Project Mesha: transforming the lives of rural women through productivity improvements

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Formative evaluation report

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Note to readers

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Abbreviations and acronyms

BAHO	Block Animal Husbandry Officer
FMD	Foot and mouth disease
HH	Household
SHG	Self-help group
TVO	Touring veterinary officer

Glossary

BAHO: A block animal husbandry officer (BAHO) oversees the implementation of schemes and subsidies introduced by the Department of Animal Husbandry at block level. A block is a local administrative unit.

Bihar Rural Livelihoods Promotion Society/JEEViKA: India's Ministry of Rural Development has restructured the Central Scheme Swarnajayanti Gram Swarozgar Yojana into the National Rural Livelihoods Mission. As a first step in implementing the Mission at state level, the Bihar government has designated the Bihar Rural Livelihoods Promotion Society (locally known as JEEViKA) as the State Rural Livelihoods Mission.

The objective of the Bihar Rural Livelihoods Promotion Society is to enhance the social and economic empowerment of the rural poor in Bihar through the institutional platform of self-help groups, which were established under Swarnajayanti Gram Swarozgar Yojana and have now been absorbed into the National Rural Livelihood Mission.[1]

Chiks: Chiks are goat traders or middlemen who purchase goats from farmers and sell them to independent butchers or large meat markets. In some areas of rural Bihar, chiks also act as butchers, slaughtering animals and selling the meat.

District animal husbandry officer: This title refers to the head of the Department of Animal Husbandry at district level. The officer guides and instructs the institution throughout the district. Official responsibilities also include implementation of government schemes in cooperation with high officials.

Posiya: Posiya is a traditional practice of goat farming that is prevalent in rural Bihar. According to this practice, two goat farmers enter into a (verbal) agreement in which one loans a female goat(s) to another. In return, the borrower must take comprehensive care of the goat. If the goat gives birth to more than one kid during the duration of the contract, the lender and the borrower split the ownership of the litter. If the goat gives birth to a single male kid, the adult goat is sold in the market upon attaining maturity.

Profit from the sale is split equally between the borrower and lender. If the goat gives birth to a single female kid, ownership of the litter born from this goat is split between the borrower and lender, and the mother goat is returned to the owner. The practice also specifies that if a goat dies while in the care of the borrower, they are liable to compensate the original owner for the loss incurred. This agreement is largely beneficial for both stakeholders. In most cases, the borrower is able to eventually own a herd without investing substantial capital, and the lender benefits from reduced costs.

***Peste des petits ruminants* (also known as sheep and goat plague)**: This is an acute, highly contagious and economically significant transboundary viral disease among sheep and goats. Caused by the *peste des petits ruminants* virus, it is associated with high morbidity and mortality. It is regarded as the most economically significant viral disease of small ruminants, particularly goats, in areas where these animals are

[1] Bihar Rural Livelihoods Promotion Society website. Available at: http://www.brlp.in/web/brlp/objective.

intensively reared. The disease clinically manifests as fever, necrotic stomatitis, gastroenteritis, pneumonia and sometimes death. Outbreaks have dramatic consequences for animal owners due to high associated mortality rates.[2]

SHG: A self-help group is an informal association of 10–20 women belonging to the same village and sharing a common socioeconomic background. They are primarily affinity-based savings and credit groups. They provide microfinance services such as savings, credit, bank linkages, insurance, remittances and equity. They also offer collectivisation and group activities. SHGs offer social security and social action on various fronts including health, nutrition, food, gender and convergence, either directly or through their federations.[3]

TVO: A touring veterinary officer is responsible for the treatment of ailing animals such as vaccination and castration in the designated catchment area. TVOs travel to villages to provide these services.

[2] Information on the disease was sourced from the following websites: available at: <https://www.merckvetmanual.com/generalized-conditions/peste-des-petits-ruminants/overview-of-peste-des-petits-ruminants?query=petits%20ruminants>[Accessed April 2020]; <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3889233/> [Accessed April 2020]

[3] This definition was sourced from the Aajeevika FAQ page (http://aajeevika.gov.in/content/faq), as well as the website of NGO Pradan, the official NGO partner for JEEViKA in Bihar (https://www.pradan.net/).

1. Introduction

The importance of goats and other small ruminants to rural economies, and their potential for income generation, risk mitigation and financial resilience have been well recognised among livelihoods experts and practitioners. Goat farming requires fewer materials and financial resources than raising large animals such as cattle and buffalo. Thus, this can be a low-cost livelihood support model for the poorer sections of society comprising the landless, women, small and medium farmers (South Asia Pro-Poor Livestock Policy Program, FAO 2010).

In India, goats account for over one quarter of all livestock and provide livelihoods for an estimated 33 million households, the majority being landless or marginal landholders and/or farmers. A national representative survey of land and livestock holdings in India found that landless farmers, or those with less than one hectare of land, comprise nearly 70 per cent of goat farmers (Government of India, Ministry of Agriculture and Farmers Welfare, 2016).[4] Goats are primarily raised for meat and milk – markets that are growing both nationally and internationally.

Despite the potential benefits from goat farming, the number of goats in India declined between 2007 and 2012, unlike large ruminants.[5] High mortality and morbidity among goats indicates the low priority and limited investment these animals receive.[6]

1.1 About the programme

Against this background, the Aga Khan Foundation – in collaboration with the Bihar Rural Livelihood Mission (JEEViKA) and with support from the Bill & Melinda Gates Foundation – proposes to implement Project Mesha, a women's empowerment project, in four blocks of the Muzaffarpur district of Bihar. The study was implemented in 2016.

Mesha means 'goat' or 'sheep' in Sanskrit, and the programme's stated objective is 'to transform and improve the quality of life of landless and marginal farming households in Bihar, India, through improvements in small ruminant production'. Women who formed self-help groups (SHGs) under the Bihar government's JEEViKA programme will form goat producer groups as part of Project Mesha.

The programme envisages the SHG platform as a nucleus for imparting new knowledge and skills in goat rearing, as well as empowering women. In order to increase awareness and provide chargeable goat-related services on the ground, the project proposes to develop and train a cadre of women paraveterinarians (paravets) across villages. It is hoped that this will ensure financial stability of the interventions from day one.

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[4] Ministry of Agriculture and Farmers Welfare, 2016. All India Report on Input Survey 2011-12, Government of India. Available at: <http://agcensus.nic.in/document/is2011/reports/all_india_report_2011_12.pdf> [Accessed 24th April 2020]

[5] The number of milch animals (in-milk and dry) among cows and buffaloes increased from 111.09 million to 118.59 million, an increase of 6.75 per cent between the 18th (2007) and 19th (2012) editions of the Livestock Census. On the other hand, the goat population declined by 3.82 per cent.

[6] The average mortality rate of adult goats is around 40 per cent and among kids it is 50 per cent (Project Mesha documents). This was confirmed by interviews with experts from the Pusa Institute, Bihar Veterinary College and the BAIF Development Research Foundation.

Pashu sakhis (small ruminant healthcare providers) will be selected from the SHGs on the basis of their potential and interest in the work. The training will cover productivity enhancement activities such as better feeds, vaccinations, deworming, improved castration methods, formal marketing channels and hygienic shelters. Engagement in SHG activities will provide a foundation upon which the women could build goat rearing work. Decreased animal mortality and morbidity, improved goat health and subsequently higher incomes are the main mechanisms through which the stated project objectives will be achieved.

Similar community-based programmes for the improvement of goat farming practices are currently being implemented in other Indian states. There is also some indication that such approaches are successful in increasing productivity, incomes and resilience among poorer households. For example, a community-based service programme for small ruminants in Rajasthan's Udaipur district found that adoption of improved health, feeding and breed management among goat keepers led to better sales (ImGoats 2013).[7]

The Aga Khan Rural Support Programme in India previously implemented a similar project in Jhirniya block, Khargone, Madhya Pradesh. The project found that increased outreach of vaccination services, selection and promotion of community animal health workers, and enhancement of their capacity led to a significant reduction in mortality and an increase in the goat population.[8]

The feasibility of project implementation and its subsequent impacts are determined by a number of context-specific enabling factors and challenges. The objective of this formative study is to understand and assess the context in which Project Mesha would be implemented, and to inform the project's implementation, monitoring and evaluation systems.

This formative study was implemented in selected villages of the Muzaffarpur district of Bihar, one of the poorest states of India. The majority of Bihar's population is rural (89%, higher than the national average of 72%) and approximately 34% of rural Bihar's population lives below the poverty line. The state is characterised not only by its poverty, but also low literacy rates: 63.82%, as opposed to the national average of 74.04%, and female literacy is even lower at 53.7%.[9]

However, Bihar is one of the few Indian states whose goat population has gradually increased. It reported the third-largest number of goats in the country (12.15 million) in 2012, an increase of over 19 per cent from 2007, and one of the highest goat population densities in the country (Livestock Census 2012). The predominant breed of goat in Bihar is the Black Bengal, considered to be one of the world's finest for meat and leather.[10]

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[7] Available at: https://imgoats.org/2014/11/24/community-services-to-support-goat-production-in-india/ [Accessed 11 April 2016].

[8] De A, 2016. *Strengthening goat-based livelihoods in Jhirniya block, Khargone district, Madhya Pradesh, End Term Evaluation Report*.

[9] All statistics are from the 2011 Census of India.

[10] This information was gained through interviews with experts from the Pusa Institute, Bihar Veterinary College, the International Livestock Research Institute and the BAIF Development Research Foundation.

2. Objectives of the formative study

There are three main objectives of this formative study:

1. To gain a contextual understanding of goat rearing and management practices, as well as the associated demand- and supply-side constraints, in Muzaffarpur district in Bihar. This will subsequently inform the implementation of Project Mesha;
2. To validate the proposed theory of change for Project Mesha; and
3. To inform the output and outcome indicators that could be tracked at baseline, as well as in midline and endline impact evaluations.

2.1 Key questions

2.1.1 Objective 1: Gaining contextual knowledge

Specifically, the formative study will endeavour to address the following questions to inform this objective:

- What goat farming practices are followed in this area?
- What is the contribution of goats to overall household income?
- Who are the key stakeholders and decision makers in goat rearing and management in Muzaffarpur?
- What are the market linkages for the sale and purchase of goats?
- What is the existing healthcare system in this area?

