across various markets.

Low access to credit limits the ability of target households, and low lending from SHGs limits their capability to meet project objectives. Only 16 percent of households had a loan in the past year. Of these, only around a third reported using the credit to purchase farm assets; most reported using it for non-income generating activities. Further, despite high participation rates in SHG savings activities, the savings generated were low and often not utilized for productive purposes. The mean prescribed amount of savings per member was modest, and only in one-third of instances did the respondents report that savings were loaned out immediately. Low savings and lending limits the capacity of SHGs to meet the project goals of extending financial support for value chain activities, such as processing, marketing and undertaking agri-business.

Low knowledge and training on new practices needs to be addressed to improve productivity and climate resilience. Less than 4 percent of the households received any skills training in the past three years. This holds back adoption of new practices and skills training support is required to augment the capacity of participating farmers. Further, adverse weather conditions make farmer households vulnerable to crop loss. Less than 1 percent of households reported having received any training in climate-related stresses and their impact on livelihoods or having adopted any farm-level practices to cope better

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Average sale price of tomato at various levels of markets

<table>
<thead>
<tr>
<th>Markets</th>
<th>Proportion of households selling tomato in the market (%)</th>
<th>Average price for tomato in the market (INR/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmgate</td>
<td>15.28</td>
<td>15.91</td>
</tr>
<tr>
<td>Village</td>
<td>55.14</td>
<td>12.76</td>
</tr>
<tr>
<td>Block</td>
<td>32.22</td>
<td>21.56</td>
</tr>
</tbody>
</table>

Producer households are ranked by output productivity (kilograms produced by acre).
with climate change. Supporting farmers to manage climate risk and other shocks would increase income and de-risk investments in diversified and intensified production.

**Significant scope for promoting livestock development and significant efforts to nudge households to take up fisheries and non-timber forest products (NTFPs) to address vulnerability in the form of low levels of diversification and high rates of landlessness.** Baseline data at the village level showed that 27 percent of scheduled castes, 19 percent of other backward castes and 9 percent of scheduled tribes were landless. Supporting these vulnerable households by providing opportunities to adopt allied production activities, such as livestock rearing, fish farming in community-owned water bodies, and collection or processing of NTFP would be key in addressing the needs of landless households. This effort of supporting vulnerable households requires focus, since only 6 percent of households reported

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**Contribution of various income sources toward average annual household income**

- Non-Timber Forest Product (NTFP)
- Livestock
- Wages
- Agriculture
- Other sources
- Enterprise
- National Rural Employment Guarantee Act (NREGA)
livestock as a primary or secondary activity, even though 42 percent of households reported owning a goat. This suggests significant scope for promoting livestock as a profitable economic activity. Data suggests that impediments for women livestock producers include inadequate knowledge on scientific management practices, compounded by a lack of formal training. JOHAR needs to focus on alleviating these issues. Further, only 10 percent of target households reported engagement in the collection or processing of NTFP, which implies that significant effort would be needed in nudging households, whether landless or landed, to engage in the collection or processing of NTFP.

Way Forward

The data collected for the project baseline evaluation validates the project’s theory of change, by showing that diversification and intensification of production can significantly increase incomes for rural producer households in Jharkhand. In particular, facilitating irrigation and switching to HVA cropping has the potential to transform incomes. This can be supplemented by supporting broader adoption of good practices, collective marketing of produce, improving access to credit, and promoting supplementary income generating activities.

7. Average gross sales per acre for households that only cultivate paddy is INR 20,290, whereas is INR 37,464 for households that cultivate paddy and HVA.

ABOUT THE DISCUSSION NOTE SERIES

This note is part of the South Asia Agriculture and Rural Growth Discussion Note Series, that seeks to disseminate operational learnings and implementation experiences from World Bank financed rural, agriculture and food systems programs in South Asia.

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LEARNINGS FROM COMMUNITY-BASED SMALL SCALE IRRIGATION IN TRIBAL AREAS OF JHARKHAND, INDIA

Key achievements

- 1060 detailed project reports for community led irrigation developed through active women participation
- 450 local cadres developed to support project preparation, installation, operations and maintenance
- Over 500 water user groups promoted for judicious use of water resources
- Strengthened internal capacity building of staff and self driven innovation, ensuring sustainability

Context

The absence of robust irrigation infrastructures and water resource constraints resulting from climate change would reduce Jharkhand’s agricultural production over time. The state utilized only 12 percent of its irrigation potential (of the net sown area only 13.5 percent has access to irrigation) due to inadequate development and poor maintenance of irrigation infrastructures.

Being agro-climatically favorable for high value crop cultivation, Jharkhand has the advantage of addressing issues of food insecurity, adversities of climate change, as well as subsistence farming through augmenting irrigation facilities with small-lift irrigation systems, gravity-based irrigation systems and check dams on seasonal streams. However, much needed to be done as irrigation equipment (such as pumpsets, sprinklers or drip irrigation systems) was owned by only 5.72 percent of rural households. Capitalizing on the state’s potential, the JOHAR project intrinsically focused to harness irrigation facilities for deprived households through lift irrigation systems.

JOHAR is a pioneer in enabling tribal communities to be an integral stakeholder in development by ensuring availability, accessibility and utilization of water resources for agricultural development. JOHAR supports 200,000 small and marginal farmers in primarily rainfed, backward, drought prone, upland and tribal areas of Jharkhand. It facilitates a unique approach, that of “community-led irrigation” which brings water directly to the fields, and fosters community ownership from the onset of project conception, to survey and implementation, right through to operations and maintenance.

This note highlights JOHAR’s focus on promoting such an approach through engaging the community, particularly women in planning, implementation, monitoring and overall management of their irrigation infrastructure.

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2. Undulating land topography, runoff and geomorphological characteristics promotes sub-surface flow of water after the monsoon season.
Interventions

Development of community-led irrigation systems resulted in the JOHAR team strategically engaging communities right from inception, planning, implementation, monitoring and overall management of the irrigation infrastructure. Details of the iterative activities and processes conceived for the irrigation scheme are outlined below.

Formation of high value agriculture producer group (PG):
A high value agriculture PG of 25-50 members was formed by the JOHAR team at the initial stage with women farmers from a particular area (generally a village) to collectively plan for overall agriculture development and undertake collective actions for engaging with markets. Community members undertook small-scale irrigation work to ensure accessibility, availability and utilization of irrigation facilities to all members.

Concept seeding, identification and selection of irrigation patch:
PG members were trained by community service providers of high value agriculture to identify possible sites for installation of lift irrigation and gravity-based irrigation systems through community consultation processes. The technical team of JOHAR, along with community members, later conducted a technical feasibility study of plausible sites and selected the most suitable sites based on local biophysical and social criteria. Any discordance between the community consultation and the technical feasibility study were reconciled at village meetings and concurrence was arrived at by community consultation processes.

Technical survey and preparation of detailed project report:
The designs of pumpset, pumphouse, seepage wells and positioning of outlets were calculated from technical survey data. Detailed cost estimates and drawings of pumphouses, seepage wells, trench excavations, pumpset installations and solar panels installations were prepared with due diligence to environmental and social aspects. A final detailed project report (DPR) entailing geographic, demographic, technical, environment and social aspects was prepared by a technical team in consultation with community members. JOHAR’s para irrigation engineers (PIEs) and district irrigation consultants used an innovative automated system of DPR preparation through an application-based software specifically designed for the project.

Selection of PIEs and technical service providers:
JOHAR prioritized capacity building processes and identified and trained a local cadre of PIEs for timely technical support at each site. Community members selected a person from within the village as a technical service provider (TSP) who received customized training on overall operational procedures and management of irrigation infrastructure. After installation of the irrigation infrastructure, TSPs were entrusted to manage day-to-day operations of the irrigation infrastructure and collect irrigation fees at the village level for its services.

Formation of water user group and training:
A water user group (WUG) with 15-20 farmer members for a command area of 5-8 hectares shared common responsibilities of judicious and efficient use of irrigation

4. A sub-group of agricultural producer group.
water. WUG members were trained by the technical cadre on institutional aspects, common property sharing, efficient utilization of water resources, conflict management, as well as overall management and maintenance of irrigation infrastructure. WUGs collectively participate in crop planning, procurements of crop inputs, and marketing activities along with the other PG members.

**Vendor selection and management:**
Community members were oriented and trained by the JOHAR team and technical cadre on community procurement processes, vendor selection and vendor management. Vendors for installation of pumpsets (solar/diesel), solar panels and underground pipes were selected by community members from the state’s empanelled list of vendors. Local vendors were selected for installation of the pumphouse and construction of seepage wells. Community members followed due diligence procurement processes and sequentially managed the implementation of various crucial timebound tasks with the respective vendors.

**Monitoring and supervision during implementation:**
The technical team of JOHAR (consisting of PIEs, district irrigation consultants and engineers of the technical support agency) provided backstopping support to community members during the overall implementation of irrigation schemes.

**Command area planning and irrigation system operation:**
Community members participated in crop selection and irrigation scheduling to plan irrigation infrastructure use during each cropping season to efficiently use the water resources.

### Key Learnings

Prior to JOHAR’s interventions, Jharkhand lacked projects that focused exclusively on multi-season irrigation. Instituting systems, processes and building capacity resulted in a huge change from the conventional system of planning, design and implementation that was often susceptible to ‘elite capture’.

1. **Technology and innovation:** included resilient technologies for improving productivity and reducing climate risk, such as:

   I. improved planning where engineers used modern tools and skills of project management to build replicable and scalable systems, and procedures for monitoring scheme implementation. The activities and sub-activities of the scheme were mapped with stipulated timeframes to connect sequential activities with outcomes. Through this process, the project was able to foster the creation of a skilled cadre of local irrigation managers.

   II. increased transparency by conducting geo-tagged surveys to collect GPS locations of water sources and pumphouses through geo-fencing of the command area of each irrigation site to promote Geographic Information System based planning. The innovative online DPR preparation and approval system allowed automatic real time calculations, online updation and transfer of data to facilitate real time informed decision making in the management of water. The approach focused on technology adoption and innovation for all those engaged in implementation processes for improved management, development and uptake of solar solutions.

   III. introduced solar solutions, such as the innovative cycle mounted solar pump (of 0.5 HP) to help small and marginal farmers to irrigate up to 0.5 acres with a discharge of 2-3 liters per second (lps). Currently, 100 PGs have received the cycle mounted solar pump-set and JOHAR targets to scale this model to additional 2000 PGs.

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5. Elite capture is a form of corruption whereby public resources are biased for the benefit of a few individuals of superior social status in detriment to the welfare of the larger population.
Geo-fencing is a location-based service in which an app or other software uses GPS/RFID/Wi-Fi/cellular data to trigger a pre-programmed action when a mobile device or RFID tag enters or exits a virtual boundary set up around a geographical location, known as a geo-fence.

The geo-fence allows for remote monitoring of MIS of community-based micro irrigation such as when a PG member visits locations or uploads geo-tagged photographs of installations through the app/software.

Geo-fencing uses GIS based technology for field inspection and aids third party verification by eliminating the need for manual third party verification process and periodic inspection by field staff.

### Advantages of the cycle mounted solar pump

1. it can be moved to any field location that needs immediate irrigation;
2. farmers unaddressed by lift irrigation schemes can use the cycle mounted solar pump to irrigate their field from a nearby farm pond or seepage well, and
3. the cost of operating a cycle mounted solar pump is minimal enabling economically deprived household to access the irrigation facility at the local level.

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2) **Sustainability**: was ensured by

I. institutionalizing systems, processes, tools and guidelines developed within the state architecture; and

II. knowledge and capacity building across all levels and stakeholders.

Guidelines, specifications and design parameters for engineering structures, water user association (WUA) mobilization manuals and training materials, and agricultural extension materials developed were embedded as standard operational procedures and made available to farmers within and outside the project through meetings and website. Knowledge exchange between the project team and other government officials helped reduce structural overdesign and associated capital costs.

3) **Women’s participation**: is at the centre of all JOHAR promoted irrigation projects. Women played an integral and decisive role in patch selection, prioritization of schemes, vendor selection and management, installation of irrigation works, monitoring and command area development as well as during construction of irrigation infrastructure. As a group, they were “empowered” because they had access to irrigation, and “ownership” as they contributed as labor during the installation phase and were at the center in all decision making processes.

4) **Convergence with other schemes and departments**: such as with the agriculture department for micro-irrigation system in the command area of the lift irrigation system under the Pradhan Mantri Krishi Sinchai Yojana (PMKSY), and for solar pumps with the Jharkhand Renewable Energy Development Agency (JREDA) further facilitated water utilization efficiency of irrigation projects promoted under JOHAR as well as extended the coverage of irrigation to deprived households.

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### Challenges

Implementation of the community-led small scale lift irrigation scheme in scattered remote areas had certain challenges. These included:

- **Overcoming the knowledge gap and building capacity at all levels** (farmers, engineers and project staff). One of the major challenges in implementation of small-scale lift irrigation in the remote areas was the existing knowledge gap in selection, implementation and management of the irrigation systems.

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6. Designs of irrigation systems were site specific considering the local hydrological conditions, contrary to a one size standard project design.
Customized regular training programs for farmers, local engineers and project staff are needed to bridge the knowledge gap.

**Sensitization on the importance of solar irrigation versus conventional uses.** Farmers and local engineers were primarily aware of diesel or electric based irrigation systems. Installation of solar based irrigation systems created apprehensions regarding duration of operational hours, safety of solar panels, and care and maintenance of solar pumps, which were addressed through village level sensitization workshops.

**Overcoming construction issues in some topographies** due to the presence of underground rock or hard strata. Community members had to dig out large heavy stones by hands which was time and energy consuming.

**CASE STUDY : Community led irrigation scheme under JOHAR project**

Indrawati Devi, a middle-aged tribal woman with a newly installed lift irrigation system in 0.8 hectares says: “This is the first time that I have access to water in my cropland. Earlier, I use to grow either finger millet or black gram during the Monsoon season or sometimes leave it fallow. But this year I planted high value crops like tomato, cabbage and brinjal and have plans to plant crops like green peas and watermelon in the summer season”. She generated an income of INR 40,000 from 0.2 hectares of tomato crop that she cultivated in the last cropping season.

The newly installed lift irrigation system in remote Unchidih village (located at higher elevation) in Basia sub-district of Jharkhand state currently benefits 15 households with irrigation facilities for 8 hectares of cropland. The village has 25 households that primarily cultivated rainfed crop and were entirely depended on rainfall for crop production. The JOHAR project constructed a seepage well of 90 m³ of water volume that provided sub-surface recharge from the adjacent perineal stream. A 8 HP diesel pumpset was installed to convey irrigation water to a distance of 500 m through underground pipes and four outlet points. The community plans to retrofit the system to solar power to reduce operational costs.

Community members of Unchidih village collectively constructed the seepage well, pumphouse, underground main line installation and configured the outlet points under the guidance of the technical team. Community members have collectively formed an informal producer group, called Rani Mahila Kisan Upadak Samuh, for overall management and farming operations in their village. There is also a water user group for water sharing and grievance redressal.

Community members received customized training sessions on patch selection, crop planning, cost estimates, package and practices of high value crops and management of irrigation infrastructure. They have developed plans for planting selected crops in the command area of the lift irrigation system to judiciously use the irrigation facility. They take minimal operational charges on an hourly basis from each member serviced from the lift irrigation system to meet any maintenance costs. The technical service provider at the village level is responsible for operating the pump on a daily basis.
Way Forward

JOHAR project plans to undertake more than 2000 similar small-scale lift irrigation schemes covering more than 18,000 hectares of land with irrigation facilities in the next two years. Due to bio-physically suitable locations and endowment of a dense network of small seasonal streams, the small-scale lift irrigation system is emerging as a model to ensure accessibility and availability of irrigation facilities in remote water-deprived areas.

For effective monitoring, risk mitigation and allocation of responsibilities, JOHAR is developing a management information system (MIS) to track location-specific work progress on a real-time basis. JOHAR is planning to introduce an Android application for improving the irrigation monitoring system to regulate pump operations from any remote location. The application will also enable the identification of major issues and faults of the irrigation pump. An irrigation monitoring application will help local community members to efficiently schedule irrigation and create a database for efficient planning and management of irrigation. In response to requests from other departments outside the project, the project team is training state engineering cadres to provide technical support.
BUILDING LAST MILE LIVESTOCK SERVICES FOR RURAL COMMUNITIES IN JHARKHAND, INDIA

Key achievements

1,020 ‘Pashu sakhis’ (or livestock friends) trained, accredited and equipped to deliver services to improve livestock productivity and help farmers access markets.

70 percent of targeted households (i.e. 39,900) increased marketable surplus of select meat and eggs and are expected to achieve targeted net profits for goat, layers and dual purpose poultry (Kuroiler) mother units of at least INR 1 lakh\(^2\) annually; and pig, broilers and small scale Kuroiler delivering INR 65,000, 42,000 and 14,000, respectively.

100 percent female beneficiaries and service providers (Pashu sakhi).

Context

Livestock is one of the fastest growing sectors and is a promising high-value option for landless and marginal households. Market prices in India for meat and eggs have increased by 70–100 percent in the past decade in local markets and have also pushed up farm gate prices. Diversification to high-value options such as livestock could more than double household primary income.

Livestock productivity has been low in Jharkhand however; less than 12 percent of that in leading states\(^3\). Livestock farmers have traditionally suffered very high levels of mortality (over 30 percent loss of goats, and up to 80 percent of pigs and poultry) and low levels of productivity (egg production <30 percent of potential, and meat animals requiring vastly long times (4–6 times) to reach ideal market weights). Smallholders lack access to key services like advisory, training and access to quality inputs supporting nutrition, health, breeding and management. The ratio of veterinarians/paravets to livestock in the state is amongst the lowest in India, with limited resources and services that mostly focus on cattle and buffalo.

Jharkhand’s livestock production is in the hands of marginal and landless farmers with women accounting for over 70 percent of the production. The JOHAR\(^4\) project aims to enhance and diversify household income through the livestock component to target nearly 57,000 beneficiaries for enhancing productivity and accessing markets in selected value chains (broilers, layers, pigs, goats and dual purpose backyard poultry).

Given the major role of women, especially from marginal and landless households, JOHAR livestock activities target over 90 percent female beneficiaries.

While local service providers are an important feature in all livestock related investments the Bank finances, the JOHAR model is believed to be the most comprehensive and successful of all.

This note highlights JOHAR’s livestock activities, the JOHAR Pashu sakhi model, lessons learned and what makes the JOHAR model different.

Role of JOHAR in Livestock Interventions

- Matching grants to support procurement of improved stock and establishment of pig and goat breeding villages and poultry units
- Housing demos for goats, pigs and poultry
- Revolving loans to support working capital for beneficiaries to purchase inputs and services like feed and vaccination
- Organizing beneficiaries into producer groups and forming producer organizations to enable services and inputs delivery and market access
- Maintaining livestock service centers to support access to inputs, services and aggregation hubs, and to operate on cost recovery basis
- Training and equipping cluster level managers/paravets
- Providing beneficiary training through farmer field schools

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1. Pashu sakhis or livestock friends are community service providers offering inputs, advisory supporting productivity (breeding, feeding, animal health), farmer training, market linkage and risk mitigation.
2. INR 1 lakh is highly significant given that baseline household incomes are INR 45,000.
4. Jharkhand Opportunities for Harnessing Rural Growth (JOHAR).
Each Pashu sakhi delivers services and inputs to about 50-100 farmers, and upwards of 1,000 livestock supporting productivity, market access, farmer training and risk mitigation. Because many Pashu sakhis work part-time, they can effectively cover a maximum of 100 farmers and 1,000 livestock while receiving good remuneration. Services and inputs provided by Pashu sakhi comprise:

**Market access support** through supporting organization of farmers into producer groups; maintaining records to identify animals that have reached ideal market requirements; providing a link between farmers, producer groups and traders; advising farmers on preparing animals for market/production cycle management; advising farmers on market prices; supporting grading and weighing of animals so that farmers are in a better position for negotiation; and supporting filling buyer/trader orders for animals of specific breed, sex, age, weight, color, etc.

**Comprehensive productivity enhancing services and inputs** such as:

I. vaccination, deworming, ectoparasite control, castration, first aid and referral to vets for challenging cases — for health;
II. feed and water advisory and supply of mineral mix and other supplements, climate tolerant fodder saplings and seed, and climate mitigating fodder storage approaches — for climate smart feed storage;
III. advise and collection of records in breeding villages to support performance recording and selection of outstanding breeding animals — for breeding;
IV. advisory and assistance in demo housing construction, farm hygiene and waste management — for housing.

**Establishment of breeder villages** through performance recording and selection of top males for breeding based on defined techno-economic parameters. The Pashu sakhi trains and increases awareness among farmers in breeder villages about the importance and economic benefits of rearing breeding stock for use and sale. Castration of low performing animals is practiced, with the Pashu sakhi offering this service. This has led to a change in attitude of farmers to undertake timely castration of animals, and the ability to identify key production traits in the newborn.

**Farmer training and advisory** in JOHAR is central to project success and adopts the farmer field school approach whereby the Pashu sakhi organizes regular get-togethers at different farms, and farmers meet to learn skills (‘learn to do by doing’) covering the above areas, which the Pashu sakhi then supports with services and inputs. Because the Pashu sakhi is a part of the farming community, she can readily follow-up with farmers to remind them of the new skills and lessons learned. Farmer training to develop and help them practice new skills is a long-term activity. The farmer field school approach supported by Pashu sakhi has led to high adoption rates of new productivity and marketing practices.

While the three main risks related to disease, climate and markets are dramatically reduced by services and inputs (see box on page 5), the Pashu sakhis also support adoption of livestock insurance and claims.

Building the capacity of local women to be ‘Pashu sakhi’ seems to offer a solution to improve livestock productivity and help farmers access markets. Pashu sakhis earn income as entrepreneurs selling services and inputs (very important in India which has amongst the world’s lowest women labor force participation in the world). Initiated in the early 2000s, there are now about 15,000 Pashu sakhis across India, over 6,300 in Jharkhand, and 1,020 under JOHAR.

Pashu sakhis are adopted in many states, agencies and projects across India, but there are major differences in the approach, orientation and purview of work of these health workers. Three models exist in India for delivering livestock services to farmers: I. traditional model (mostly government veterinary services), II. standard model, and III. JOHAR model. The major differences in these models are described on page 3.

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While local service providers are an important feature in all livestock related investments the Bank finances, the JOHAR model is believed to be the most comprehensive and successful of all.

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6. Nearly all recruited and trained through the Jharkhand State Livelihoods Promotion Society.
<table>
<thead>
<tr>
<th><strong>Comparison criteria</strong></th>
<th><strong>Traditional system before JOHAR</strong></th>
<th><strong>Standard Pashu sakhi program</strong></th>
<th><strong>JOHAR Pashu sakhi model</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service location</strong></td>
<td>Service centralized at dispensary or hospital</td>
<td>Service at farmer’s doorstep</td>
<td>Service at farmer’s doorstep</td>
</tr>
<tr>
<td><strong>Livestock focus</strong></td>
<td>Focus on large ruminants: cows and buffalos</td>
<td>Focus on small ruminants (goats, sheep); pigs and poultry</td>
<td>Focus on small ruminants: pigs and poultry</td>
</tr>
<tr>
<td><strong>Treatment focus</strong></td>
<td>Focus on treatment</td>
<td>Focus on prevention, improved practices and management</td>
<td>Focus on prevention, improved practices and management</td>
</tr>
<tr>
<td><strong>Service focus</strong></td>
<td>Services focused on vaccination for foot-and-mouth disease and artificial insemination</td>
<td>Services include vaccination, deworming, sale of feed supplements, weighing of animals to inform market prices (some programs also support farmer training as in Jharkhand)</td>
<td>Full range of services include comprehensive support for productivity enhancement; improving access to markets; training farmers; risk reduction through insurance</td>
</tr>
<tr>
<td><strong>Service records</strong></td>
<td>No animal tagging precluding accurate records of treatment, vaccination, conception</td>
<td>No animal tagging precluding accurate records of treatment, vaccination, etc.</td>
<td>All animals tagged. An App based system to record all treatments, services rendered (still in development stage)</td>
</tr>
<tr>
<td><strong>Training duration</strong></td>
<td>Limited training duration 1-3 days common, sometimes up to 7 days</td>
<td>3-7 days training</td>
<td>30 days training</td>
</tr>
<tr>
<td><strong>Trainer specifications</strong></td>
<td>No requirement that the trainer be a training professional</td>
<td>Trainer Animal Husbandry staff or NGO</td>
<td>Master Trainer specially trained as trainer, selected on skills and experience</td>
</tr>
<tr>
<td><strong>Credentials of the trainer</strong></td>
<td>No requirement to assess ability of trainers involved in training farmers. No assessment of effectiveness of training based on farmer adoption of practices/knowledge; no assessment of increased productivity or profitability from training</td>
<td>No certification of Master Trainer</td>
<td>Master Trainer certified through Agriculture Skill Council of India (ASCI)</td>
</tr>
<tr>
<td><strong>Credentials of Pashu sakhi (or traditional Community Animal Health Worker)</strong></td>
<td>No certification requirement for the service provider / or trainer</td>
<td>No certification requirement</td>
<td>Certification through ASCI</td>
</tr>
<tr>
<td><strong>Gender focus</strong></td>
<td>No focus on women to deliver services</td>
<td>Over 95 percent female</td>
<td>Over 95 percent female</td>
</tr>
</tbody>
</table>
JOHAR targets over 1,020 Pashu sakhis (90 percent women), and 29 Master Trainer Pashu sakhis (90 percent women). The key steps and considerations required for successful implementation of the Pashu sakhi model are described and summarized in the box.