2.1.2 Objective 2: Validation of the theory of change

While answering the key questions related to contextual understanding, we will additionally verify some key assumptions underlying the proposed theory of change for Project Mesha. We identified the following as key assumptions that could impact the project:

- That the SHGs are present and functioning in the project area;
- That there is demand for preventive healthcare, management practices and related services among goat farmers;
- That it is feasible to develop a cadre of community health service providers and producer groups from goat farmers in the area; and
- That women have agency to make economic decisions regarding goats.

This study administered a household-level questionnaire designed to gather data on goat mortality, morbidity, purchase and sale. It conducted focus group discussions with SHG members to understand the working of these groups, as well as qualitative key stakeholder interviews.

2.1.3 Objective 3: Informing output and outcome indicators

Household-level questionnaires and qualitative interviews were piloted during this period to assess the feasibility of data collection and inform the indicators to be collected, as well as their frequency and aggregation.

The report is structured as follows: Section 3 describes Project Mesha and its objectives in detail, along with its proposed theory of change. Section 4 describes the evaluation methods used in the formative study. Section 5 discusses key findings of the evaluation questions, and Section 6 concludes the report by summarising implementation challenges, our validation of the assumptions underlying the proposed theory of change, and proposed recommendations.

3. Project Mesha and its theory of change

The Aga Khan Foundation's Project Mesha was conceptualised with the goal of 'transforming the lives of women SHG members through productivity improvements in small ruminants'. The project seeks to transform and improve the quality of life of landless and marginal farming households in Bihar, India, by: improving small ruminant production; increasing and strengthening the role of women in the small ruminant value chain; and demonstrating an implementation model that can be expanded at significant scale through public investment.

The Bihar Rural Livelihoods Promotion Society (also known as JEEViKA) is operating at a significant scale, having established 186,000 SHGs with 2.3 million women members and with plans to reach 15 million women by 2022. In view of the important role of women in goat rearing and the significance of the practice for the poor in Bihar, Project Mesha aims to use the institutional platform of female SHGs to strengthen and improve goat rearing as a viable income earning opportunity. The project targets resource-poor households within four blocks of Muzaffarpur district, demonstrating a model that JEEViKA could potentially upscale to other districts.

In order to benefit 50,000 women SHG members, the project will initially develop a cadre of 250 female small ruminant health workers – each *pashu sakhi* would therefore potentially reach 200–300 households (800–1,000 goats). It is expected that this coverage would ensure the viability of *pashu sakhis* through income earned from regular vaccination against major diseases, deworming and other preventive health services.

Project Mesha will also seek to diversify the services of *pashu sakhis* and build their capacity to provide these services. To enable them to establish themselves as small ruminant preventive health service providers and gain acceptability and recognition among goat farmers in the area, the project will provide an output-based monetary incentive for the first two years.

The establishment of a cadre of cluster paravets has been proposed as the key link between *pashu sakhis* and the vaccine and dewormer supply chain, with 1 cluster supporting 10 *pashu sakhis.* The cluster paravets will be primarily responsible for facilitating bulk sourcing of vaccines and dewormers and making these available to *pashu sakhis* based on schedules developed by the *pashu sakhis* in consultation with SHG members. In order to facilitate and contribute to the sustainability of the cluster paravet cadre, Project Mesha will similarly provide an output-based incentive to the clusters for the first two years.

Key project activities will include developing the entrepreneurial skills of *pashu sakhis* and cluster paravets, diversifying the 'service basket', and undertaking a sustained community information campaign regarding the benefits of preventive vaccination and deworming. Investing in strengthening women's SHGs will facilitate collective action for women's rights, entitlements and economic empowerment. The project will also develop SHG-based community insurance models for goat rearing wherein SHG members collectively decide a premium amount for goat mortality. This will then be contributed voluntarily to a group insurance fund to be paid out to members in case of goat mortality or predation.

The project will form technical partnerships to provide ongoing support for development and administration of the training module for *pashu sakhis* and cluster paravets. This will include training of Project Mesha staff to administer the curriculum to ensure sustainability, supporting development of the supply chain for vaccines and dewormers (including facilitation of linkages with private sector suppliers), and supporting diversification of the service portfolio for *pashu sakhis* and cluster paravets.

3.1 Theory of change

The ex-ante theory of change for Project Mesha was created by the Agriculture Learning and Impacts Network. It demonstrates the implementation of a sustainable model for the delivery of preventive health services and livestock extension at significant scale (benefiting 50,000 SHG members in four blocks) in order to reduce high levels of mortality and enable goat rearing to develop as a viable income earning opportunity for women SHG members.

Project Mesha will use the collective SHG forum to build the community knowledge base on goat rearing, improve husbandry practices, and enable women goat farmers to advance further up the small ruminant value chain from their current limited role in the production and rearing. In parallel, project interventions will prioritise training and capacity building of women SHG members on their rights and entitlements. This is meant to increase women's social empowerment and contribute to their enhanced role at both household and community levels.

The viability of the above practices will be determined by the project's success along the following three major outcomes:

Increased income
The first key outcome is an increase in incomes from small ruminant rearing. To attain this, the project uses a comprehensive integrated approach that prioritises reduction in goat mortality and a simultaneous focus on improving the knowledge base and practice around the management of goat flocks.

National studies indicate a large unmet demand and supply gap for goat meat, which is presently the most expensive meat available, retailing at 50–150% higher than chicken meat. The predominant breed in the area is the Black Bengal (and its variants), one of India's finest meat breeds. Additionally, the Black Bengal is known for its prized leather value and high kidding rate. Twinning is a common trait, with triplets and quadruplets also reported.

Investments in reducing mortality, improving production, and facilitating access to markets for female goat farmers can potentially increase incomes and lead to the development of a recognised goat-rearing cluster that contributes healthy, disease-free goats to the market.

Women's empowerment
The second key outcome is the increased empowerment of women, which is perceived as the critical link that translates income gains from increased production to a greater role for women in goat rearing and improved well-being and status within the household and community. Increased access and control over incomes from goat rearing is

expected to translate into improved nutrition and health outcomes for women. This is a key hypothesis that Project Mesha will assess.

Working through and further building the collective strength of SHGs, and linking these institutions to higher federations such as producer companies for goat marketing, is expected to further improve the status and recognition of women at household and society levels. Towards achieving this outcome, the project will focus interventions on training and capacity building of women SHG members with regard to improved management of goat flocks, increased access to and control over productive resources, community insurance for goats and an increased role in decisions related to income from goat sales.

In partnership with non-profit Anandi, Project Mesha will prioritise the development of a training curriculum for women's empowerment, leadership and decision-making both within the household and community, and an increased role in the small ruminant value chain. Project Mesha will focus on building a shared goal among SHG members: to strengthen and increase incomes from goat rearing, and take collective decisions to improve goat productivity.

Adoption of approaches by the State Rural Livelihoods Mission
The final key outcome is the adoption of programme approaches by the State Rural Livelihoods Mission, thereby potentially reaching one million women. The project will converge and work within existing women's SHGs to demonstrate approaches that can be replicated at scale through the Mission.

Integrating small ruminant productivity improvement interventions into JEEViKA SHG platforms is the best approach to test whether National Rural Livelihoods Mission SHGs can be used for agricultural interventions. Simultaneously, Project Mesha will work closely with the state Department of Animal Husbandry, leveraging existing schemes of the department for small ruminant farmers. Replication and upscaling of project approaches will, therefore, follow two strategic pathways: through the institutional platform of women's SHGs under JEEViKA; and through schemes, programmes and technical collaboration with the Department of Animal Husbandry.

4. Evaluation: Design, methods and implementation

4.1 Data collection for formative evaluation

The key questions proposed for this formative evaluation were examined using a mix of quantitative and qualitative methods exploring both demand- and supply-side constraints and opportunities. On the demand side, household-level quantitative surveys were conducted among goat farmers. Additionally, since Project Mesha proposes to use women's SHGs as an institutional platform for the programme, focus group discussions were organised with SHG members who were also goat farmers. On the supply side, key informant interviews were conducted with block- and district-level veterinary officials, chemists, private veterinarians and untrained animal health service providers.

4.2 Sampling

Project Mesha will be implemented in four blocks of Muzaffarpur district: Bochaha, Moraul, Musahri and Sakra. For this study, two villages were randomly selected from each block using the Primary Census Abstract of 2011 as the sampling frame. The demographic characteristics of these villages are summarised in Table 1.

Table 1: Demographic characteristics

District	Villages	HHs	Population	SCs	Male literacy	Female literacy	Cultivator HHs	Agricultural labourers
Bochaha	Bhagwanpur	1,346	6,147	1,068 (17%)	1,520	1,022	138 (10.25%)	703 (11.43%)
	Parati	615	3,338	188 (5.6%)	919	614	2 (0.32%)	4 (0.11%)
	Mirapur	2,072	10,778	1,685 (15%)	3,521	2,488	477 (23%)	1,246 (11.56%)
Moraul	Nigopur	669	3,067	1210 (39%)	1,056	723	200 (29.89%)	616 (20%)
	Rohua Apuch	1,163	5,738	451 (7.8%)	1,711	1,171	138 (11.8%)	549 (9.56%)
Musahri	Bhotaulia	144	673	283 (42%)	169	118	0 (0%)	55 (8.17)
	Narsinghpur	387	1,901	204 (10.7%)	587	377	70 (18%)	164 (8.62%)
Sakra	Khanpur Pearey	216	936	351 (37.5%)	291	189	6 (2.7%)	2 (0.21%)

Note: HH = household; SC = scheduled caste.

For the household survey, 4 goat-rearing households were selected from each village; the study surveyed a total of 8 villages and 32 households in the sample frame. Purposive sampling was adopted to select households in which members were available and agreed to be interviewed. The survey was targeted at the household member involved in the day-to-day activities of rearing goats.

There were two components of the household survey. The first was a quantitative section that collected information on current herd size, mortality and morbidity, costs of goat rearing and socioeconomic characteristics of the household. The second component comprised detailed interviews on management practices, household division of labour and decision-making related to rearing goats.

4.3 Stakeholder mapping

While piloting the study tools, a stakeholder mapping exercise was conducted with staff of the Aga Khan Rural Support Programme in India to understand perspectives on goat rearing among all stakeholders along its value chain. We identified the following as key stakeholders in the value chain of goat rearing: goat farmers, middlemen who link households to the goat meat market, health service providers (formal and informal) and meat sellers or butchers.

Table 2 shows the list of key stakeholders interviewed in each block. However, their importance, availability and accessibility varied across villages and blocks. For example, goat farmers from Musahri could easily access the block animal husbandry officer (BAHO). On the other hand, farmers in other villages mostly depended on chemists and vets.