**JOHAR Pashu sakhi model**

The Pashu sakhi model in JOHAR is believed to offer the first accredited and potentially most comprehensive and sustainable model in the country.

Pashu sakhis, meaning ‘livestock friends’, are critical to providing door-step services and inputs to farmers to support productivity, market access, farmer training and risk mitigation. Pashu sakhis are enabled through Technical Service Support contracts. The Jharkhand Women’s Self Supporting Poultry Cooperative Federation Limited supports commercial poultry implemented as a turnkey operation; and Asset & W/Heifer International supports Master Trainer Pashu sakhi, Pashu sakhi and farmer training, capacity building and technical advisory support for goats, pigs and backyard poultry. MoUs with private sector suppliers provide quality inputs, such as Kuroiler chicks by Kegg Farms, vaccine by Hester and other productivity enhancing inputs like mineral mix and feed supplement.

**Technical service provider offers training-of-trainers (ToT) and coaching.** Heifer International’s India subsidiary Asset & W were contracted to select and train Master Trainer Pashu sakhis (Heifer has over 10 years of experience in training Pashu sakhis in India). They also provide coaching and handholding support in: the selection and training of Pashu sakhis, Pashu sakhi supported services and inputs delivery, demos conducted by the Pashu sakhi and farmer training. A total of 29 Master Trainers were selected according to the following criteria: (i) Pashu sakhi with proven training skills based on earlier experience with farmer training, (ii) hands-on experience with livestock, (iii) female 30-45 years of age, (iv) education: 10th pass and above, and (v) ability to travel to different parts of the state.

**Selection criteria.** Pashu sakhis are selected from the farming community to enable timely services and follow-up; and also because they most often have experience raising livestock themselves. Nearly all are women (>95 percent), preferred for reasons of sustainability and skills, and found to offer higher quality of service.

**Pashu sakhi training and certification.** They are trained in batches of 15-20 by Master Trainer Pashu sakhis. Each receives 30 days of training over 18 months in 5 sessions of 4–7 days each. Training content is similar to Master Trainer Pashu sakhi training and covers all roles and responsibilities. After the completion of the third training session and 6 months of experience, the Pashu sakhi is eligible to take the ASCI certification examination. Further preparation for the certification is provided by ASCI over a period of 7 days. The cost for training a Pashu sakhi including the costs for training the Master Trainer Pashu sakhi in ToT mode, is INR 75,000 per Pashu sakhi. This includes accommodation, travel costs for the Pashu sakhi and all associated training costs such as services of Asset & W in preparation of materials, training Master Trainers and coaching support for Pashu sakhi.

ASCI certification offers several benefits. Firstly it professionalizes the Pashu sakhi, and offers a way to standardize the quality of Pashu sakhis across the country. Certification of Master Trainers offers the added benefit that they are recognized as highest quality professional trainers and can work anywhere in India.

**Equipment supplied to the Pashu sakhi.** Fundamental to providing support is the provision of equipment which includes a smartphone and a kit containing a blue sari, apron, hat, cool box for carrying medicines, weighing scales, castrator and a basic initial stock of supplies to support first aid. Ayurvedic treatments are provided when available.

The cost to equip each Pashu sakhi is INR 5,000 for the kit and another INR 5,000-7,000 for a smartphone accruing to a total of about INR 12,000. After the first inventory of supplies is provided, the Pashu sakhi earns income to maintain her stock of supplies which she purchases from the Livestock Service Center.

**Institutional support, monitoring and evaluation.** Emergency back up support (such as for a broken leg or complicated birth) is provided by the project and local veterinarians. This referral service that operates through smartphones and WhatsApp also enables vets to focus their time on cases they are best trained to handle.

A Pashu sakhi’s delivery of services and inputs is monitored by the farmer producer group through broad criteria such as number of farmers trained by them; number of animals marketed; and number of animals vaccinated. An App can support service delivery as well as monitoring and evaluation.

**Connection to input supply to access quality timely cost effective inputs.** Producer groups operate a Livestock Service Center, which serves about 1,000 farmers and enables the capture of data on economies of scale due to bulk purchase. Each Livestock Service Center supports about 8-10 Pashu sakhis who restock from these Centers where feed inputs like mineral mix and supplements are stocked, and cold chain is provided for vaccines. The Livestock Service Center also provides an aggregation point for meetings, training and marketing support. However, if a Livestock Service Center has not yet been established, the Pashu sakhi is oriented to be able to identify quality cost-effective inputs from agro-vet shops.

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7. These are contracts awarded to the partner organization that undertook capacity building efforts; in this case Heifer International – the very best organization involved in the training of Pashu sakhi.
A detailed breakdown of the services offered by the Pashu sakhi for the four broad service areas – marketing, productivity enhancement, farmer training and risk mitigation are presented below.

<table>
<thead>
<tr>
<th>Service Area</th>
<th>Service/Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing</td>
<td>• organization of farmers into producer groups</td>
</tr>
<tr>
<td></td>
<td>• animal identification and record keeping</td>
</tr>
<tr>
<td></td>
<td>• inventory of animals for market</td>
</tr>
<tr>
<td></td>
<td>• facilitating trader contact point and link between farmers, producer groups, so traders can access animals according to number and specifications (such as weight, age, breed, sex, color, vaccination and health status)</td>
</tr>
<tr>
<td></td>
<td>• advising farmers on preparing animals for market/production cycle management</td>
</tr>
<tr>
<td></td>
<td>• advising farmers on market prices</td>
</tr>
<tr>
<td></td>
<td>• weighing animals</td>
</tr>
<tr>
<td></td>
<td>• facilitating castration to enable higher prices</td>
</tr>
<tr>
<td>Productivity enhancement</td>
<td>• facilitating vaccination</td>
</tr>
<tr>
<td></td>
<td>• deworming and ectoparasite control</td>
</tr>
<tr>
<td></td>
<td>• facilitating castration</td>
</tr>
<tr>
<td></td>
<td>• providing first aid and referral to vets for challenging cases</td>
</tr>
<tr>
<td></td>
<td>• ensuring climate smart feed sampling</td>
</tr>
<tr>
<td></td>
<td>• providing feed and water advisory</td>
</tr>
<tr>
<td></td>
<td>• supplying mineral mix</td>
</tr>
<tr>
<td></td>
<td>• supplying other feed supplements</td>
</tr>
<tr>
<td></td>
<td>• supplying climate tolerant fodder saplings and seed</td>
</tr>
<tr>
<td></td>
<td>• demonstrating fodder storage approaches</td>
</tr>
<tr>
<td></td>
<td>• giving breeding advice on selection of high quality breeding animals</td>
</tr>
<tr>
<td></td>
<td>• collecting records in breeder villages to support performance recording and selection of outstanding breeding animals</td>
</tr>
<tr>
<td></td>
<td>• giving housing demos and advisory</td>
</tr>
<tr>
<td></td>
<td>• advising on farm hygiene and waste management</td>
</tr>
<tr>
<td>Farmer training through farmer field schools</td>
<td>• organizing monthly training sessions to train farmers in batches of 20-25</td>
</tr>
<tr>
<td></td>
<td>• ensuring farmer participation for 4-8 training sessions to learn skills necessary for improved feeding, animal health, breed improvement, housing and water availability, farm hygiene; producing animals for market demand</td>
</tr>
<tr>
<td></td>
<td>• providing ongoing coaching to farmers</td>
</tr>
<tr>
<td></td>
<td>• organizing exposure visits to aid peer-to-peer learning</td>
</tr>
<tr>
<td>Risk mitigation</td>
<td>• helping producer groups to access livestock insurance</td>
</tr>
<tr>
<td></td>
<td>• assisting farmers with insurance claims</td>
</tr>
</tbody>
</table>

The key outputs tracked are number of: producer groups formed; service centers established; Pashu sakhis trained and equipped; breeding bucks and boars supplied; farmers trained; farmers with improved shelters; animals vaccinated; and goats, pigs, eggs and birds marketed through producer groups. Value addition is through providing quality eggs and healthy market animals of consistent size and numbers according to market demand. The key outcome was that 70 percent of targeted households increased marketable surplus of select meat and eggs and are expected to achieve targeted net profits for goat, layers and Kuroiler mother units of at least INR 1 lakh annually; and pig, broilers and small scale Kuroiler delivering INR 65,000, 42,000 and 14,000, respectively.
**Key Learnings**

**Master Trainer Pashu sakhis effectively train Pashu sakhis.**

Master Trainers travel within the state and stay overnight for several nights at village training sites. Master Trainers are certified by Agriculture Skill Council of India (ASCI) with the same test that is used to certify vets or paravets. The most effective Master Trainers are: Pashu sakhis with 2-3 years of experience, and ideally women as they also have experience in livestock rearing. Master Trainers also enable sustainable expansion of the Pashu sakhi program after the project ends. Government Animal Husbandry Department staff often do not have the required skills and knowledge in diverse areas for supporting productivity enhancement, marketing, farmer skills development and risk management to be Master Trainers. Vets/paravets are not officially certified by ASCI as Master Trainers.

**Empowerment and entrepreneur training are critical to revenue generation and sustainability.**

Sustainability of Pashu sakhi relies on a viable revenue model based on charging fees for services. Two years into the JOHAR Pashu sakhi program and after about 6 months of field practice, each Pashu sakhi initially covers about 50 animals monthly owned by 50 farmers in 1-2 villages, with the aim to double this. There is considerable variability in earnings from over INR 6,000 to INR 12,000 per month based on availability and experience of the Pashu sakhi; they receive a subsidy of INR 1,200 per month during the initial 2 years until they can establish their business. Earning success is enhanced by empowerment and entrepreneur training, which builds confidence, provides charge rates for suggested services, as well as builds capacity in managing inventory and finances. Ongoing coaching of Pashu sakhi through biweekly meetings builds confidence and support and offers a peer mechanism for problem-solving.

**Access to quality, cost-effective and timely inputs in adequate quantity through Livestock Service Center according to a viable business model.**

It is critical to connect Pashu sakhis to the input supply chain that assures sufficient quality, quantity and timely availability of feed and nutrition inputs, as well as vaccine and animal health inputs (like dewormer). Bulk purchase of inputs by the producer group and making it available through the Livestock Service Center where the Pashu sakhi can access, is not only cost-effective, but also enables suitable storage, including refrigeration for vaccines. The Livestock Service Center is managed by the farmer producer organization. The Livestock Service Center is a new innovation that supports market.
aggregation, access to inputs and also serves as a demo and training hub.

**Impact on productivity dramatically higher than anticipated.** Project data showed that mortality among livestock before JOHAR, which was upwards of 35-85 percent, got reduced because of services offered by Pashu sakhi.

**Certification rate is nearly 100 percent and higher than expected.** This is because of the careful selection of Pashu sakhis by producer groups and the excellent training by the Technical Service Provider, which resulted in 100 percent of them being certified by ASCI.

Pashu sakhis are ready for certification by ASCI after the third training session and 6 months of experience. Pashu sakhis are effectively trained over 3 sessions of 7 days each, and each of these sessions covers new skills related to productivity (feeding, animal health, housing and management, farmer training and market support).

Currently 300 Pashu sakhis have reached the necessary training requirement for ASCI certification, and have been certified based on both an online test and oral examination by veterinarians contracted by the ASCI.

**Use of social media application “WhatsApp” has proven extremely successful for peer and emergency support.** WhatsApp is used to share good practices among Pashu sakhis; both video clips and photos are taken to share experiences. WhatsApp has been vital for providing timely emergency backup support to Pashu sakhis to receive advise on actions to take or resolve challenges.

One of the major challenges is the lack of timely diagnostic services and emergency support services from the Animal Husbandry Department. Options for an effective and sustainable approach to diagnostics are being explored.

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*Image Credit: Helen Leitch*
Way Forward

The JOHAR Pashu sakhi model is being expanded to other states through new project financing to firstly hire an experienced technical service support organization to build capacity of a Master Trainer Pashu sakhi cadre, facilitate training and equip Pashu sakhi to support productivity, market access, farmer training and risk management. Lessons learned are being shared broadly.

An alternative strategy to support disease diagnostics is under development that will make maximal use of cheap, accessible diagnostic kits and low cost technology like famacha cards to assess parasitic infection to inform deworming regimen. Private diagnostics labs may also prove to be a viable option. An App-based decision support system for supporting disease diagnosis would also be useful.

Emergency veterinary services alternatives are being explored (to support cases such as difficult kidding problems or undiagnosed diseases), via Corporate Social Responsibility (CSR) initiatives that support emergency animal health services.

Opportunities for better integration with Animal Husbandary Department are being explored to support animal health services more broadly in the state, and monitor animal health coverage.

ABOUT THE DISCUSSION NOTE SERIES

This note is part of the South Asia Agriculture and Rural Growth Discussion Note Series, that seeks to disseminate operational learnings and implementation experiences from World Bank financed rural, agriculture and food systems programs in South Asia. JOHAR livestock activity was designed supervised and implemented with technical support through the joint program with UN Food and Agriculture Organization (FAO).

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LEVERAGING FARMER PRODUCER COMPANIES TO TRANSITION TO MARKET-BASED PRODUCTION SYSTEMS IN JHARKHAND

Key achievements

JOHAR’s strategic marketing interventions to support Farmer Producer Companies (FPCs) increased sales for poultry and tomatoes

19 FPCs, covering 1.4 lakh households, promoted to avail quality inputs and access more lucrative output markets

Context

Small and marginal farmers in India struggle for access to good quality inputs in farming of crops (seeds, fertilizers, crop protection) and livestock (stock species, breed, density, feed consumption); credit; market acceptance (such as for a new product); connectivity (for bulk marketing); and storage facilities. Aggregation of farmers into Farmer Producer Companies (FPCs) has shown to overcome many of these problems.

JOHAR FPCs are unique compared to existing ones because of their huge membership base (7,000–8,000 per FPC), shareholder composition (only women), and product basket with produce that helps double incomes.

JOHAR has planned to promote 30 FPCs covering 2 lakh households of which 19 FPCs are operational, to enhance agricultural incomes of rural producers by increasing productivity, improving market linkages and providing value addition. FPCs formed under the JOHAR project were successful in increasing production and farmer incomes by opening up a new source of earning.

Ensuring market access would further boost farmer livelihoods. For this, it is important for FPCs to have sustainable market linkages with different types of buyers, such as wholesale markets (intra- and inter-state), modern retail chains, business-to-business e-commerce players and corporates dealing with food processing. However, capacities

1. Jharkhand Opportunities for Harnessing Rural Growth
2. Many organizations such as NABARD, SFAC, FORD Foundation, Rabobank Foundation, HIVOS, State governments, Tata Trust and Corporates have taken initiatives to support the promotion, registration, and growth of these FPOs. In the process, thousands of FPCs came into existence throughout the country.
Problem Analysis: Kuroiler

Kuroiler (a breed that produces more eggs than the native or desi breed can also be sold for meat), is being promoted in the JOHAR project to increase household income of beneficiaries by selling live birds.

JOHAR Kuroiler has the following advantages over broiler:
- Less food safety risk as it is less exposed to antibiotics
- Reared in natural semi-intensive environment
- High content level of protein, calcium and vitamin
- Low level of fat content; and flesh and tastier meat

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Kuroiler</th>
<th>Desi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Multi-color</td>
<td>Multi-color</td>
</tr>
<tr>
<td>Annual egg laying capacity</td>
<td>150</td>
<td>40</td>
</tr>
<tr>
<td>Time needed to start laying eggs</td>
<td>22 weeks</td>
<td>33 weeks</td>
</tr>
<tr>
<td>Weight after 6 months</td>
<td>Male: 4 kg, Female: 2.5 kg</td>
<td>Male: 1 kg, Female: 1.2 kg</td>
</tr>
<tr>
<td>Food requirement</td>
<td>Normal household food</td>
<td>Normal household food</td>
</tr>
<tr>
<td>Bird price per kg (INR) (wholesale)</td>
<td>140</td>
<td>250-300</td>
</tr>
</tbody>
</table>

JOHAR Kuroiler has the following advantages over broiler:
- Less food safety risk as it is less exposed to antibiotics
- Reared in natural semi-intensive environment
- High content level of protein, calcium and vitamin
- Low level of fat content; and flesh and tastier meat

JOHAR Kuroiler is a hybrid breed of chicken developed by Keggfarms Group in Gurgaon, Haryana during early 1990s. It has been derived from crossing over either Coloured Broiler male with Rhode Island Red Female or White Leghorn Male with Rhode Island Red Female.
However, various poultry wholesale markets in and around Ranchi had low demand for Kuroiler resulting in it selling at the price of a broiler. The reasons for the low demand were attributed to existing market dynamics and customer perceptions regarding Kuroiler, such as the following:

**It is considered an adulterate of the native (desi) breed** which resulted in very low number of these birds sold per day.

**Lack of rearing of Kuroiler for commercial viability** through FPCs or cooperatives did not secure it as a product category in the marketplace.

*De-motivating for farmers* as they could not envision the benefits of rearing Kuroilers due to low price realization and sales volumes, because it was being sold at the price of broilers or as an adulterate.

**Lack of customer awareness** about Kuroiler made it unpopular with producers and to consumers.

**Lack of product validation before entering the market** resulted in poor understanding and communication about the added value proposition of Kuroilers over broilers and desi breeds, and hence, FPCs were not able to create a pragmatic market entry strategy.

**Competition from substitutes** such as Cockrail (another poultry breed very similar to desi breed).

**Absence of retailers** accepting Kuroiler, except a few counters where adulteration was noted.

**Confusion in positioning of Kuroilers** because these birds were neither considered premium like desi birds nor like broilers in the marketplace. Farmers were incurring high cost of production with respect to broilers (popular backyard poultry bird) and were expecting to sell Kuroilers at the price of desi birds.

Rearing cost for Kuroiler is higher than that for the broiler breed. Rearing for 15 days at the mother unit incurs a total cost of INR 39.50; rearing for another 30 days at the rearing unit incurs a total cost of INR 85–90 and by this time period a chick develops into a bird weighing 1–1.25 kg. However, the market was offering just INR 90–100 for a kg (i.e. at same price as that of broiler).

**Interventions: Kuroiler**

**Market positioning and segmentation.** The FPC targeted the educated consumer in the age group 30 plus years with a sedentary job or lifestyle, dwelling in urban posh areas of Ranchi city to position Kuroiler meat as safe for consumption.

**Pricing mechanism.** Kuroiler appears as an alternative to the native (desi breed) bird which can be available to consumers at an affordable (comparatively cheaper) rate. Thus, it was planned to manage pricing to a maximum retail price of INR 200 per kg so that the retailer could profit by a margin of 43 percent with FPC and as a member or grower profit by 12 percent and 25 percent, respectively.

**Positioning in retail outlets.** Through a buyer-seller meet, 10 retailers were chosen and provided a 3 feet length, 6 feet width, 2 feet depth cage each, at no cost for their retail counters. They were also supported through promotional materials. Depending upon the retailer’s demand, birds were supplied at their doorstep.
Tomato was selected as one of the key vegetables to be grown because it: (i) can be cultivated in all seasons and in all types of lands, (ii) has a good shelf life, (iii) is conducive for high scale production, (iv) provides a good profit, (v) can be sold through all types of channels, and (vi) has an established market both within and outside the state.

Jharkhand’s varied topography and climatic zones allows growing of tomatoes even during off-season. The majority of farmers under JOHAR grow cooking variety tomatoes accounting for 60 percent of the market share. Salad variety tomatoes (40 percent), usually sold through modern retail outlets (such as Reliance Fresh, Spencer’s) are sourced from other states. Produce from local farmers growing tomato varieties are not accepted due to lack of product standardization. Inconsistency in tomato varieties is due to huge variation in seed types used by the farmers. Moreover, farmers who produce tomatoes in small volumes sell in local markets at retail price and do not know the benefits of trading through FPCs. Size and weight variations lead to weighing of each crate before sales adding to the selling cost, which annoys buyers. Sometimes, overloading of crates adds to wastage due to mismanagement and damage during transportation.

Streamlined supply of birds. Murhu Nari Shakti Kisan Producer Company Ltd. was given the responsibility to ensure a regular supply to the 10 retail outlets. The FPC took responsibility for the arrangement of logistics, weighing and loading of birds in plastic cages. Losses incurred due to mortality and shrinkage during transportation were borne by the FPC.

Marketing communication. Regular news items were published in newspapers to communicate that Kuroiler meat is safe and available readily. Each retail outlet/counter was provided with pamphlets and standees to communicate the benefits of consuming Kuroiler meat and its advantages over other substitutes.

Problem Analysis: Tomato Marketing

In addition, farmers in Jharkhand prefer to know the selling price of their produce before committing to sales and usually choose to settle for a stable lower price over...
an unstable higher price. They also prefer to
collect cash at the time of transaction. FPCs
do not prefer transacting in cash as it could
lead to malpractices.
In the beginning, aspects of agri-marketing
such as demand estimation (seller and
buyer), price information, demand fulfilling,
Goods Receive Note issue, payment to
farmers, credit management, as well as data
validation/reporting were done in an ad-hoc
manner. Furthermore, not having adequate
number of staff at the FPC office, and not
having a financial management system for
producer groups and FPCs resulted in many
inefficiencies during operations.

Interventions: Tomato Marketing

Agri-marketing on a large scale consists of
key activities such as demand estimation
from buyers and suppliers, quality and price
verification, demand aggregation, billing,
logistics and payments. A technical support
agency (TSA) with experience of setting
up processes for agri-marketing was hired
to set up processes for FPCs and train
FPC staff to operate in a process driven
environment.

During the peak operation season,
many FPCs did not have accounts and
computers. A marketing plan workshop was conducted to set up processes for FPCs and train
FPC staff to operate in a process driven
environment.

During the peak operation season,
many FPCs did not have accounts and
computers. A marketing plan workshop was conducted to set up targets for three FPCs – Murhu Nari Shakti Kisan, Dakshin Koel
and Churchu Urja Shakti Kisan Producer
Company Limited. Post workshop, three
rounds of data validation exercises were
conducted for realistic production data.
Based on refined data, prospective buyers
were contacted by the FPCs.

Intense handholding support to the three
FPCs was planned for execution of agri-
marketing activities. FPC staff and board
members were able to positively influence
farmers to sell through the FPC and
mobilize produce from farmer members
through the following strategies:

Establishing product segments.
FPCs in JOHAR started providing inputs
(seed, fertilizer, and crop protection) and
Package of Practices to create standardized
products. In addition, to growing popular
salad varieties (Vaibhav and Vaishali),
discussions were initiated with interested
organizations for conducting pilots for
varietal trials.

Streamlining supply. A new
parameter called ‘number of saplings
transplanted’ was introduced to achieve
more accuracy in calculating the number
of plants and in turn, expected yield. FPC
collection centers (CCs) were planned at
strategic locations in existing trade routes to
have better access to farmers for inputs and
output sales. Physical presence of FPCs in
the form of CCs infused confidence among FPC farmer members to access a definite buyer/seller and switch from their existing trading partners.

**Demand aggregation.** The Board of Directors were tasked to participate in monthly farmer group meetings to explain the benefits of selling through FPCs. Haat campaigns were organized for each local haat, where FPC products were displayed, new farmers were mobilized and prospective suppliers traced for aggregation.

**Packaging.** Farmers were trained both on- and off-field to provide graded products with a uniform weight in FPC-provided crates. A regular training and messaging system for quality and weight reminders showed benefits in the marketplace.

**Price discovery.** Synergy Technofin (TSA for agri-marketing for JOHAR) did a three-month pilot to list the critical features and design requirements for developing a market intelligence system. The current offline system collected data from all relevant markets related to tomato trading for JOHAR FPCs. The proposed market intelligence App would provide pricing information to farmers at their doorstep.

**Payments.** Commercial wallets were used for instant payment to farmer’s bank accounts (with a fee of INR 5 for INR 1,000 transaction value). It was operated manually to pay farmers instantly. Chief executive officers and accountants were allowed to hold cash value equal to their monthly salaries for immediate cash payments. This would help new farmers to gain confidence in transacting with FPCs. After a few rounds of transactions, these farmers will be motivated to transact digitally with FPCs.

**Setting up business processes.** Accountants (hired on priority basis and trained on operating Tally) created standard line items to capture revenue and cost, leading to standardization, which resulted in significant improvement in reporting frequency and time. A Financial Management System was designed for transparency and accountability for segregating procurement activities from trading activities.

**Marketing plan.** A data validation exercise was planned to ascertain realistic numbers at the right time for execution of the marketing plan, and initiate a customer engagement activity to motivate farmers to feel connected with the FPCs and in turn sell their produce via them. Because of the marketing plan’s match-making process, farmers obtained practical experience of understanding time, quality, packaging and payment requirements of different types of buyers.
JOHAR’s strategic marketing interventions to support FPCs increased sales for poultry and tomatoes.

- Strategic marketing interventions created an increase in demand for Kuroiler. On alternate days, the FPC received a demand for about 150-200 birds, and on Sundays it increased to 250 birds.