Table 2: List of key stakeholders

Stakeholders	Bochaha	Moraul	Musahri	Sakra	Total
Block animal husbandry officer	1	1	1	1	4
Butcher	1	1	1	1	4
Drugstore keeper	1	1	1	1	4
Community buck service provider	1	1	-	-	2
Community mobiliser	-	-	-	1	1
District animal husbandry officer					1
Expert					2
FGD with SHG members	2	2	2	2	8
Homeopathic doctor	-	-	1	3	4
Households interviewed	8	8	8	8	32
Private vet		1			1
Untrained service provider	-	-	-	1	1
Touring veterinary officer	-	1	-	-	1
Village organisation leader	1	-	-	-	1
Total					**66**

Note: FGD = focus group discussion

5. Results of key evaluation questions

5.1 Demographic profile of respondents

Our quantitative analysis is based on the following household sample. In a total sample of 32 households, 7 were Muslim, 13 were from scheduled castes and 12 were from other backward castes.[11] Thirteen households (40%) were fairly new to the trade and had adopted goat farming in the past three years. This could suggest that the value of goat farming is slowly being recognised.

Interesting patterns of gendered division of labour were observed. Goats are primarily reared by women, who are involved in the daily management and upkeep of goats in 31 of the 32 sampled households. Yet, only 30 per cent of those respondents identified themselves as one of the principal earning members of the household, suggesting that income from goats is perceived to be a secondary source of household income.

The descriptive statistics of our household sample are summarised in Table 3. On average, small and marginal landholders with an average holding of 0.2 acres farm goats. These goat keepers are likely to be older women (with an average age of 41 years) with low levels of education. The poor economic status of these households is reflected in the finding that 45 per cent of principal earning members from the sample were working as daily wage labourers. In our sampled villages, JEEViKA has not yet attained saturation levels, which is confirmed by the finding that 37 per cent of respondents were not members of SHGs.

[11] Anecdotal evidence suggests that Muslim households are more likely to have larger herds. Given the purposive nature of our sampling, this is an underestimate.

Most households do not farm goats at scale and the quality of the herd is poor. The average goat herd in the sampled household comprises approximately five goats. On average, respondents reported that around 13 per cent of their herd was sick or unhealthy. None of the respondents reported having administered any vaccine to their goats. Although far from universal, deworming practices were more common, and about two goats per herd were likely to have been dewormed.

Table 3: Summary statistics of household sample of goat farmers

	Mean	SD
Age of primary carer of goat (in years)	41.46	11.86
Highest level of education completed (in years)	1.69	3.20
SHG member (1 = yes, 0 = no)	0.63	0.49
Household size	6.16	3.14
Land owned (in kathas)	2.48	4.15
Herd size	4.72	2.07
Number of kids	2.31	1.45
Number of posiya	0.56	1.05
Number of goats vaccinated this year	0.00	0.00
Number of goats dewormed this year	1.94	2.38
Number of goats currently sick or unhealthy	0.63	0.83

Note: SD = standard deviation.

5.2 Significance of goats

Our qualitative interviews highlighted the significant role goats play in the economic lives of their owners. The majority of respondents reported that they rear goats to supplement household income; goats were seldom reported as the principal income source. Yet their importance cannot be underestimated – goats are viewed as a quick and easy source of income requiring low investment:

> Goat rearing is beneficial for us. If we work hard and invest our time, we will get profit. We sell goats twice a year. — Respondent from Musahri block, Rohua Apuchh village, who owns six goats.

With most respondents dependent on small-scale farming and working for daily wages, they are often constrained for liquidity. However, selling goats provides easy access to cash in times of need. This point was emphasised particularly by women whose husbands live away from home for work. The income from goats is used to pay for their children's education, weddings and festivals, health emergencies and daily household needs. Thus, goat farming contributes to increasing the financial resilience of poor households:

> It's their ATM. — Aga Khan Rural Support Programme field staff.

> When I need money, I will sell them. — Respondent from Moraul block, village Mirapur, who owns four goats and whose husband works in a marble factory in town.

> If there is any emergency health-wise or any other emergency, I will sell them. — Respondent from Bochaha block, Bhagwanpur village, with five goats.

Why are goats more often farmed by women than men? One possible answer is that they are easy to manage. Respondents in female-headed households mentioned that small ruminants, such as goats, are easier to maintain than large animals, such as cows and buffaloes, which need more and sustained resources. Several women reported that goat farming provides them with an opportunity to engage in a meaningful activity to earn income instead of being idle at home. The death of a goat due to disease leads to loss of livelihood and depletion of family income. Some households also said that some goats would not be sold as they were being raised for religious sacrifices.

5.3 Prevalent practices

We now examine the prevalent practices involved in goat farming in our study area, based on interviews with households and key stakeholders.

5.3.1 Feeding

Most respondents follow a mix of extensive and intensive feeding practices. They graze their adult goats (i.e. four months and older) on common pastureland or in uncultivated or fallow fields twice a day for a few hours. After grazing, the goats are brought back to the house and given a feed mix consisting of ground maize, wheat and husk, along with some water. Some respondents reported feeding goats raw grains or leftovers from the food cooked for the family. This feeding practice may be far from ideal and, indeed, dangerous. Almost all vets we interviewed said that feeding goats raw grain or stale food causes bloating, which may prove to be fatal.

Some respondents further stated that if they are unable to take their herd out to graze on some days (particularly in the monsoon months from June to September), they feed them green fodder such as leaves and grass. But respondents also raised the concern that, with shrinking pastureland, the availability of green fodder is decreasing, and these traditional feeding practices are being challenged.

Respondents also raised concerns about feeding kids. Black Bengals are a highly prolific breed, but their milk-producing capacity is the lowest among small ruminants. Most respondents claim to depend on other sources of milk, such as cow milk, to feed the kids. This comes as an additional out of pocket expense for households that do not have other milch animals.

5.3.2 Housing

According to small ruminant experts, BAHOs, touring veterinary officers (TVOs) and chemists, goats are best suited to medium and consistent temperatures, and should not be exposed to weather extremes. Goats are at high risk of disease when exposed to seasonal change, and their highest mortality rate is recorded during the monsoon season and in winter. This makes appropriate shelter a critical element for the maintenance of goats.

However, we found that almost 50 per cent of respondents did not have a separate shelter for their goats, who were instead kept in a corner of their home. Among those who kept their goats in a separate shelter, most used *kutcha* (mud brick), or semi-*pucca* (semi-permanent) structures with a mud floor. Most of these shelters retained animal droppings and water, and were generally in filthy and poor condition. This contrasted with the separate shelters provided for other large ruminants.

Other households without a separate shelter for their herd kept them outside during summer and brought them into the house at night. During winters, *tirpal* (tarpaulin) are used to create makeshift shelters, and sacks are wrapped around the animals to keep them warm. It is possible that households do not invest in permanent separate shelters because of the costs involved in their maintenance. *Kutcha* shelters are unable to withstand the rain and must be refurbished every year. This is costly for households, and some respondents reported spending around INR2,000 (approximately USD26)[12] to maintain shelters for their goats.

5.3.3 Breeding

As with feeding and housing practices, we found that breeding practices in our villages were mostly undertaken incorrectly. Goats typically conceive their first kid by the time they are six months of age, although from our interviews with experts, this should be 8–9 months. The gap between pregnancies is usually 2–4 months, although some respondents have reported this to be as low as 20 days.

Buck services are easily available at the village level; the cost varies across villages, ranging from INR50–100 for a local breed to INR100–200 for other breeds, which are known as *bakkar*. Artificial insemination services initiated by the government are available for large ruminants but absent for small ruminants in the district.

Castration of bucks happens from 1–2 months of age. Charges vary from INR50 to INR100 per castration, depending on the service provider, and include a tetanus injection.

5.3.4 Health management practices

The majority of respondents adopt curative rather than preventive health practices for goats. Home remedies are usually the first option and are quite common for symptoms such as bloating and diarrhoea. Chemists and vets have raised concerns that medical advice is sought only when a sick goat exhibits serious symptoms and distress. Often this is done too late and the animal does not recover from an otherwise curable disease.

Perhaps the only exceptions to this practice are deworming and the administration of deworming pills without consultation, which are common practices among respondents:

> If goats have diarrhoea, they treat it with deworming medicines. — Respondent from Sakra who had four goats and had given goats as posiya. Her primary source of income has been goat rearing since her husband died.

Pharmacists from the Musahri and Sakra blocks mentioned that more than 80 per cent of goat farmers from different villages come to purchase deworming pills regularly. However, the farmers are not aware of the exact deworming cycle, and pills are often administered when goats fall ill instead of following the cycle. The practice of giving goats liver tonics and a few other medicines was found to be common, as this is believed to increase meat content by increasing the animals' weight. The chemists, however, do not believe these tonics do much.

[12] Conversion valid as of 19 April 2020: INR76.50 = USD1.

5.3.5 Knowledge and awareness

From our discussion on prevalent practices, we conclude that there was limited knowledge of best practices, potential diseases and medicines among goat farmers. For instance, none of the respondents in our household survey were aware of vaccination. Instead, we came across a few goat farmers who were prejudiced against vaccines and believed that goats died because of the vaccines. Of course, it is hard to assess if the lack of awareness is because of lack of information or non-availability of vaccines.

Another example of lacking awareness is the misplaced view on colostrum. Colostrum feeding increases the chances of kid survival by boosting the immune system. This practice is quite common for cows, yet colostrum feeding was absent among goat farmers. Most of the goat farmers reported extracting the colostrum and throwing it away.

Chemists and vets corroborated this lack of awareness. A chemist from Musahri block mentioned that villagers continue to follow traditional home remedies instead of medical treatments from trained service providers. There have been no attempts, by either the private or public sector, to educate and inform farmers of new methods of goat farming:

> Community people react out of hearsay and not on the basis of their intelligence. They believe more in superstition and magical powers. — Chemist from Musahri.

Similar thoughts were seconded by chemists and other stakeholders in other blocks.

5.4 Diseases and mortality

High goat mortality was reported in our sample. Of the total households sampled, 11 reported no deaths in the past two years, while the remaining 21 reported an average of 2.43 goat deaths per household in the same time period. For an average herd size of five goats, this translates to 24 per cent mortality per household in the past two years.

Our estimate of average goat mortality is lower than Project Mesha estimates. However, this must be interpreted with caution as households' recall for periods beyond a year was poor, indicating that the number of deaths measured is likely to be an underestimate.

In total, 21 households reported 50 deaths in 2 years. For each of the 50 deaths, Table 4 shows responses to the question of who was consulted when these animals fell ill. For 38 deaths, no one was consulted and respondents reported that the goats died suddenly before they could take any action. In eight cases, a chemist or a trained vet was consulted.

Table 4: Persons consulted during instances that led to death (total deaths = 50)

Person consulted before death	Number of deaths
No one	38
Drugstore keeper	4
Vet	4
Homeopath	1
Local informal vet	3

Most respondents reported diseases and general poor health to be the main causes of death among goats (Table 5). The majority of service providers mentioned that the common diseases prevalent in Muzaffarpur area are pneumonia and worm infestation, and most goat deaths can be attributed to these.

Peste des petits ruminants (sheep and goat plague) is prevalent, but its prevalence rate is being estimated through symptoms alone. The initial symptoms are diarrhoea, coughing, lesions in the mouth area and watering of nose and eyes. For 8 of the 16 cases where the cause of death was reported to be due to disease, respondents listed diarrhoea, frothing and fever as symptoms. Of course, government officials could not confirm this, as *peste des petits ruminants* can only be diagnosed through lab tests.

As Muzaffarpur is a low-lying region with frequent waterlogging, liver flu is another prevalent disease affecting goats in the area. There have also been cases of foot and mouth disease, rabies, blue tongue, tetanus and ticks. According to the district animal husbandry officer, meningitis is prevalent, but there is very little awareness of it among goat farmers.

Additionally, homeopathic doctors reported health problems that no other service providers mentioned. These are restricted masticating, bloating because of overeating and infertility. Bloating leads to pressure on the thoracic cavity, which exerts pressure on the lungs causing difficulty in breathing and eventual death. There is no medical treatment for bloating.

Stillbirths accounted for 12 per cent of reported deaths. Although this is a sizable proportion, service providers reported that they have not received any cases of brucellosis. Instead, they attributed stillbirths to malnutrition and low birthweight among kids, particularly when goats deliver triplets and quadruplets.

In an equal number of cases, respondents said that they do not know why their goats died. This indicates lack of awareness about animal diseases, healthcare and cures for small ruminants.

Table 5: Reported causes of death (total deaths = 50)

Reported cause of death	Number of deaths
Diseases	16
Don't know	6
Extreme weather	4
Others	7
Poor health	11
Stillbirths	6

The problem of goat mortality in the Muzaffarpur region is multidimensional. Animal husbandry experts point out that proper feeding, breeding, housing and health management practices can reduce goat mortality by half. While bad management practices and lack of awareness among farmers may indeed contribute to goat mortality and morbidity, the problem is made worse by endemic disease and the lack of even basic healthcare facilities. We investigate this further in the subsequent qualitative analysis.

5.4.1 Health facilities and services

Goat farmers mostly depend on local drugstore keepers for medicines and medical advice. Almost every village has access to a private drugstore, often within one or two kilometres of the village. In our interviews with animal husbandry experts and trained vets, such as BAHOs, this was raised as an important concern. Untrained service providers treat symptoms rather than diseases and often their diagnoses may be incorrect and lead to death.

Perhaps the dependence on this informal sector is due to farmers' limited access to public animal health centres, which are located at the block and district levels. Even though villages close to the block headquarters may have easier access to the animal dispensary or hospital, the quality of services is far from satisfactory. Several of our respondents claimed that the BAHO often did not have the requisite medicines or equipment for even basic healthcare.

We observed the ramshackle infrastructure of these dispensaries during our visits. One respondent said that she had once taken her goat to the BAHO, but the dispensary did not have the medicine prescribed by him. She eventually had to buy the medicines from a chemist and felt that was a waste of her money.

The poor quality of the public system was echoed in our interviews with BAHOs. The public system is severely constrained by a lack of both human and physical resources. According to the BAHO at Musahri, almost 50 per cent of staff positions at the block level are vacant. A well-functioning animal health centre requires a cadre of livestock assistants and TVOs for door-to-door visits. These positions have not been filled in most of the blocks.

In some blocks, the BAHO doubles as a TVO, responding to house calls after office hours.[13] Medicines and vaccines are seldom regularly available in public dispensaries and the BAHO at Musahri complained of the lack of vaccines even for large ruminants. Although BAHOs are expected to hold a yearly routine vaccination drive for cattle, this could not take place last year because the vaccines were not made available.

Almost all service providers (both private and public) pointed out the lack of adequate support from the government for small ruminants. Vaccines for goats have not been procured and provided in public health centres. Most are expensive, and the government has not attempted to incentivise their uptake through subsidies.

5.5 Accessibility of markets and services

This section discusses our observations on the sale and purchase of goats and associated mechanisms from the household surveys and interviews.

From our total sample of 32 households, 11 reported no purchase or sale of goats in the past two years.[14] In the remaining 21 households, the average number of goats

[13] We found that in three out of four blocks, the BAHO was also responsible for providing the services of a TVO.

[14] The reason cited for not selling goats in most cases was that the animals were being raised for religious sacrifice.

bought and sold in the past two years was 2.5 (Table 6). Table 7 shows the age at which goats were bought or sold, as reported by respondents, indicating that the majority were sold when they were possibly still growing (at 4–6 months).

Moreover, when probing for the reasons behind selling goats, we found that 23 of the 49 goats were sold because they were sick or unhealthy (Table 8). The average selling price of goats in our sample was INR2,016 but this varies greatly according to their health and age. The average price of goats sold for being sick or unhealthy was half that of goats sold as a response to a general need for money.

Table 6: Summary statistics of purchase and sale of goats in the past two years

	Mean	SD
Number of goats bought	2.5	2.34
Number of goats sold	2.6	1.84

Note: SD = standard deviation. Sample restricted to 21 households that reported purchases or sales.

Table 7: Distribution by age at which goats were purchased or sold

Age	% bought	% sold
0–3 months	7	0
4–6 months	20	47
7–11 months	0	12
One year or above	0	20
Adult	60	4
Kid	13	14

Table 8: Reasons for selling goats

	Number of goats sold	Amount received (INR)
Difficult to manage	5	3,175
General need for money	19	2,380
Sickness/poor health	23	1,508
Other	2	1,500
Total goats sold	49	2,016

5.5.1 Access to markets

Market linkages in the sale of goats are well defined. Typically, chiks (butchers who visit the homes of owners) purchase goats. One expert mentioned that goats are products for which the market reaches out to sellers, rather than sellers reaching out to the market. Often chiks and small-time butchers act as middlemen who procure goats from households and then sell them to the retail market.

This practice has its fair share of disadvantages. Although it may be argued that it reduces the transaction cost for the seller, the net benefits for the seller remain questionable, as they may not be aware of the best possible price in the market. Usually, all farmers in the same village sell to one chik, indicating that there is very little competition among buyers.

The price received by farmers for their goats may not be the best price for yet another reason: chiks rarely use standard scales to weigh goats.[15] Butchers obtain a higher value for the goat by selling parts separately, whereas goat farmers receive payment for its meat content alone. Many of our respondents expressed dissatisfaction about the price at which they sell their goats.[16]

5.5.2 Other services

In villages where wandering bucks are not available, goat farmers depend on commercial buck service providers. Most farmers reported that accessibility is not an issue; the majority of service providers were within a range of less than two kilometres. However, they were dissatisfied with the practice of having to pay again for the same services if the goat did not conceive on the first attempt.

5.5.3 Demand for services and willingness to pay

There is a general willingness to pay for health services among goat farmers. Apart from medicines and health services, some of our respondents said they would be willing to pay for feeding materials and vitamins, which help in improving the quality and quantity of meat. The amount they may be willing to pay varied from INR20 to INR500 annually. Some respondents said they would be willing to pay if the service was provided at their doorstep, was effective and taken up by others:

> Will there be credit facility available? I am ready to pay, just keep my goat disease free. — Respondent from Sakra, who is a traditional goat farmer.

> I am ready to accept and pay for services if my neighbour also agrees for same. — Respondent from Sakra, who had started goat rearing recently and believed in following practices that were prevalent in the neighbourhood or village.

5.6 Empowerment of goat farmers

This section presents findings on intra-household decision-making with respect to goat rearing. During the household survey, respondents were asked about the family member responsible for making decisions related to the health, sale and purchase of goats. We found that women, who were mostly involved in the day-to-day care of goats, also made these major decisions.

Out of 32 households, 22 respondents claimed that women were the main decision makers with respect to goat health. Five respondents reported that the male head of household made all major decisions related to the goats, even though women were the primary caretakers. The remaining five respondents reported that the decisions were made jointly by the husband and wife, or collectively by the family.

In households where other livestock were reared, men were the primary decision makers and caretakers for large ruminants such as cows or buffaloes. Some houses reported that while women decided when to buy and sell the goats, it was their husbands who bargained on their behalf and sometimes took part of the proceeds.

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[15] The usual practice is to estimate the meat content by holding the goat's spine.

[16] During the festivals of Holi and Eid ul Bakr sellers get a better price than any other time in the year.

A few households also reported that men took the entire amount from their wives and invested it in their businesses. The majority of respondents also claimed that the person making the decision to buy or sell also decided how to utilise the money earned. Our findings suggest that women who take care of goats also have the agency to make all major decisions on any economic transaction related to goats:

> We raise and take care of the goats, so we keep the money earned from them. — Focus group respondent in Musahri block.

5.7 Self-help group function

Project Mesha expects to leverage the existing SHG platform to roll out the *pashu sakhi* model. A major assumption in the implementation of the project is the proper functioning of SHGs under JEEViKA. The field team conducted 8 focus group discussions with SHG members in each of the villages, as well as 1 in-depth interview with a village organisation leader and 1 interview with a community mobiliser. The focus group discussions were not restricted to goat farmers. The key findings in this section highlight the perceptions of SHG members regarding SHG functions and activities conducted under JEEViKA.[17]

The women who participated in these discussions were mostly illiterate (although some could write and sign their names) and from poor economic backgrounds. Most were eligible for some form of social protection, and reported having at least a ration card, a 'BPL' (below the poverty line) card or a 'MGNREGA' (Mahatma Gandhi National Rural Employment) card.

We also found a general awareness about the purpose and functions of SHGs. Most women were aware of different government schemes and subsidies, such as the provision of bicycles for girls upon reaching grade nine, the Mid-Day Meal Scheme, and the provision of subsidised rice through their SHGs. They were aware of the benefits of SHGs. Most felt that SHGs helped in weeding out the traditional moneylenders who charged them high interest rates on loans.