- Increasing demand from retail markets pushed the wholesale market to restructure its benchmark pricing for Kuroilers. As a result, a wholesaler was ready to offer a price of INR 130-132 per kg at the farm gate.

- 263 metric tonnes of tomatoes worth INR 5.1 million were sold by the three piloting FPCs during the intervention period by following process-driven aggregation and sales.

**Key Results**

FPC successfully placed 1,700 birds and recovered more than 70 percent of payments within one month of starting operations.

**2019**

<table>
<thead>
<tr>
<th></th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of birds</strong></td>
<td>1,077</td>
<td>790</td>
<td>907</td>
<td>1,145</td>
</tr>
<tr>
<td><strong>Weight (Kg)</strong></td>
<td>982</td>
<td>742</td>
<td>877</td>
<td>1,111</td>
</tr>
<tr>
<td><strong>Reason</strong></td>
<td>Sale started with an expected jump due to promotional activities in print media</td>
<td>Sale dropped due to onset of festive season</td>
<td>Low stock of birds was noticed at the rearing units</td>
<td>Sale was high on account of Christmas and New Year and severe winter (non-vegetarian eating trends)</td>
</tr>
</tbody>
</table>

Time period of data: September to December 2019
Key Learnings

- FPC was able to capture and monitor data related to mortality and shrinkage in weight for each transaction. This helped the FPC to set standards for operational efficiency during transportation.

- A clear positioning strategy aided with regular communication in mass media helped retailers to accept Kuroiler as a premium product and increase their order size for chicks.

- Regularly educating FPC members about customer preferences and quality adherences, and providing training to respond to these market demands resulted in increase in number and volume of transactions.

- Need for market driven production to meet the significant demand for table variety tomatoes in Jharkhand. Standard varieties are not grown locally and as a result these varieties are sourced from far away states such as Karnataka and Andhra Pradesh. Hence it is important to conduct market assessment to find gaps and accordingly reshape production plans.

- Simple principles related to sorting, grading, and packaging helped FPCs to create a niche for tomatoes in wholesale markets. This created a positive impact on farmers to supply graded products.

- Rural business hubs were positioned as a strategic tool which operated as permanent CCs for both inputs and outputs. This physical proximity to farmer locations helped farmers in addressing initial trust issues related to procurement and payments. In addition, rural business hubs became focal points for communicating the benefits of transacting with FPCs and motivating farmers to join FPCs.

- Initially, tomato availability in any cluster was calculated based on the number of tomato samplings distributed and their expected yield as suggested by experts. These data were not helpful to the marketing team as real outputs have large deviations. Later, yield calculation method was changed by counting number of live plants and their expected yield in a periodic manner to increase the accuracy related to tomato availability.

- Bringing FPCs and market leaders together through a buyer–seller meet to explore possibilities for each other is an effective way to build relationships and start transactions. Hence, a buyer–seller meet was organized with market leaders, such as Big Basket (Kolkata), Big Bazar (Kolkata), Nature’s Cart (Ranchi), Reliance Retail (Ranchi), Mother Diary (Ranchi), Spencers (Kolkata), SMP Agro (Ranchi) and Jubilant Consumers (Noida) to initiate market led production and delivery systems and processes. This event not only cleared the doubts of FPCs relating to transaction activities such as quality requirements, payment terms and conditions, and logistics but also gave confidence and vision to adopt these practices that are followed by private sector players.
Challenges

Existing relationships between farmers and local traders.
Local traders source products from farmers either by pre-booking through various instruments such as supplying seeds, inputs, and offering token amounts as advance or by paying cash at the time of purchase. These relationships are age-old. FPC is not only a new entity in the market but also a competitor of the existing trader network. FPC’s procurement practices are different from that of traders, which are generally exploitative in nature. To break this nexus between farmers and traders is a huge challenge.

Unable to match demand and supply during festival season.
There was a surge in market demand at the end of Sawan month (July). By the time, FPC attained enough production during mid-September, demand declined due to onset of the Durga Puja festival. FPC was forced to hold the inventory during this time and started supply of birds after the end of the festival when demand for birds was revived.

Need for optimizing logistics.
The cost for transporting live Kuroilers was INR 9 per unit whereas the industry average is INR 4 per unit. This high cost of transportation resulted from underutilization of capacity during transportation, which has squeezed the profit margin of the FPC.

Weight and size issues.
Customers prefer birds of weight around 1–1.5 kg, but FPC was providing underweight (600 gm) birds, which is creating scope for customer dissatisfaction and loss of revenue for farmers.

Unexpected decrease in production because transplanting season for tomatoes was delayed by one-and-half months due to excessive rain for prolonged periods of time. The yield of tomato crops was affected, and many plants grew in size but did not bear fruit. This decrease in production led to forgoing of commitments made with buyers.

Lack of regulated markets in the state.
Jharkhand does not have an Agricultural Produce Market Committee (APMC) Act and the markets do not have the required infrastructure (roads, shops, parking facilities, drainage, waste disposal, storage facilities, price and quantity monitoring) to operate efficiently. Most marketplaces are haats that operate on a specific day of the week. Jharkhand is popular for off-season production of many essential vegetables which are sourced by traders from the neighboring states. These outstation buyers need better support and infrastructure while transacting with these markets.

Increase in retail sales.
Decreased yields led many farmers to sell their produce themselves in retail markets as prices were
quite attractive. FPC could not motivate farmers to sell through it as it was offering wholesale prices. As FPC is planning to increase the production volume for farmers, it will face hurdles in future in aggregation of produce due to misunderstanding of the pricing mechanism in retail and wholesale markets by farmers.

**Quality issues.** Tomatoes had dark spots and white lines on their surface, and many were misshapen due to prolonged rains. Due to poor quality, the quantity sold and sales price realization in wholesale markets were affected.

**Aggregating demand,** standardizing supply and estimating production volume for such a large number of farmers spread over 17 districts was difficult without use of technology. Many times, desired volumes were not available to transact with rewarding markets and buyers due to wrong estimations.

**Lack of market information and intelligence system.** Data collection related to market information are on need basis and reactive in nature. The decisions related to buyer engagement are taken in haste. Many times, farmers miss good opportunities existing in nearby markets due to lack of prior knowledge.
Expansion of rural business hub network. Rural business hubs will help FPCs to reach farmers in a strategic way. This physical presence will be aided with technology driven processes to carry out input and output businesses. Currently, JOHAR is using facilities provided by government to set up rural business hubs and in the future, FPCs will set up temporary rural business hubs as CCs to facilitate output procurement.

Developing market led production clusters. FPCs are planning to start new production clusters by increasing the area of cultivation for existing varieties and by introducing new varieties as per market demand. This would have the following implications: minimum scale will be available for transacting with big buyers; increase in yield and volume will increase the total income for farmers; and for new varieties, FPCs will have competitive advantage as a supplier.

Contract farming. FPCs are planning to undertake pilots on select crops, such as potato, tomato, watermelon, which have longer shelf-life and strong market requirements. These trials would be in collaboration with corporate buyers who will dictate quality specifications and handhold the production process by sharing and implementing Package of Practices, extending financial support, and buying back the produce. Based on the on-field experience, these pilots will be scaled for large scale production.

Establish farmer’s wholesale market. To address the lack of marketing infrastructure in the state, JOHAR FPCs plan to establish wholesale farmer’s markets in which bulk volume trading activities will be undertaken. Based on the learning from existing markets of Karnataka and Maharashtra, activities will be scaled up for creating more marketplaces, increasing capacities of existing markets, and introducing technology for automation and data communication.

FPC member training. Continuing awareness and training programs to educate FPC members about customer preferences and quality adherence would enable farmers to respond to market demands. JOHAR will engage with business-to-business e-commerce companies for hands on training on setting up CCs, quality management and periodic training on grading and packaging.

Robust supply chain. Efficiency is required in every step of the supply chain (such as bird availability, rearing, feed conversion ratio, vehicle occupancy, mortality of birds during transportation, placement of bird retail counters (occupancy, fill rate), and payments and credit management), and for each step there is an industry standard to achieve. JOHAR’s large geographic presence would allow the capture and reporting of data related to the above operational processes.
for different socio-economic conditions and would facilitate in creating area-specific operational standards.

**Price fixation and monitoring.** For Kuroilers in Jharkhand, price fixation is not yet scientific. With a sizeable customer base, demand volume, and distribution network, JOHAR will devise a price fixation mechanism for Kuroilers for the whole state and will regulate the price dissemination systems and processes.

**Making marketing intelligence App reachable and usable.** Regular trainings will be facilitated to use this App for extracting market information before making transactions. A feedback system will be implemented to understand the difficulties in the use of this App, and based on the responses new versions will be launched.

Image Credit: Rohit Jain

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**ABOUT THE DISCUSSION NOTE SERIES**

This note is part of the South Asia Agriculture and Rural Growth Discussion Note Series, that seeks to disseminate operational learnings and implementation experiences from World Bank financed rural, agriculture and food systems programs in South Asia.

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PIONEERING NEW APPROACHES TO RURAL AGRI-ENTREPRENEURSHIP SKILLS DEVELOPMENT IN JHARKHAND, INDIA

Key achievements

1,202 community service providers assessed as Trainers and Master Trainers under the National Skills Qualification Framework for the JOHAR project by the Agriculture Skill Council of India.

Context

Agriculture and allied sectors in India are amid rapid change with growing urbanization leading to shifts in consumption patterns from cereals to high-value commodities. Specific commodities underwent rapid growth, leading to an increase in agricultural exports over the past decade. However, skills training approaches (to increase competitiveness and employment in income generating commodities of agriculture and its allied sectors) have been mostly unsuccessful in targeting rural producers and rural youth. While the percentage of skilled workforce in developed countries is 60–90 percent of their total workforce, in India only 5 percent of its workforce (in the age group of 20–24 years) has formal vocational skills.

It is imperative for India, with median age of population at 29 years and 64 percent in the working age group as of 2020, to build a skills base, ensure robust skilling for better wages at entry level, and facilitate the need for training and certification to have qualified, trained human resources. Any initiatives on skill development and entrepreneurship across the country have been highly fragmented and constrained by poor knowledge and limited skill-sets of on-ground community service providers (CSPs), reflecting inadequate capacity. Jharkhand has a large proportion of marginal and small landholders (84 percent), who mainly practice rain-fed, single-crop subsistence farming, cultivating a low-yielding variety of paddy. A vast majority of these rural producers are unable to transition to high-value commodities. The average landholding per farmer is 1.17 hectares. Of the 3.43 million hectares of cultivable land, only 2.23 million hectares (65 percent) is being farmed leaving nearly 35 percent of cultivable land fallow. Small livestock rearing and fish farming in catchment farm ponds, tanks and reservoirs could be important potential sources of livelihood for these rural households. Collection and sale of non-timber forest produce (NTFP) contributes substantially to incomes of forest dwellers and inhabitants of hamlets surrounding forest areas, who are mostly disadvantaged and landless communities belonging to ‘particularly vulnerable tribal groups’.

This note explains the skilling and rural agri-entrepreneurship approach, process design, learnings, and the way forward of the JOHAR skilling initiative.

1. Jharkhand Opportunities for Harnessing Rural Growth.
2. High-value commodities include fruits and vegetables, dairy, fish, eggs, pulses, and small ruminants.
3. “Skilling in Agri-Sector for Growth & Sustainability - Mapping of Institutional Arrangements in the area of Education and Training in Agriculture” — CSIR NISTADS.
4. First-level CSP and Senior CSP are jointly referred as CSPs or cadres in this note.
6. Refer to Note 10 in this series. Leveraging community institutions to support agri-business and livelihoods in Jharkhand, India.
Government of India’s Skilling Landscape

The skilling landscape in India has undergone massive change in the past five years with revised strategies and models such as the creation of a separate Ministry of Skill Development and Entrepreneurship, revised policy on Skill Development and Entrepreneurship 2015, robust focus on convergence, formation of National Occupation Standards and Qualification Packs and declaration of new schemes like Startup Rural Entrepreneurship, Micro Units Development & Refinance Agency Ltd (MUDRA) and formation of sectoral Skill Council. In addition, schemes of Pradhan Mantri Kaushal Vikas Yojana and Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) for skilling India have been rolled out. The National Rural Livelihood Programme (NRLP) provides significant support to the institutional building of community institutions in rural/tribal areas, while the Mahila Kisan Sashaktikaran Pariyojana (MKSP) as a sub-component of NRLM focuses on capacity building of rural women concentrating on entrepreneurship development. National Skill Development Corporation (NSDC) was set-up as a public–private partnership to stimulate private sector participation in the Indian skill development sector.

i. India is among the countries facing the greatest skill shortages. Source: Manpower Talent Shortage Survey via OECD
ii. Government-funded programs that fully or partially subsidize training/apprenticeships, market-led trainings (where trainees pay for the course), market-led apprenticeships and industry-led/on-the-job training and long-term development finance. A core role of the NSDC is to provide long-term development finance to profit and non-profit organizations to build for-profit vocational training initiatives.
iii. A core role of the NSDC is to provide long-term development finance to profit and non-profit organizations to build for-profit vocational training initiatives.

Jharkhand State Livelihoods Promotion Society (JSLPS), under the JOHAR project is developing and nurturing about 7,000 CSPs with expertise in high-value agriculture (HVA), fisheries, NTFP, livestock, irrigation and agri-entrepreneurship. These CSPs are providing skilled technical services to tribal and rural women, producer groups (PGs), and agro-producers across the JOHAR project areas. CSPs are self-employed and earn user fees on the provision of services, and also incrementally increase their income as they gain experience and broaden their knowledge base through continuous interactions with the community and other stakeholders. Over the past few years NRLP, through CSPs, has provided technical support services (to HVA, NTFP and livestock producer households) as well as on-ground capacity and institution building support to community institutions.

JSLPS has collaborated with the Agriculture Skill Council of India (ASCI) for training, assessment and certification of trainers (Sr. CSP), certification of training centers and assessment and certification of trainees (first-level CSPs) under the relevant Qualification Packs (QPs) and National Occupational Standards (NOS) (for additional information concerning skilling landscape in India, refer to the box above). Under this agreement, ASCI is responsible for the training of trainers, assessing and accrediting training centers based on the recommendation of JSLPS, and assessing and certifying trainees/technical para-professionals for promoting HVA, livestock, fisheries, NTFP and irrigation.

Jharkhand State Livelihoods Promotion Society, under the JOHAR project is developing and nurturing about 7,000 CSPs with expertise in HVA, fisheries, NTFP, livestock, irrigation and agri-entrepreneurship.

Interventions

Structured two-tier system of CSPs. For training and capacity building of farmers of PGs, a two-tier system was developed at the village level. Each PG (approximately 40 to 50 farmers) received guidance and support from a first-level CSP. Ten such first-level CSPs were guided and supervised by a Senior (Sr.) CSP in the field. These CSPs collectively worked to execute the various field activities of the PGs.

The Sr. CSP was a ASCI certified trainer and responsible for imparting training and developing skill-sets of first-level CSPs in respective areas. Afterwards, first-level CSPs trained farmers of their PGs and developed their capacities.

Domain wise designation of CSP. According to the QPs, CSPs had certain designations/technical titles, that were used to define their actual skills and roles while searching for additional jobs. This process of standardization of job roles in rural areas helped develop confidence among those who received such trainings. The table on page 3 elaborates this point.

7. JSLPS, through the implementation of development and economic transformation projects (such as JOHAR, NRLM and NRLP), recognizes the need to skill rural producers, introduce them to new technologies and best practices. These will enable them to adopt new techniques, multiply the production of HVA, such as horticulture and other cash crops, and generate revenues. It is also facilitating opportunities in livestock and NTFP to make them more remunerative. It is, thus, essential to develop new mechanisms and strengthen existing ones to provide regular training and on-field handholding support to producers in agriculture and allied sectors.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Sr. CSP</th>
<th>CSP</th>
<th>Technical name as per QPs</th>
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<tbody>
<tr>
<td>HVA</td>
<td>Sr. Ajeevika Krishak Mitras (Sr. AKM)</td>
<td>Ajeevika Krishak Mitras (AKM)</td>
<td>Agriculture Extension Service Provider (AESP)</td>
</tr>
<tr>
<td>Livestock</td>
<td>Sr. Ajeevika Pashu Sakhi (Sr. APS)</td>
<td>Ajeevika Pashu Sakhi (APS)</td>
<td>Animal Health Worker (AHW)</td>
</tr>
<tr>
<td>Irrigation</td>
<td>Para irrigation Engineer (PIE)</td>
<td>Technical Service Provider (TSP)</td>
<td>Irrigation Service Technician (IST)</td>
</tr>
<tr>
<td>Fisheries</td>
<td>Sr. Ajeevika Matasay Mitras (Sr. AMM)</td>
<td>Ajeevika Matasay Mitras (AMM)</td>
<td>Fisheries Extension Associate (FEA)</td>
</tr>
<tr>
<td>NTFP</td>
<td>Sr. Ajeevika Van Mitras (Sr. AVM)</td>
<td>Ajeevika Van Mitras (AVM)</td>
<td>Non-timber Forest Produce Collector (NTFPC)</td>
</tr>
</tbody>
</table>

JOHAR Skills Process Flow

The flowchart explains the process of training and skilling of the CSPs under JOHAR, achieved in collaboration with ASCI.
The JOHAR project has taken concrete steps towards developing a skilled cadre base in agro-allied sectors through its community-centric approach of capacity building of CSPs and offering work opportunities with compensation to gain valuable experience and earn livelihood in the process. Besides, these cadres are helping the project by building the capacity of PGs and exposing them with new learnings, which has a direct application on the production, increase in productivity, marketing, and sustainability of the project.

**Successes**

**Creating a pool of trainers.** The model of training CSPs, their assessment, certification, and enrolment on the Takshashila platform served multiple purposes: (i) It built a skills base oriented towards training and certification of qualified human resources. (ii) CSPs received work opportunities and gained work experience, that was remunerative as well, which ensured their motivation to work, self-belief and proactive engagement with communities and local officials. Further, as CSPs travelled for work, they get exposed to newer environments, came across new work opportunities and accepted new training assignments. Overall, a pool of cadres will contribute to the project areas beyond the life-cycle of the project.

**Acceptance of QP based skill training in the agro-allied sector.** Awareness and training programs helped PG members understand the importance of skill training and certification. It will prompt many educated and semi-educated farmers or farm workers to undergo such training and certification. They can become self-employed and diversify their livelihood opportunities.

**Challenges**

**Research and appropriate training modules development.** 59 percent of the country’s total workforce is employed in agriculture in India. Building skills, creating job opportunities, and increasing productivity in the agro-allied sector is critical but challenging. Training provisions, capacity building and ecosystem in terms of QPs and training contents relevant to rural occupations and livelihoods are weak, requiring new research and appropriate training modules. Further, mapping of additional job roles and existing modules or package of practices need to be included in the National Skills Qualifications Framework (NSQF).

**Sourcing of candidates to train as a community service provider.** JOHAR project requires a pool of trainers and master trainers for the dissemination of knowledge among the rural communities. But, a significant challenge is the identification of the right person from the community who possess the right ability and attitude to execute the knowledge transfer effectively with the perspective of career growth.

**Addressing eligibility criteria of CSPs to be Trainers and Master Trainers.** There is a considerable eligibility gap in the selection of suitable CSPs across the agro-allied sectors as per existing NSDC requirements. As per NSQF, job roles of the service providers defined in the table in the interventions section requires the minimum qualifications like Diploma, Graduation and Masters in respective domains such as agriculture, fisheries, mechanical forestry. The cadres who belong to PGs and are from the rural community do not possess the requisite degree which impedes in building a trained workforce.

**Conducting round-the-year refresher training** is crucial for the CSPs for their up-skilling, new learnings, and contribution towards the effective implementation of the project. Convergence with State Skill Development Missions and NSDC should be explored in which a structured training mechanism can be designed to strengthen the sustainability and qualifications of the CSPs.

**Planning beyond project life-cycle.** Currently, as part of the project design, CSPs are paid by the project itself. This ensures an average income of INR 5,000–6,000 per month. The impetus for CSPs to work hard and find additional work on their own is less as the project provides a specific complacency, which limits the scope for engaging in entrepreneurial endeavors.

**Enhancing focus on entrepreneurship.** A need-analysis in coordination with the domain leads needs to be carried out to explore the agro-entrepreneurship avenues in the program and the project areas and engage with the trained cadres to take up entrepreneurial activities.

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8. Takshashila is an initiative by NSDC under the Skill India mission. The portal serves as a dedicated online platform for the management of trainers and assessors of the Indian short-term skill ecosystem, functioning as the central repository of information concerning development of quality trainers and assessors.

9. NSQF is a competency-based framework that organizes all qualifications according to a series of levels of knowledge, skills and aptitude.
Aarti Devi is 35 years old and lives in Banaidag village of Angara block in Ranchi district. She joined Sakhi Mandal in 2012. She was selected as Aajeevika Pashu Sakhi (APS) and was given training by JSLPS in 2013. After the completion of the training cycle, she started providing her services in her village and received some honorarium. Because the honorarium and her husband’s income were inadequate for the family, she began seeking opportunities to enhance her income.

Fortunately, the introduction of the JOHAR project in 2017 provided her with a tremendous opportunity. Recognizing her commitment and efforts as an APS, she was selected as Senior APS (Master Trainer) in the JOHAR project. She received a comprehensive 200 hours of training administered by the JOHAR Livestock team and Asset & W with the support of the skills team.

The training consisted of four modules: (i) aadharshila (foundation), (ii) bakari palan (goat rearing), (iii) suar palan (pig rearing) and (iv) murgi palan (poultry farming). These training modules are aligned with national QPs approved by the NSDC. After completion of the technical training (200 hours), Aarti received an additional 10 days of TOT (Training of Trainers) through ASCI.

After the completion of all trainings, she appeared in the examination conducted by ASCI wherein she scored 80 percent marks leading to her selection as Master Trainer. Further, with her name registered on the NSDC national portal – Takshashila, she became a duly certified Master Trainer. With her certified skill-sets, she is now capable of providing training and services in Jharkhand and beyond, which is a great achievement for her.

Since July 2018, she is working as a Master Trainer and provides module training as well as TOT to the Pashu sakhis in various districts of Jharkhand. For each training, she receives a daily honorarium of INR 750 and conveyance charges. As a Master Trainer, she is engaged for eight to ten days of training every month. Additionally, she provides her services as an APS in the village. Together with her Master Trainer services and APS honorarium, Aarti earns around INR 8,000–10,000 monthly, which is a significant improvement over her earlier earning of just INR 15,000-20,000 annually.

Narrating her transformation, she says, “I always wanted to financially support my family and have my own identity, as well. Therefore, immediately after joining the Sakhi Mandal, I became an APS. However, the meager honorarium, along with my husband’s income, was hardly enough to sustain my family. But getting selected for the Master Trainer was like a dream come true. Now, I am being hired to provide APS training in different districts, and my earning has increased manifold. Further, I can send my children to a good private school in Ranchi, and my family now enjoys a decent quality of life. Most importantly, not only my villagers but people of different districts recognize me and look at me with respect. My confidence has improved a lot, and I’m proud of my achievements.”
Way Forward

Ensure appropriate training infrastructure. This would include the need to:

- perform new research and needs assessment for developing training contents relevant to rural occupations and sustainable livelihoods.
- create a pool of CSPs with opportunities beyond the life-cycle of the project.
- ensure training of competent experts/service providers: to comprehensively cover a large dedicated zone on multiple job requirements; to take on a cluster approach in terms of coverage of cadres as well as households; and provide trainings in various job roles round the year.
- ensure that the project does not stress on skilling in various job roles that are not yet approved under NSQF.
- ensure training of CSPs in multi-modules to cater to various geographical areas and domains.

Explore avenues for including people with limited education but extensive farming experiences by re-examining qualification criteria.

- In rural areas, most of the people do not study till college and a good majority study till 10+2 only or below matriculation. Higher educational qualification is a major preventive factor and excludes people with limited education. Therefore, if the NSDC or NSQF re-examines educational qualification requirements and lowers the bar for eligibility, then more people can gain access. This process will ensure that many more become eligible and receive instruction, increasing the pool of trained workforce in rural areas.
- Increase access to higher education for rural youth.

Access to new technology platforms and convergence with Krishi Vigyan Kendras.

- Multiple new technology platforms/jobs sites (such as Baba Jobs, Youth4work) are available where CSPs can enrol themselves to seek further work opportunities. Such avenues need exploration within the purview of the project. However, there may be constraints if these job sites are not addressing agriculture and allied sectors.
- Converge with Krishi Vigyan Kendras (KVKs)10 and other such agencies that impart training to farmers, rural youth and grass roots level extension workers in broad-based agricultural production systems. JOHAR can converge with KVKs for skilling and refresher training courses, as well as engage in strategic deliberations with job sites to create work avenues to its trained CSP cadres beyond Takshshila.