The quality of SHG function can be determined through adoption of the key principles of *Panchasutra* (or five norms) under the National Rural Livelihoods Mission: weekly meetings; weekly savings; regular lending and borrowing; timely loan repayment; and regular and accurate maintenance of books of accounts. Among our sample of SHGs, we found that all held regular weekly meetings where members deposited INR10 with the community mobiliser. A typical SHG meeting started with all members praying together, followed by the tallying of records, collection of the week's deposit money, and discussions on topics such as maternal and child health, and sanitation.

There were some groups whose activity was confined to loaning and inter-loaning. The office bearers were usually the most literate women in the group, most of whom had received an induction and soft skills training under JEEViKA. Many of the village organisation and SHG leaders were given training on how to manage and maintain their books and other records.

[17] The team could not access the SHG books and other records because they did not have the requisite permission and clearance to do so. Hence, they could not confirm whether the SHGs were following proper protocol.

However, the main activities of SHGs remain lending and borrowing. Several women reported that they had taken loans from SHGs but these were mostly consumption loans to make small investments in their household enterprises. Interestingly, we found that some respondents had taken loans for investment in large ruminants; only one SHG member reported taking a loan to buy goats. Perhaps one reason for this is their perception of goat farming as a high-risk business. With high mortality and low sale prices, farmers may not find it profitable to take loans for investments in goats.

We observed that there was an unmet demand for SHG activities. Participants from all focus group discussions reported that they were promised multiple vocational and entrepreneurial trainings, which they were yet to receive. Most women felt that their SHGs were not functioning to their full capacity, and much more could be done to promote livelihoods.

6. Discussion of findings

This report is based on a small-sample quantitative and qualitative study of key stakeholders in goat farming in eight villages of Muzaffarpur, Bihar. The main objective was to understand the opportunities and challenges that could influence the implementation and eventual impact of Project Mesha.

We provide a brief summary of the report's key findings below:

What is the contribution of goats to overall household income?
Goat farming may not be considered a main income-generating activity, but it has an important role in improving financial resilience and reducing vulnerability among asset-poor households without a steady stream of income. It is a low-investment activity that can be undertaken by women and the elderly. The potential benefits of goat farming are well-understood among households, and we found that a few have recently taken up goat farming. However, this is not being undertaken at scale, and herd sizes remain small. One possible reason is that goat farming is also viewed as risky, given the high rates of mortality and morbidity among these animals.

What goat farming practices are followed in this area?
Most goat farmers follow basic management practices that make these animals more susceptible to disease. Feeding practices include a mix of grazing and providing feed-mix and leftover home-cooked food. Goats are also usually kept in conditions that make them vulnerable to diseases. Very few farmers adopt preventive healthcare approaches of providing good nutrition and day to day care. This, however, stems from a lack of awareness about best practices of goat farming.

Who are the key stakeholders and decision makers in goat rearing and management in Muzaffarpur?
Most goat farmers are women. They are the primary caregivers of goats and make key decisions about their health, sale and purchase. Other key stakeholders in the ecosystem of goat farming are health service providers such as chemists, animal husbandry officers, private vets and untrained vets. Chiks and butchers also play an important role, acting as the link between farmers and the market. The relative significance of each of these stakeholders varies across villages.

What are the market linkages for the sale and purchase of goats?
Market linkages for the sale of goats are very well-defined and developed. Chiks and butchers collect goats from the owner's doorstep, thereby reducing transaction costs for farmers. This is particularly important for women farmers, for whom barriers to mobility may be higher than men. The net benefits of this system however need to be explored further. There are no producer groups or farmers' cooperatives for goat farmers in the project area. With multiple farmers selling to a small set of chiks, the bargaining power of farmers may be limited. Most chiks and small butchers act as middlemen and sell the animals at a much higher price in the retail market.

What healthcare systems exist in this area?
Both formal and informal healthcare systems exist in Muzaffarpur. The formal system includes BAHOs, TVOs and other trained doctors, whereas untrained health service providers and chemists are part of the informal system. The quality of services in the formal animal healthcare system is poor, with a large number of positions for professional staff remaining vacant (high vacancies) and lack of basic infrastructure such as cold storage for vaccines and medicines . As the formal system does not meet the demands of goat farmers, it is not surprising that the informal system is large and growing. Again, the quality of services provided by untrained or semi-trained providers remains unclear. People rely on both systems depending on their availability and accessibility.

6.1 Validation of assumptions of the theory of change

We next summarise our validation of the main assumptions of Project Mesha's proposed theory of change.

Self-help group functioning
Project Mesha will use SHGs as the platform for their community-based activities and training. This makes the adequate functioning of SHGs an important factor for project implementation. Contrary to what we had expected, SHG saturation has not been achieved in our sampled villages, and only 63 per cent of households we surveyed were members. SHG members have a mixed opinion regarding the functioning and overall performance of SHGs.

The focus group discussions provided insight into perceptions of the quality of SHG are functioning; while some appeared to be working well in terms of loaning and inter-loaning, others had initiated only limited activities. The role of SHGs has remained restricted to providing loans and savings. However, there was a clear demand for more training and livelihoods-related activities through SHGs.

Demand for preventive healthcare, management practices and related services among goat farmers
Given the high mortality and morbidity of goats, most farmers interviewed were willing to pay for the services of a community-based health service provider. This willingness was, however, not unconditional; while some farmers said they would pay if these services were delivered at home, others asked for alternative payment options and the facility to purchase services on credit. This has implications for the delivery, packaging and pricing of services of the community healthcare provider.

Much of the demand may be latent. Some farmers do not wish to purchase these services because they are not aware of the benefits. Moreover, demand for services does not necessarily ensure adequate uptake, due to the number of factors involved in people's behaviour. In rural areas, behaviour is often determined at the community level and households are influenced by the attitudes or norms of their neighbours. We suggest that activities to generate awareness and demand for services must be considered at the beginning of the programme.

Feasibility of developing a cadre of community pashu sakhis from goat farmers
We see some operational challenges here. Most goat farmers are illiterate women aged in their early forties. Compared to younger women, they may have limited mobility, networks and communication skills. Therefore, identifying *pashu sakhis* may be a challenge. Training must be tailored to their understanding. There will be a need for constant support to these *pashu sakhis*, at least in the initial phase of the project. The maintenance of vaccines and medicines would also require close monitoring, given the poor existing infrastructure.

Women's empowerment and agency
Goat rearing has an important role to play in the intra-household decision-making structure. As mentioned earlier in the report, women are the primary caretakers and decision makers with regard to goats. Thus, there is substantial potential to improve women's economic positions through this project.

6.2 Main recommendations

1. Project Mesha should focus on generating awareness of animal diseases and best practices of goat farming, while simultaneously focusing on health services provided by *pashu sakhis*. Our interviews with experts suggested that good management practices could bring a significant reduction in goat mortality. Unless strategies are adopted to bring about change in the management practices of goat farmers, the provision of medicines will not be effective in reducing goat mortality.
2. The potential of goat farming to generate income, mitigate risk and increase financial resilience should be highlighted through community campaigns in order to generate demand for healthcare services. Non-SHG members form a substantial proportion of goat farmers, and special attention is required to target them. While we found a fair amount of demand for the services of goat health workers, households are only willing to pay low fees for them. If the benefits of goat farming are made obvious to the community, willingness to pay is likely to increase.
3. The pricing and packaging of services of *pashu sakhis* will require innovative approaches. We suggest that price schedules for various services are developed in a participatory manner with the main beneficiaries.
4. The training modules for *pashu sakhis* should be piloted and revised to make them comprehensible, given that most trainees are likely to be poorly educated. We suggest exploring innovative approaches such as gamified learning.
5. There is a need to ensure that *pashu sakhis* obtain support through the project period. This includes refresher courses, monitoring of the equipment and tools provided, and feedback.

6. The main recommendations for output and outcome indicators are summarised below, and were also discussed in meetings with the Agriculture Learning and Impacts Network (please refer to Appendix C for detailed recommendations):
    a. We recommend that the recall period for mortality, births, sale and purchase is one year, and no longer. In formulating the recall period, we suggest that this cover the three main festivals – Eid ul Fitr, Eid ul bakr and Holi – when goat sales increase and prices rise.
    b. We found that households do not report stillbirths when asked to report mortality. Special attention should be paid to capture this indicator.
    c. There is a considerable overlap of the social issues being discussed by producer groups and SHGs, which we found to be redundant. The role of producer groups may be to discuss livelihoods-related issues, as SHGs already discuss social issues. A clear demarcation of the scope of producer groups and SHGs is required.
    d. We fielded a questionnaire with vignettes on women's empowerment, but this did not receive a positive response. Indeed, most women could not relate to the settings we provided. 3ie does not have expertise in developing empowerment questionnaires and we recommend that gender experts are consulted for the development of these tools.

Appendixes

Appendix A: Study instruments (qualitative and quantitative) given below:

I. Formative Evaluation of a livelihood program for women through productivity improvements in small ruminants in Bihar, India

Consent form

Namaste, My name is_____, and I am working with 3ie. We are conducting formative research on Project Mesha in four blocks of Muzaffarpur district. The blocks are – Bochaha, Moraul, Musahri, Sakra. I would like to conduct an interview and this shall take about 45 minutes. This interview shall be audio recorded if you permit for not lose out on any critical information that you provide. Your participation is voluntary. You are free to choose not to participate. Should you chose to participate you can withdraw at any time without consequences of any kind. You may also refuse to answer any individual questions without consequences. Can I tell you more about what your participation would entail? There are no risks involved in your participation and we do not anticipate any personal discomfort. The information that you share with us may help us improve programme intervention on livelihoods.

I would like to assure you that your identity will be kept secret by not using your name, birth-date, contact details or any other personally identifying information. All information that you give will be used only for research purposes. At any point in the interview you can choose not to answer any question or exit the interview midway and this will not impact you negatively. What questions do you have?

We would like to proceed with the protocol if we have your consent.

Do you verbally give consent? Please confirm with YES/ NO (They have to say YES for you to proceed).

If you have any questions now or in the future about your participation in the study please contact Priyanka Dubey and Avantika Bagai (hand out visiting card).

This form has been read to me and I understand what is being requested of me as a participant in the study – YES/ NO

I have been given satisfactory answers to my questions – YES/ NO I have been provided with the copy of this information – YES/ NO

I permit to audio record the interview – YES/ NO I freely consent to participate – YES/ NO

Investigator's Initials

This questionnaire is for SHG members for HH interview.