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10. KVKs are agricultural extension centers for imparting vocational training to practicing farmers, school dropouts and field level extension functionaries in the rural areas.
MARKET PROVISIONING OF TECHNOLOGY-ENABLED AGRICULTURAL SERVICES IN INDIA

Context

Farmers in India, especially smallholders, face a number of challenges that make their income streams low and unreliable. These include: (i) low productivity due to degradation of soil quality, insufficient water, poor quality of inputs, poor production practices, pest and disease attacks and insufficient access to tools and implements; (ii) shortage of formal credit to purchase inputs in part because of transaction costs and perceptions of repayment risks of formal lenders; (iii) climate variability leading to low productivity and wastage of inputs and produce (such as unexpected rains washing away fertilizers or ruining crops); (iv) market risks including price volatility and not availing the best market price available; (v) lack of storage facilities or processing to realize higher incomes; and (vi) inefficient business processes of farmer producer organizations (FPOs) leading to difficulties in offering collectivized services to their members. All of the above combine to make smallholder farming a risky business that generates losses all too often.

Small farm sizes, low incomes and declining last-mile extension services by the government prevent farmers from investing in productivity enhancing technologies thereby increasing the chance that they stay in a poverty trap. Low willingness and ability to pay has deterred private provisioning of services. However of late, entrepreneurs and investors seem to be convinced that there are enough efficiency gains to be had for them to profitably provide income enhancing services that address the above challenges.

In this context in recent years, a slew of start-up companies have entered the agriculture sector with a fee-based revenue model alongside leading technology firms like Microsoft, IBM and Google. Armed with technology, data analytics capabilities and risk capital, these agritech firms provide a range of services to farmers from input sales and conventional cropping advisories, to hiring out farm implements and sales. For farmer collectives and for institutional buyers, farm Enterprise Resource Planning (ERP) software are being used for automation across the value chain and for traceability. Finally, some forecast weather, pest and disease attacks and yield and loss estimates, automate optimal irrigation and provide intelligence on borrowers’ creditworthiness and claims payouts to banks and insurers. There are around 450 agritech firms in India today; of these 35 were started in 2018 alone. Venture capital jumped up from US$73 million in 2018 to US$248 million in 2019 (as of July). A NASSCOM report states that about half of the agritech CEOs interviewed expect that one of the firms in this space will reach a valuation of US$1 billion within the next three years.

This note explains the services offered by these firms and provides a perspective on these services based on experiences in World Bank projects and stakeholder interviews.

Armed with technology, data analytics capabilities and risk capital, agritech firms provide a range of services to farmers from input sales and conventional cropping advisories, to hiring out farm implements and sales.

1. There appears to be no clear definition or categorization of agritech services. The National Association of Software and Service Companies (NASSCOM) report includes Samunnati’s lending to farmer collectives and DeHaat’s selling of input and outputs under agritech though neither uses any specialized technology that is core to their business. Agritech can be broadly denoted as private provisioning of goods and services to stakeholders in the farming ecosystem, using better organization and software to formalize or modernize the sector or using analytics and prediction technologies.

Interventions

**Market-provisioned technology-enabled agricultural support services.** The table below summarizes the technology-enabled agricultural support services offered based on the type of service and illustrative providers. Most of the expansion appears to be in the marketing space based on the number of players and marquee investments made. Services are classified into three categories based on the level of technological complexity of the solution offered: (i) conventional services, (ii) newer services using mature technologies, and (iii) advanced analytics based services.

<table>
<thead>
<tr>
<th>Type</th>
<th>Specific services</th>
<th>Selected providers³</th>
</tr>
</thead>
</table>
| **Inputs and cropping advisory and forecasting services** | Sale of quality inputs  
Advisory on inputs, crop selection, package of practices, pest and disease remedial action  
Weather forecast to schedule farmer operations better  
Pest and disease attack forecast and protection advisory  
Predicting sowing and harvesting windows  
Forecasting crop health and yield | Agrostar  
Weather Risk Management Services  
Satsure  
IBM  
Vassar Labs  
Farmguide |
| **Marketing and sales**                            | **Inputs and cropping advisory and forecasting services**  
Advisory on inputs, crop selection, package of practices, pest and disease remedial action  
Weather forecast to schedule farmer operations better  
Pest and disease attack forecast and protection advisory  
Predicting sowing and harvesting windows  
Forecasting crop health and yield | DeHaat  
Ninjacart |
| **Enterprise resource planning (ERP) software for FPOs** | **Inputs and cropping advisory and forecasting services**  
Advisory on inputs, crop selection, package of practices, pest and disease remedial action  
Weather forecast to schedule farmer operations better  
Pest and disease attack forecast and protection advisory  
Predicting sowing and harvesting windows  
Forecasting crop health and yield | Cropin  
FarmERP  
SourceTrace |
| **Credit and insurance**                           | **Inputs and cropping advisory and forecasting services**  
Advisory on inputs, crop selection, package of practices, pest and disease remedial action  
Weather forecast to schedule farmer operations better  
Pest and disease attack forecast and protection advisory  
Predicting sowing and harvesting windows  
Forecasting crop health and yield | Impact Micro Ventures  
Aye Finance  
Credit Vidya  
Think Analytics |
| **Precision irrigation**                           | **Inputs and cropping advisory and forecasting services**  
Advisory on inputs, crop selection, package of practices, pest and disease remedial action  
Weather forecast to schedule farmer operations better  
Pest and disease attack forecast and protection advisory  
Predicting sowing and harvesting windows  
Forecasting crop health and yield | Avanijal  
Conserwater |
| **Farm implements**                                | **Inputs and cropping advisory and forecasting services**  
Advisory on inputs, crop selection, package of practices, pest and disease remedial action  
Weather forecast to schedule farmer operations better  
Pest and disease attack forecast and protection advisory  
Predicting sowing and harvesting windows  
Forecasting crop health and yield | Oxen  
Goldfarm  
Trringo  
Kethinext  
Agribolo |

³ Most of these providers offer services in multiple categories. Disclaimer: the Bank does not endorse any of these companies.
Conventional services using software and Information and Communication Technology (ICT) channels.

- Inputs and cropping advisory: These include SMS and voice-based advisory on crop selection and production practices along with sale of the recommended inputs and package of practices reminders that are sent through SMS on the phone.

- Pest and disease prevention advisory: Farmers or community extension workers are provided with a mobile app to take a photo of the affected plant and send it to a back-end agri-specialist who diagnoses and recommends remedial action by phone call or through the app.

- Marketing and sales: The provider negotiates with buyers based on the harvest date and amount, and offers a price to the farmer in exchange for a commission. They further organize collection centers for sales after harvest. They also recommend good inputs and procure and distribute the same to farmers. The provider uses software for demand aggregation and logistics.

Newer services using mature technologies.

- Weather forecast-based advisories: Providers forecast rainfall and temperature 24 hours to 15 days in advance, downscaled to block or sub-block levels and advise farmers to schedule farm operations better (such as harvest a few days earlier before a thunderstorm destroys the crops). This has been enabled by use of satellite data, installation of automated weather stations and improved forecasting algorithms.

- Precision irrigation automation: Plants need a certain amount of soil moisture at different cropping stages. Providers use satellite data or field-installed sensors to determine current soil moisture and use weather forecasts to determine the ideal amount of irrigation. Internet of Things (IoT) controllers help release the right amount of water from the irrigation source to maintain ideal soil moisture for a given crop.

- Farm ERP software: This is end-to-end software which can help an FPO or the principal in contract farming arrangements to manage the entire value chain from crop planning, inputs supplies, credit needs, sowing and harvest dates, logistics, sales, invoicing and payment through to accounting. It has the potential to help an FPO or buyer to monitor and manage a large number of member farmers where manual processes would be too difficult. It can also provide traceability of food through the value chain.

Advanced analytics based services.

- Predicting sowing window: Recommending the ideal sowing window that would maximize yield based on historical sowing and yield data as well as weather forecasts.

- Estimating farmers’ sown area, current crop health and yield at the end of the season: Using historical data and satellite imagery, providers make available intelligence to: (i) inform lenders about the creditworthiness of a farmer; (ii) recommend the ideal repayment schedule for the lender’s loan collection officers; (iii) alert an institutional buyer in case the contracted quantity of yield may not materialize; and (iv) estimate yield to inform crop insurers the extent of losses and hence the claim payout amount.

- Automated diagnosis and prediction of pest and diseases: The provider receives the photo which is fed into a classification model that diagnoses and prepares an advisory. Additionally, based on the location, weather conditions, soil and water conditions, the forecasting engine can predict an imminent attack and warn the farmers through SMS.

4. IoT is a network of “smart devices” that can sense and interact with their environment by means of the Internet for their communication and interaction with users and other systems. In this context an irrigation IoT system will enable automated operation of pumpsets.
Potential clients. The table below lists the types of clients and how they benefit from Agritech services.

<table>
<thead>
<tr>
<th>Public, private, small banks, NBFCs</th>
<th>Borrower risk assessment and repayment collection intelligence to banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public and private insurers</td>
<td>Yield loss estimates to insurers largely of PMFBY to settle claims</td>
</tr>
<tr>
<td>Government</td>
<td>Departments of agriculture, horticulture, rural development and farmers who received individual advisory</td>
</tr>
<tr>
<td>Direct to farmers and FPOs</td>
<td>Farmer pays for inputs supplies and crop advisory is delivered through phones as SMS or through an app</td>
</tr>
</tbody>
</table>

Key Learnings (Assessment of the sector)

The sector is in a rapid growth phase. Agritech providers are profit-seeking firms operating on commercial principles and are funded by venture capitalists. While some earn user fees from farmers, others get paid by the government, buyers, insurers and lenders. Investors are interested because: (i) the agriculture market size is large, (ii) portfolio companies make regular earnings and the burn rate is moderate, (iii) there are large institutional customers like lenders and insurers, and (iv) low mortality rates of 10%–20% of these start-ups.

Multiple enabling factors. A combination of high penetration of mobile phones and data, free or cheap satellite data, and skills in machine learning\(^5\) and artificial intelligence\(^6\) as well as capital and interest of sophisticated human resources that apply modern business practices, has enabled providers to develop forecasting models and deliver advisories to farmers electronically at a lower cost compared to field extension services and with less reliance on scarce agriculture experts.

Sizeable early outreach. Aggregated sectoral outreach figures are not readily available. However, as the table below shows, the outreach of these services are considerable, well above pilot figures, and include high-profile projects and stakeholders.

Potential farmer impact. A randomized controlled trial of mobile based advisories delivered by Avaaj Otalo\(^7\) found that the demand for advice was high and the intervention was impactful. It increased the farmers’ yield of cumin (28%) and cotton (8.6%, for a sub-group that received the

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5. A class of techniques that enable a computer to do well, things which are difficult for humans, such as playing the game Go.
6. A class of techniques that enable a computer to do well, things that come easy to humans, but have previously been a struggle for computers such as identifying a cat in a picture.
7. This is a mobile phone-based technology that allows farmers in India to call a hotline, ask questions and receive responses from agricultural scientists and local extension workers.
Way Forward

Technology-enabled agricultural services are very welcome development, with the private sector offering a valuable service to large numbers of neglected poor customers. However support is required for this sector to survive, grow and deliver income-enhancing services to farmers.

**Support from government and funders:** Not all providers have comprehensive domain knowledge or viable models to work with poorer farmers who are of particular interest to the development sector. Hence more engagements with government subsidized projects to service low income farmers, already aggregated

**Benefits to lenders and insurers.** Better assessment of credit risk and loan monitoring helps banks target borrowers better and optimize repayment collections. This has the potential to enable private and public lenders to profitably cover more poor farmers. Correct and lower loss estimates can enable insurers to make correct and timely claims payouts to insured farmers.

<table>
<thead>
<tr>
<th>Provider</th>
<th>Outreach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satsure</td>
<td>- Lending intelligence to ICICI Bank’s 100,000 customers</td>
</tr>
<tr>
<td></td>
<td>- Loan monitoring of ICICI Bank’s INR 18,000 crore portfolio</td>
</tr>
<tr>
<td></td>
<td>- Loss estimates for settling 73,000 Pradhan Mantri Fasal Bima Yojana (PMFBY) crop insurance claims by various insurers</td>
</tr>
<tr>
<td></td>
<td>- Leading public and private crop insurers are using satellite data from analytics firms to estimate yield loss as per PMFBY guidelines</td>
</tr>
<tr>
<td>Vassar Labs</td>
<td>- Providing yield-increasing advisory through Multipurpose Extension Officers of the Department of Agriculture, Andhra Pradesh in a command area of 18,000 villages with 5 million farmers having varied land sizes</td>
</tr>
<tr>
<td>IBM</td>
<td>- Piloting farmer advisories through Krishi Vigyan Kendras (KVKs), including soil moisture, crop health and yield estimation, market price forecasts in 5 districts through Karnataka state’s agriculture department</td>
</tr>
<tr>
<td>Agrostar</td>
<td>- Several lakh farmers directly pay for agro advisory services, package of practices, and inputs through a call center delivery mechanism</td>
</tr>
<tr>
<td>Cropin</td>
<td>- Weather, pest and cropping advisories to 8,000 self-help group member farmers in Bihar and Madhya Pradesh, and to 30,000 farmers in Jharkhand</td>
</tr>
<tr>
<td>Weather Risk</td>
<td>- Sells income guarantee product to farmers directly conditional on farmers adoption of recommended package of practices</td>
</tr>
</tbody>
</table>

8. World Bank internal presentation.
into collectives will enable providers to gain experience of servicing smallholders profitably at a lower unit cost due to economies of scale and lower cost of client acquisition. As the initial willingness of farmers to pay is likely to be lower than the benefits, these government subsidized projects will help farmers test out and experience the value of these services to decide if they want to pay out-of-pocket after the project period.