Date of Interview:_____/____/_____Name of Interviewer: _____
Village name:_ Tola:_____ Respondent name:_____
_____

Religion: _ Caste:_____
_____

SECTION A: QUANTITATIVE SECTION

A. Household Roster

Please let us know some details of the members of your household. By household, we mean all those members who share a common kitchen. Please include all members who may be away from home currently such as persons who send remittances. Please exclude married daughters. Please fill in details of the respondent in the first row of the roster.

ID of HH member	Relationship to respondent	Is he/she the household head? *(0=No, 1=Yes, 9=Don't know)*	Age	Ever enrolled in school? *(0=No, 1=Yes, 9=Don't know)*	Can read and write a letter? *(0=No,1=Yes, 9=Don't know)*	Highest level of education completed? (see code below)	Principal Occupation * in the last 12 months	Months in the past year lived in the household?	Is this member involved in the day-to-day care of goats? *(0=No, 1=Yes, 7=Not applicable, 9=Don't know)*	What daily activities related to goats does this member perform? (Qualitative input)
1										
2										
3										
4										
5										
6										
7										
8										

Education code: (0) illiterate (1) Class 1 (2) Class 2 (3) Class 3 (4) Class 4 (5) Class 5 (6) Class 6 (7) Class 7 (8) Class 8 (9) Class 9 (10) Class 10 (11) Class 11 (12) Class 12 (13) B.A./B.Sc. (14)M.A./M.Sc. (15) professional degree (16) diploma (17) literate but no formal schooling (18) Other-specify

* *By principal occupation, we mean income generating activities that a person may be involved in. If a person is involved in multiple activities, ask them to report the one that generates the highest income.*

B. Household Income and Assets

1. Total land owned_____(mention units)

2. Total land cultivated_____(mention units)

3. How many of the following assets are owned by the household? (Enter 0 if none)

Code and Asset type	a. Number Owned	
	Child	Adult
01 Cow		
02 Bull		
03 Buffalo		
04 Goat		
05 Poultry		
06 Horse/Donkey/Mule		
Transportation		
07 Bullock Cart		
08 Bicycle		
09 Motor cycle		
10 Jeep/car		
11 Tractor		
Other goods		
12 Radio/Tape Recorder		
13 Television(TV) Black & White		
14 Television(TV) Colour		
15 Refrigerator		
16 Fan		
17 Telephone/ Mobile		
18 Mattress		
19 Pressure cooker		
20 Cot/bed		
21 Table		
22 Chair		
23 Sewing machine		
24 Watch/Clock		
25 Kerosene Stove		
26 Kerosene/oil/gas lamp		
Agricultural Goods		
27 Pumpset		
28 Thresher		
29 Power tiller		

4. Dwelling tenure:

(0) No dwelling unit (1) Owned (2) Rented (8) Other (specify) _____

5. Type of structure of house in which the household resides?

(1) Katcha/thatch (2) Katcha/tile (2) Semi-pucca (3) Pucca

6. What is the type of material used for the floor of the house? ☐

(1) Mud (2) Brick (3) Stone, tile, cement (8) Other (specify) _____

7. Number of separate rooms in the house (including kitchen)? ☐

(1) One (2) Two (3) Three (4) More than three (8) Other (specify) _____

8. Where does your drinking water usually come from? ☐

(1) Tap (2) Well (3) Handpump/Tubewell (4) Tank/Pond/Reservoir

(5) River/Canal/Lake (8) Other (specify) _____

9. How far is this source from your house? ☐

(1) Within premises (2) Less than 0.5 km (3) 0.5 to 1 km (4) More than 1 km

10. What is the main source of lighting for your house? ☐

(1) Electricity (2) Oil, Kerosene, Biogas (3) No lighting (8) Other (specify) _____

11. What kind of fuel is most often used for cooking in your household? ☐

(1) LPG (2) Electricity (3) Kerosene (4) Coal (5) Firewood (6) Cow dung cakes

(7) Leaves/straw/thatch (8) Other (specify) _____

12. What type of toilet facility does your household have? ☐

(1)No facility/bush/field (2) Own flush toilet (3) Shared flush toilet

(4) Own pit toilet/latrine (5) Shared pit toilet/latrine (8) Other (specify) _____

B. INFORMATION ON CURRENT GOAT HERD

	Total	Posiya (Indicate if the goat was taken as posiya)	Own	Adult	Kid	How many were ever vaccinated?	How many were dewormed last year? (2015 and until now)	How many do you think are of good health?	How many have fallen sick at least once in the past six months?
Male									
Female									

C. INFORMATION ON GOATS BOUGHT OR SOLD IN THE PAST TWO YEARS

Goat ID (Serial number)	Bought/ sold	Age when bought/sold	Male /Female	Amount in Rupees bought/sold	Reason bought/sold	Ever Vaccinated	Dewormed the year of buying/selling

D. INFORMATION ON GOATS THAT DIED IN THE PAST 2 YEARS

Period	**# Died**
Jan- May 2016	
Jul- Dec 2015	
Jan- Jul 2015	

D.1 This table is to be filled based on each goat that had died in the past 2 years

Goat ID	Did you consult anyone?	If yes, who?	Reason Died (Symptoms of diseases)	What did you do in response to the goat falling sick?

E. COSTS OF GOATS/ OTHERS

	Goats/ per month	Others (Name animal)/ per month
Feeding		
Shelter		
Vaccination		
Deworming		
Other preventive medicines		
Curative Medicine		
Others costs related to goat health		
Transactions costs		

Qualitative section

1. What is the significance of goats that you own currently?
2. What herd size would be optimal for your current needs?
    a. If the number mentioned is same as current, ask, why do they think so?
    b. If not the same then, ask – what are the barriers in maintaining that herd size?
3. What are the feeding habits for goats that you practice?
    a. What do you feed them?
    b. How often in a day?
    c. Do these differ by gender and age of the goats or by season?
4. What vaccinations have you been able to administer to your goats?
    a. Do you think vaccines are important to be administered? Why? Why not?
    b. Are you aware of the names of the vaccines?
    c. Are you aware which vaccines provide protection against which disease?
    d. Are you aware of the cycle of the vaccines?
5. When did you last give deworming pills to your goats?
    a. How often do you give deworming pills?
    b. Awareness on deworming cycle?
6. What do you do when your goats fall sick? Why?
    a. How is the accessibility of vets/ clinics in terms of distance and services offered?
    b. Do you get medicines from the same veterinarian for your goats?
    c. Do you visit the chemist separately for any particular medicine (deworming pills?)?
    d. Do you prefer a particular service provider? Why?
7. What kind of shelter do you provide to your goats?
    a. Does the shelter provides protection during extreme conditions? Do you rebuild shelters for extreme winter or summer?
    b. What is the maintenance cost?
8. Would you be willing to pay for services received for your goat's health?
    a. Which services would be willing to pay for?
    b. Which services you won't pay for?
9. What is the reproductive cycle of the goats?
    a. How many times do they reproduce in a year?
    b. When does a female goat reach her sexual maturity?
    c. How many reproductive cycles does she go through in her lifetime?
10. What services do you need to access wrt goats health at the village level?
    a. List down all the services they need
    b. who can offer them these services (Note: The common answer given is 'Quacks')
    c. Whether these services are available at the village level?
    d. What are the different challenges that you face in accessing these services? E.g. cost of medicines, vet services, distance from the chemist shop, distance from the vet clinic, etc?
11. What are the optimal conditions for sale of a goat?
    a. Did you sell off your goat in last two years? Why?
    b. What price did you get for it? Do you think you could have got more/ less price for the same goat? Why?
    c. How do you decide when to sell a goat for meat/for rearing/ milk?
    d. Would you sell off a female goat? Why? Why not?
12. Who in your household takes decisions on buying/selling of goats?
    a. What is the buying/ selling process?
13. Who takes decisions on goat health?
    a. Taking to the vet?
    b. Getting deworming pills

c. Kind of shelter to be provided
d. Who is responsible for daily care activities of the herd?

14. Where do you purchase your herd from?

Freedom/Opportunity

Jayati Devi stays in a neighbouring village. She often has to make some decisions in her day to day life. I will now describe the decisions she might have to take. Please suggest what Jayati should do when she is taking these decisions.

A. Jayati's daughter studies in a government school. Jayati is planning to move her daughter from the government school she currently goes to a private school. She will have to pay Rs 10,000 as admission fees to the private school. However, her husband wants to use this money to buy gifts for his niece's marriage. He insists that they can move their daughter to the private school next year. What do you think Jayati should do?
   1. Spend the money on the marriage
   2. Admit her daughter in a private school
   3. Others (Please specify)

B. Panchayat elections are coming. Jayati's husband is asking her to vote for the political party he supports. However, Jayati prefers to vote for other political party. What should Jayati do?
   1. Vote for the husband's political party
   2. Vote for her preferred political party
   3. Others (Please specify)

C. How do you think Jayati should take this decision?
   1. Decide herself
   2. Let her husband decide
   3. Have a discussion with her husband and decide
   4. Others (Please specify)

D. Jayati would like to take a loan to purchase a cow to supplement the income of the family by selling the cow's milk. Jayatis's husband is not sure whether buying a cow is the best decision given the family's low income. What should Jayati do?
   1. Take a loan to purchase the cow
   2. Do not purchase the cow
   3. Others (Please specify)

E. Jayati wants to take a loan from the SHG from which she is a member to start a tea stall in her village. However her husband and mother in law does not agree. What should Jayati do?
   1. Take the loan anyways to start the tea stall
   2. Does not take the loan
   3. Other

II. Formative Evaluation of a livelihood program for women through productivity improvements in small ruminants in Bihar, India

In-depth interview Guide with animal husbandry experts. This includes regional animal husbandry director, block animal husbandry officers and researchers.

*Name:*_____ *Place:*_____ *Date:*_

Importance of Goats - Contextual
1. What are the major uses of goats in Bihar? In Muzaffarpur? Probe: a. Personal? (meat, milk, manure, etc.) b. Commercial? (sale value, commodity value - produce)
2. What is the trend in goat rearing in Bihar? Explain. Probe: a. Data shows increase in goat population in Bihar. Explain.
3. How critical is goat rearing to rural livelihoods? Probe: a. What kind of livelihood improvement training practices has been implemented in the past? Any case studies or reference?

Best practices
1. What should be the ideal feeding habits? Probe: a. Seasonal and geographical variations, if any? Explain.
2. What are the ideal healthcare steps that need to be taken? Probe: a. Important vaccinations b. Vet check-ups – number and at what age (life-cycle) c. Reproductive information

Prevalence of disease among goats in India
1. What are the different types of diseases that goats get infected and affected by? The common diseases? Probe: a. What is the severity of these diseases? Frequency of the disease b. Diseases by regions and weather? Is there any variation c. Specific diseases prevalent in Bihar/ Muzaffarpur
2. Symptoms of each disease. Explain. Probe: a. Note down all the diseases that the expert mentioned b. Specific diseases that leads to death of goats

Data sources
1. What would be the best data source to access on livestock, mainly goats? Probe: a. Where do we access it from? b. Is there any particular report that we should not miss?

III. Formative Evaluation of a livelihood program for women through productivity improvements in small ruminants in Bihar, India

Guide for SHG Members

Duration (Start time): _____ Block name:___ Village name:_____ Tola:__

Date of discussion:____/___/_____

Place of discussion:_____

Details of SHG:

1. *Name of SHG:_____*
2. *Name of the Community Mobilizer:_____*
3. *Age of SHG:_____(note the date of formation)*
4. *Number of members:_____*
5. *Have you formed VO:_____*
6. *Activities conducted at VO level:*

_____

_____

Demogr

#	Name	Literacy level (education)	Primary Occupation (probe if required)	Secondary Occupation (if valid)	Caste	Owns a BPL card (Y or N)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

4. ***Go through the SHG books and attendance records. Look for details that can indicate:***
    a. *Participation – attendance, minutes of the meeting, etc.*
    b. *Activities – process report/ brief*

If SHG has bank linkage, review the bank account details and records (eg. Passbook etc.) Note: Pictures need to be taken for all records.

Check if the records are with the SHG accountant

5. What are the main activities that you conduct within the SHG Probe: a. What activities have happened in past one year? b. What activities are currently happening?
6. Does the SHG participate collectively at any given platform? Probe: a. Community events (eg. Community led campaigns- Immunization, sanitation, against domestic violence, alcoholism etc.) b. Elections c. Grama sabha meetings d. Any other
7. Did your SHG go through a formal induction and training on financial inclusion? Probe: a. When? b. For how long? c. What all did you cover?
8. What other training programmes have been introduced through your SHG? Has any of these been directed towards animal husbandry? Probe: a. How many of you attended the training? b. What was the training about? c. What was the nature of the training programme? d. Who conducted these training programmes? e. Was it beneficial? Why? Why not? f. Have you received training/ workshops about anything else? Like sanitation during periods? Maternal health? Immunization of children? Etc. g. Were there any trainings provided to improve/ help enhance the entrepreneurial skills of the SHG members? Who conducted such trainings?
9. Have you taken loans from the SHG to invest in/ spend on livestock? *Note: AKF has forewarned us that they usually don't take out loans to invest on/in livestock.* Probe: a. Note how many of them in total have taken loans? (In last two years) b. Ask them specifically if they invested/ spent on goats c. Did you purchase any goats or spent on maintaining (vet check-up, medicines, fodder, shelter, etc.) d. Are there any other animal husbandry/ livestock related initiatives programmes that has been undertaken by the SHG? Did you participate? Did you benefit from this? e. If none of the above, what were the loans taken for? f. Who in your family decides to take loans? g. Who in your family decides for what purpose the loan will be

10. Are you aware of any government/ NGO/ SHG schemes/ policies on animal husbandry currently being implemented in the area? Probe: a. Have you ever availed any of the benefits? b. How did it benefit you?
11. What services do you need to access wrt goats health at the village level? Probe: a. List down all the services they need b. who can offer them these services (Note: The common answer given is 'Quacks') c. Whether these services are available at the village level? d. What are the different challenges that you face in accessing these services? E.g. cost of medicines, vet services, distance from the chemist shop, distance from the vet clinic, etc?
12. Do you receive any other support from any agency? (govt., ngo, local network) Pr a. What kind of support do you receive? b. What more support you would be happy to receive?
13. How much do you spend on your goats per month? Food, shelter, vaccines, deworming pill, liver and calcium tonic Pr a. Would you be willing to pay for services for your goat's health? b. Which services would be willing to pay for? c. Which services you won't pay for?
14. What breed of goats do you normally rear? Pr a. Does Black Bengal meets your household and commercial needs? b. If no, do you think a new breed should be introduced? c. If no, do you think with certain services provided to you, Black Bengal will be good enough to meet your needs? d. What other type of goat breed do you rear?

End time: _____

IV. Formative Evaluation of a livelihood program for women through productivity improvements in small ruminants in Bihar, India

Guide for AKDN Staff

1. Context of Muzaffarpur. Explain.
    a. What is the weather like in Muzaffarpur area? Is it conducive for goat rearing?
    b. Is it drought-prone area? Does that affect the goats? Is it currently affected by drought?
    c. Can you explain the demographic structure of the area?
        i. Poverty levels (% if they have or pattern)
        ii. Social structure (% and number if they have)
        iii. What is the pattern of migration in this area?
    d. Livelihood practices:
        i. Agriculture
        ii. Animal Husbandry
        iii. Remittances
        iv. Others
2. What are the best practices for goat rearing for following points?
    a. Feeding
    b. Vaccination cycle (explain the entire cycle for different vaccines. Also which diseases vaccine protects the goats from)
    c. Deworming (cycle, if any? Quantity?)
    d. Shelter
    e. Diseases
    f. Optimal conditions for sale (age/weight)
    g. Reproductive cycle
3. What do people practice in the area of Muzaffarpur for goat rearing?
    a. Feeding
    b. Vaccination cycle
    c. Deworming
    d. Shelter
    e. Diseases
    f. Optimal conditions for sale (age/weight)
    g. Reproductive cycle
4. When does a female goat reach sexual maturity?
    a. How many reproductive cycles does she go through during her lifetime?
5. Who do they go to when their goats fall sick? Why?
    a. How is the accessibility in terms of distance and services offered?
    b. Do they get medicines from the same veterinarian for your goats?
    c. Do they visit the chemist separately for any particular medicine (deworming pills?)?
    d. Do they prefer a particular service provider? Why?
6. Can you tell us the services available for goats in the Muzaffarpur area?
    a. Veterinarians (vets, hospitals)
    b. Local vet
    c. Chemists (availability of medicines)
    d. Any other service (IEC)
7. What are the regular activities that the members conduct through their SHGs?
8. What is your understanding on efficiency and quality of SHGs in the selected blocks for intervention

VI. Formative Evaluation of a livelihood program for women through productivity improvements in small ruminants in Bihar, India

Guide for Stakeholders which include vet (traditional, para-vet and trained), chemist and butcher (local or from large markets)

*Name:*_____ *Place:*_____ *Date:*_

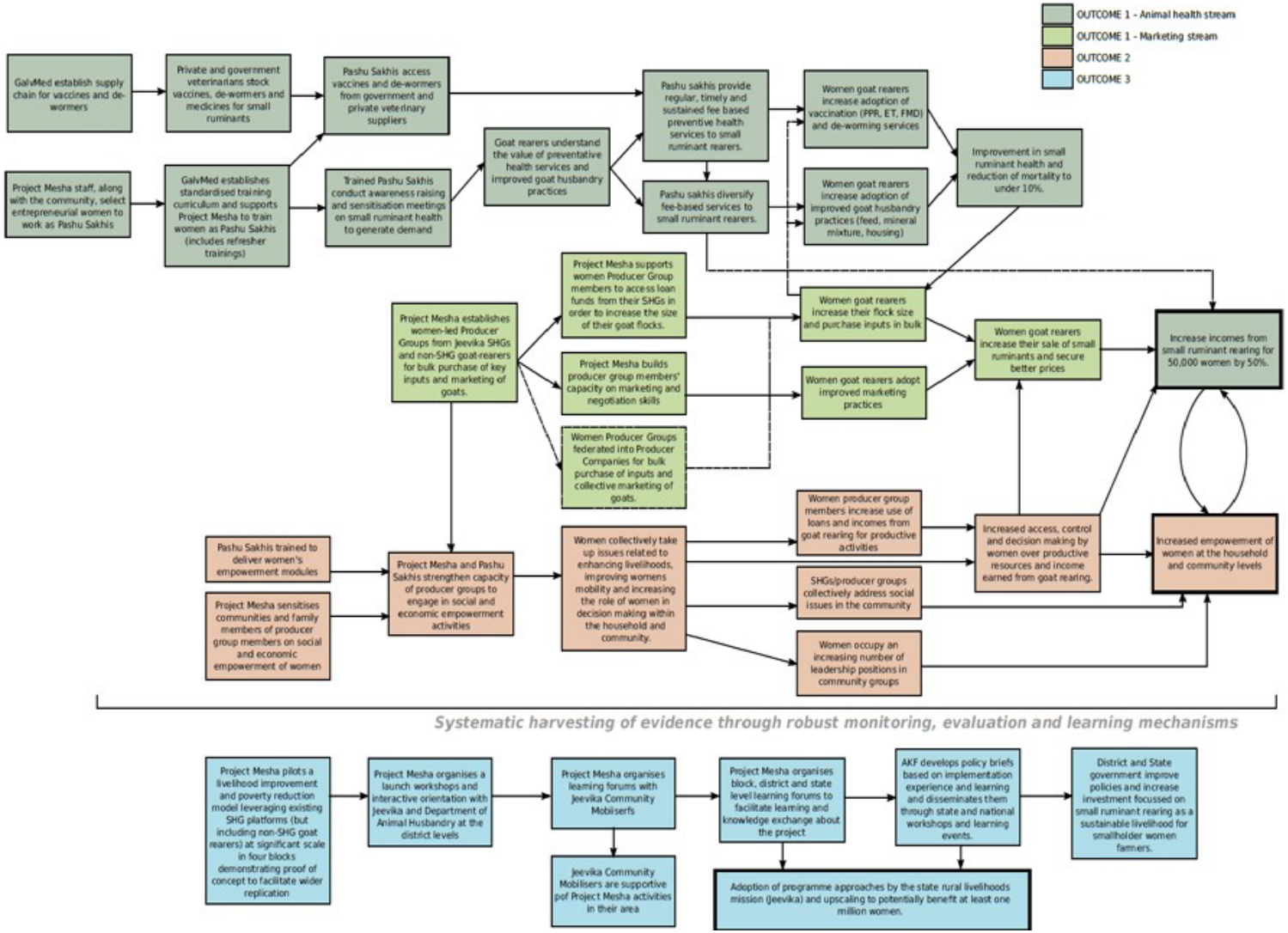
Vet
15. Explain your role in terms of function that you perform at different levels – hospital, village or block level? Pr obe: a. Do you do home visits? How? When? (on demand or is it part of your schedule)
16. What is the total number of vet centres in this area? Pr obe: a. Do they cater to different disease that goats get affected by in this region? b. What is the catchment area of each of these vet centres?
17. How does the system of vet centres function? Pr obe: a. What is the structure of the hospital? b. How many departments and doctors are there? c. Number of regular and visiting doctors d. How many of them are goat experts?
18. What are the main reasons for mortality of goats in Muzaffarpur area? Pr obe: a. Lack of infrastructure b. Lack of information c. Any other
19. What are the main diseases that infect goats in this region? Which are the ones that lead to deaths? Pr obe: a. Note down all the diseases b. Symptoms of all the diseases c. Specific diseases that leads to death of goats
20. Is there any particular season that the goats get infected/ affected? Pr obe: a. Note down the seasonal variation for different diseases b. What are the main reasons behind the infection?
21. How do you deal with epidemic diseases (specific to goats) Pr obe: a. Has there been any epidemic in past two years b. What key steps did you take deal with it?
22. What proportion of people bring their goats to you or consult you? Pr obe: a. At what stage of disease do they come to you?
23. Vaccination cycle for goats. Explain. Pr obe: a. Note down all the vaccines and the disease that it protects from

Chemists (the one that sells medicine for livestock)
1. What is your catchment area? Probe: a. People from how many villages approach your chemist?