**Data availability to speed up forecast services:** Availability and access to data is a major constraint. For a provider to predict, for example, when a pest will attack, it needs “training” data on past cropping practices, prevailing conditions and incidences of attacks from that pest to prepare a forecasting model. However, lack of access to such data is preventing providers from preparing more accurate models for more crops. Such data are available with agricultural universities and government departments and should be made available publicly.

**Hype cycle:** There is an over-promising of the accuracy levels of forecast-based services and a shortage of accuracy disclosure. Studies are needed to measure the accuracy of services, and develop common terminology and performance benchmarks for customers to gauge the quality. There is hardly any documentation on the effectiveness of these services.

More clarifying reports that demystify these services and illustrate the specific use cases through which agritech services will benefit the ecosystem will speed up understanding of this sector by potential clients. Carefully done evaluation studies will help make the benefits and use of cases clearer.

**Data privacy:** Government laws place restrictions on some providers from storing farmer level data on their servers, which makes data integration and hence delivery of services more difficult. In these cases it would be helpful to relax the restrictions and place other privacy protection policies so that farmers can be benefitted.
BUILDING RURAL POULTRY SUPPLY-CHAINS TO ENHANCE INCOMES THROUGH COMMUNITY-DRIVEN INTERVENTIONS

CASE STUDY FROM JHARKHAND, INDIA

Key achievements

Investment in layer farming has a strong potential to add nearly 50 percent to the overall rural household income of layer co-operative members.

Successful market linkages for collective procurement of inputs and sale of produce leveraged benefits of scale and improved market efficiencies for member producer households.

Context

Layer farming is an income-generating livelihood activity wherein egg-laying poultry birds are raised by a household for the purpose of egg production on a commercial scale. The few traditional rural producer households that are engaged in layer farming in Jharkhand are constrained by high input costs (such as pullets, feed, vaccinations), a high disease-based mortality rate, and poor access to credit, making it a less remunerative income source. Cereal-based feed is imported from Andhra Pradesh, Bihar and Madhya Pradesh, thereby escalating input costs. Jharkhand is dependent on egg imports from neighboring states, thus presenting a promising marketing opportunity within the state. However, low and fragmented production, coupled with poor market linkages and inefficiencies make it a challenge for households to realize remunerative prices from their produce.

As a part of its diversified and resilient production systems component, the JOHAR project has invested in layer farming under the livestock development sub-component, with the objective of improving rural livelihoods in Jharkhand.

This note investigates a layer co-operative’s federation, operational and production model as well as financial feasibility. An operational co-operative in Basia block, of Gumla district, was used as a case and analysed in detail.

The Basia layer co-operative model

Operates on a collectivization model linked to a network of producer groups

Leverages community-based institutional capacities as well as financial support from the Jharkhand State Livelihood Promotion Society and the Jharkhand Women Self-Supporting Poultry Cooperative Federation Limited

Includes 300 member households across 12 producer groups of 12 villages

Collects and markets on average 8,658 eggs produced by each household per month

1. Based on field studies conducted under the Jharkhand Opportunities for Harnessing Rural Growth (JOHAR) project
Interventions

Layer co-operative federated model

Under the JOHAR project, an initial grant of INR 1,20,000 per household was provided to producer groups (PGs) towards shed construction and INR 77,200 per member of the co-operative to meet working capital requirements with support from a federation.

In this model, the federation employed staff and deputed them to work at the co-operative and earn revenue from the supply of inputs (pullets, feed, medicines, and vaccines) to the co-operative. Meanwhile, the role of the co-operative involved utilizing this working capital to provide pullets, feed, medicine, vaccines and technical support to the PG member households. First, by using the capital for shed construction, the PG member households bore the costs of labor and undertook shed construction for the layer. Second, the members undertook

Cost-benefit analysis

A cost–benefit analysis was undertaken to examine the costs, revenues and investments of the operation and production model at the co-operative and co-operative member household levels. It included:

Household survey make of:
- Four randomly sampled villages (Longa Keonjihitoli, Lungtu Khas, Solangbira Bartoli and Sonmer Baharatoli) selected from 15 villages within the catchment area of the co-operative.
- Four randomly selected households from each of these four villages providing 16 households for the analysis from a total of 178 households where the production of eggs had already begun, at the time of data collection for this analysis.

Supervisor level survey of three randomly selected supervisors from the four villages.

Cooperative staff survey of seven members.

Follow-up meeting with the chief executive officer of Jharkhand Women Self-Supporting Poultry Cooperative Federation Limited (JWSPCFL), Ranchi to validate findings and fill in information gaps.

The analysis indicated that the co-operative is functioning profitably. The profit is expected to be divided among members which would amount to INR 64,069 per household.

3. JWSPCFL is a female farmer-owned enterprise that leverages a community-based model to build institutional capacity for the growth of small-holder poultry and layer farming in Jharkhand.
Layer co-operative operation and production model

At Producer Member Household Level

Costs were primarily incurred for labor for shed construction.

<table>
<thead>
<tr>
<th>Fixed costs for the cooperative member household</th>
<th>INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average one-off fixed costs per household</td>
<td></td>
</tr>
<tr>
<td>Cost of shed construction</td>
<td>1,60,000</td>
</tr>
<tr>
<td>Grant from PG for shed construction</td>
<td>1,20,000</td>
</tr>
<tr>
<td>Loan for shed construction from co-operative</td>
<td>40,000</td>
</tr>
<tr>
<td>Share capital</td>
<td>1,000</td>
</tr>
<tr>
<td>Membership fee</td>
<td>15</td>
</tr>
<tr>
<td>Labor cost</td>
<td>11,281</td>
</tr>
<tr>
<td>Total social investment</td>
<td>1,72,296</td>
</tr>
</tbody>
</table>

A part of the shed construction (INR 40,000) was borne by the households in the form of a loan extended by the co-operative at a 12 percent annual rate of interest. The value of labor for shed construction was incurred by the household as a one-time cost and amounted to INR 11,281. Besides, each household paid a share capital of INR 1,000 and a membership fee of INR 15 to the co-operative. Working capital costs were met through JOHAR, and thus households did not incur any substantive recurrent working costs, and had time to take care of the birds.

Revenue earning per egg on average was INR 0.30. Households sold 8,658 eggs in September 2019 with an average efficiency rate of 83 percent. Contributions towards loan repayment started once a member household’s minimum earnings from layer farming crossed the threshold of INR 1,000. The amount ranged from INR 100 to INR 800, based on the income earned by the household from egg production.

Profitability. On average a household had a net income of INR 2,278 per month. The average annual household income from all sources (including agriculture, livestock, fisheries, non-timber forest produce, wages and enterprise, and others) as per the JOHAR baseline report (2018) was INR 56,430, indicating that investment in layer farming has a strong potential to add nearly 50 percent to the overall rural household income. From a social perspective, the initial investment of INR 1,72,296 generated an annual net income of INR 35,076 (20.3 percent return on investment) which is also promising.
At Co-operative Level

Costs included expenses such as payment of staff salaries, staff travel, storeroom rent, stationery and printing costs, electricity costs, office maintenance, feed, seeds, medicines and vaccinations costs.

Total operating costs and sales revenue under the layer co-operative model

<table>
<thead>
<tr>
<th>Item</th>
<th>Per unit value (INR)</th>
<th>Gross value (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE (A)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales revenue</td>
<td>4.17</td>
<td>8,49,21,600</td>
</tr>
<tr>
<td><strong>WORKING COSTS (B)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>0.13</td>
<td>26,47,436</td>
</tr>
<tr>
<td>Feed and medicines</td>
<td>2.80</td>
<td>5,70,21,698</td>
</tr>
<tr>
<td>Admin expenses</td>
<td>0.05</td>
<td>10,18,245</td>
</tr>
<tr>
<td>Egg collection cost</td>
<td>0.10</td>
<td>20,36,489</td>
</tr>
<tr>
<td>Packaging cost</td>
<td>0.21</td>
<td>42,76,627</td>
</tr>
<tr>
<td>Reserve being kept by the co-operative</td>
<td>0.01</td>
<td>2,03,649</td>
</tr>
<tr>
<td>Payment to the household (egg purchase)</td>
<td>0.30</td>
<td>61,09,468</td>
</tr>
<tr>
<td><strong>Total working cost (B)</strong></td>
<td>3.61</td>
<td>7,35,17,260</td>
</tr>
<tr>
<td><strong>Profit (A)-(B)</strong></td>
<td>0.56</td>
<td>1,14,04,340</td>
</tr>
</tbody>
</table>

Initial shed construction, loan to households and working capital costs were largely funded by the JOHAR project. These amounted to INR 77,200 per member and was provided to 178 member households (INR 1,37,41,600). The total working costs for a year amounted to INR 7,35,17,260, i.e. approximately INR 3.61 per egg, of which INR 3.31 went as contribution towards meeting operating costs and INR 0.30 was paid to the household.

Revenue earning per annum was INR 8,49,21,600 (including interest). As the total annual working cost was INR 7,35,17,260, the operating profit would be INR 1,14,04,340. On average 56,000 eggs were produced a day with the last batch being sold for INR 4.17.

Profitability for the financial year ending 31st March 2019 was INR 45,000 reflecting that production had yet not been initiated by all the households. No dividends had been paid out to member households at the time of the study.

Key Learnings and Way Forward

Overall, this rapid assessment indicates that the layer co-operative model:
- is profitable, both at the co-operative and member household levels given the high annual rate of return on investment.
- is financially feasible as well as sustainable.
- allows households to leverage economies of scale and overcome market constraints of demand and supply because of the collectivization design.
- plays a role in enhancing rural incomes by encouraging social welfare and income equity point aspects.

Findings from a cost–benefit analysis framework provide an evidence base for informing future investment decisions to scale up the layer cooperative model. This shows promise economically for livestock interventions with potential of being scaled up and popularized. Specifically:

I. The JWSPCFL ensured capacity building for the sustained functioning of the Basia layer co-operative model, thus providing useful lessons for scaling up this design in layer interventions and other social
II. The collectivization model has the potential to be successfully employed in layer livestock development interventions when the co-operative is federated on an existing community-based organization such as the JWSPCFL.
III. The co-operative’s design can play a critical role in overcoming demand and supply-side constraints faced by rural households in terms of access to inputs and credit, high costs of inputs, as well as weak and fragmented market linkages by playing an intermediary role.
IV. The collective marketing of outputs within the layer model enabled the co-operative to leverage benefits of economies of scale and command better prices for eggs. This is an important finding given the need to improve market efficiency also from an economic policy perspective. The scaling up of this model may have the potential to reduce Jharkhand’s dependence on imported eggs from other Indian states. The economies of scale accruing on account of the streamlined and large-scale layer production makes layer farming more remunerative for member households as well.
V. The high annual rate of return on investment for co-operative member households indicates that investments
made in layer co-operatives hold the potential for enhancing rural incomes. For instance, an initial investment of INR 12,296 at the household level led to an annual net income of INR 27,336, after contribution towards loan repayment. The average annual household income from all livelihood sources as per the JOHAR baseline report (2018) amounted to INR 56,430. This highlights that investments in layer farming have a strong potential to add nearly 50 percent to the overall rural household income. This is promising from a social welfare and income equity point of view as well. It is also indicative of the JOHAR project’s impact on enhancing rural incomes.

VI. The repayment of loan principal and interest by co-operative member households showed a considerable lag requiring up to a decade for repayment. Investments in such a model must, therefore, take into consideration the time cost of investment recovery.

In conclusion, the JOHAR layer co-operative model shows promise for success towards realizing the pathways of enhancing rural farmer incomes. That said, the success of the model depends upon a high initial financial investment in the form of shed construction, access to credit and working capital requirements that had to be provided to each member household under the JOHAR project. Accordingly, decisions for scaling up and emulating this model must take into consideration the costs associated with investment recovery.

ABOUT THE DISCUSSION NOTE SERIES

This note is part of the South Asia Agriculture and Rural Growth Discussion Note Series, that seeks to disseminate operational learnings and implementation experiences from World Bank financed rural, agriculture and food systems programs in South Asia.

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