2. How many people on an average purchase medicines for their livestock? Probe: a. Are the medicines different for different kinds of livestock? b. How many people on an average purchase medicines for goats? c. Is there any particular season that the traffic of people increase?
3. Do you have enough stock every time? Probe: a. Is the supply of medicines regular? b. Is there any time that medicines don't arrive in time? What do you do in that case? c. Do you sell any vaccinations that are used for animals?
4. Do you administer vaccine for animals? Probe: a. Do people come to you for administration of vaccines? Why?

Butcher/ Trader
1. Where do you get your stock from?
2. Do the local people also sell their stock to you? In what conditions do they sell their stock to you? (Financial, health, etc.) Probe: a. Note down all the reasons. b. Ask what are the different kinds of goat you receive? c. Have you ever received diseases goats or is about to be diseased? What do you do in that case?
3. How much does the goat cost you? Probe: a. What is the best possible rate that you can get and under what conditions?

Appendix B: Theory of change developed by ALINE



Appendix C: Recommendations on indicators (Indicators developed by ALINE)

Indicator	Who collects	How	3ie's recommendations
Annual net cash income from small ruminants	Survey	Goat rearer HH survey	
Contribution of goat rearing to per capita annual household income	Survey	Goat rearer HH survey	
Mean household asset score	Survey	Goat rearer HH survey	
Number of *pashu sakhis* providing services one year after training	Development organiser	Active *pashu sakhi* list *Pashu sakhi* activity report	
Number of training modules developed by GalvMed	GalvMed	*Pashu sakhi* training register	
Number of *pashu sakhis* trained	Development organiser/ development specialist		
Number of *pashu sakhis* with knowledge of the seasonal vaccination/improved husbandry calendar of practices	Development specialist	*Pashu sakhi* survey	
Pashu sakhi attendance at monthly review meetings	Development organiser	*Pashu sakhi* meeting register	Number of meetings conducted for *pashu sakhis* may be included
Number of times cold chain for vaccines failed	GalvMed	GalvMed report	More clarity on failure is required
Number of chemists that keep full medication/ vaccination in stock	Development organiser		Variety of medications/vaccines may be included
Number of times vaccines/ dewormers were not available when needed by goat rearers	Development organiser	*Pashu sakhi* survey	Instead, number of times when PS could not provide timely vaccines/dewormers and the reason

Indicator	Who collects	How	3ie's recommendations
Number of *pashu sakhis* who develop formal/ informal partnerships for vaccine/ dewormers with government veterinary services/private retailers	Development organiser/ development specialist		Needs a better definition of how this is measured
Pashu sakhi/cluster paravet profit margin on	Development organiser		
Bulk purchase of vaccines/de-wormers			
Number of awareness-raising and sensitisation meetings held	*Pashu sakhi*		
Number of men and women trained in small ruminant health	*Pashu sakhi*		
Number/% of goat rearers with knowledge of the benefits of preventive health services and improved goat husbandry practices	Development organiser		Recommend HH survey or FGD for this
Number of households paying for *pashu sakhi* services	Development organiser		
Average monthly number of households reached by *pashu sakhis*	Development organiser		Requires validation from HH survey
Net monthly income earned per *pashu sakhi*	*Pashu sakhi*/ development organiser		
Number of *pashu sakhis* who diversify service income sources beyond vaccination/deworming (e.g. improved buck services, stocking of mineral blocks/mixture)	*Pashu sakhi*/ development organiser		
Number of women goat rearers providing supplementary feed to their goats	*Pashu sakhi*/ development organiser		

Indicator	Who collects	How	3ie's recommendations
Number of women goat rearers who have provided separate housing for goat flocks	*Pashu sakhi*/ development organiser		
Number of goat rearers adhering to the full vaccination schedule for all their goats	*Pashu sakhi*/develop ment organiser		
Number of goat rearers following the quarterly de worming schedule	*Pashu sakhi*/ development organiser		
Number of women goat rearers vaccinating their goats against PPR, ET and FMD	*Pashu sakhi*/ development organiser		
Number of women goat rearers following the quarterly deworming schedule	*Pashu sakhi*/ development organiser		
Goat weight at 6 months and 1 year	Development organiser		
Mortality rate due to disease (adult/kid goats)	*Pashu sakhi*/ Development organiser		
Number of women goat rearers who are members of SHGs	Development organiser		
Number of SHGs collectively indenting for vaccines/dewormers	*Pashu sakhi*		
Number of SHGs collectively selling goats	*Pashu sakhi*		
Number of loans from SHG funds for purchase of goats	Development organiser		
Number of trainings provided and number of participants	Development organiser		
Number of goat producer companies established and registered	Development organiser		
Number of goat rearers who are members of goat producer companies	Development organiser		

Indicator	Who collects	How	3ie's recommendations
Size of small ruminant holdings	*Pashu sakhi*	Goat rearer HH survey	
Number of women goat rearers that weigh their goat before selling	Development organiser	Goat rearer adoption survey	
Number of goats sold per household	Development organiser	Goat rearer HH survey	
Number of women changing the timing of goat sales to secure better prices	Development organiser		Recall period should not exceed a year
Number of goats sold per year per household	Survey	Goat rearer HH survey	Recall period should not exceed a year
Number of women directly selling goats in livestock markets	Survey	Goat rearer HH survey	Recall period should not exceed a year
Average price received for sale of goats (in INR/kg)	Survey	Goat rearer HH survey	Recall period should not exceed a year
Number of women reporting an improvement in status/quality of life	Survey	Women's empowerment survey	
Number of women reporting how membership in SHGs has enhanced livelihood	Survey	Women's empowerment survey	
capability, contributed to increase in incomes and confidence			
Number of training modules developed and delivered	Anandi/ development Specialist organiser		
Number of *pashu sakhis* trained in providing women's empowerment modules	Development specialist		
Level of satisfaction with the trainings	Development organiser		
Number of women's empowerment training modules delivered by *pashu sakhis* to producer groups	*Pashu sakhi*		This may not be feasible for *pashu sakhis*

Indicator	Who collects	How	3ie's recommendations
Number of producer group members who have participated in women's empowerment training sessions (by issue)	*Pashu sakhi*		
Number of producer group members who have participated in women's empowerment training sessions (by issue)	*Pashu sakhi*		
Number of sensitisation meetings held	*Pashu sakhi*		
Number/% of male participants in sensitisation meetings	*Pashu sakhi*		
Number/% of husbands who support their wife's involvement in Project Mesha	Development organiser	Women's empowerment survey	
Number of social and economic issues taken up by producer group members/number of producer groups taking up social and economic issues	*Pashu sakhi*/ development organiser	Producer group tracker	Recommend livelihoods. SHGs too discuss socioeconomic issues so we are concerned about the overlap
Increase in number/quantum of SHG loans provided for productive, income-earning activities	*Pashu sakhi*	SHG records	
Number of socioeconomic issues taken up by producer group members	*Pashu sakhi*/ development organiser	Producer group tracker	
Increase in women's leadership in community groups (SHGs, VOs) (from baseline)	Survey	Women's empowerment survey	SHGs are for women only. Should think of their measures
Increase in number of women reporting sole and joint decision-making in the purchase of goats and their healthcare (from baseline)	Survey	Women's empowerment survey	

Indicator	Who collects	How	3ie's recommendations
Increase in number of women reporting sole and joint decision-making in the sale of goats (from baseline)	Survey	Women's empowerment survey	
Number of women reporting an increased role in other key decisions within the household (e.g. crops to be planted, children's education) (from baseline)	Survey	Women's empowerment survey	
Increase in number of women directly selling goats in livestock markets (from baseline)	Survey	Women's empowerment survey	
Increase in women's control of income from goat sales (from baseline)	Survey	Women's empowerment survey	
Increase in the number of women reporting a diversification of household diet (consumption of vegetables, pulses, meat, milk, eggs) (from baseline)	Survey	Women's empowerment survey	
Number of *pashu sakhis* trained in other districts by Project Mesha staff and/or Project Mesha *pashu sakhis*	Technical manager	Request from partner organisation	
Number of visits by SHG members of other districts to Project Mesha			
Number of policy briefs developed	AKF Patna	Minutes of meetings	
Number of state/national workshops	AKF Patna	Minutes of meetings	
Number of studies, assessments, news reports on small ruminants	AKF M&E team/PS communication / block manager	Emails/letters/ minutes of meetings	

Indicator	Who collects	How	3ie's recommendations
Number of requests seeking information by other development organisations and government institutions	Block manager/ team leaders	Request letters/emails/ minutes of meetings	
Number of learning events organised with JEEViKA community mobilisers (by theme)			Recommend AKRSP team
Number of JEEViKA community mobilisers trained			Recommend AKRSP team
ASSUMPTION			
Number of visits by government officials/representatives of other organisations (by theme)	AKF Patna/regional manager/ block manager	Request/email / letter from the organisation	
Number of learning forum meetings at block/district and state levels (by theme)	AKF Patna	Minutes of meetings	
Number of programme lessons documented and disseminated (by theme)	AKF M&E team	Learning and communicatio ns strategy	
Increase in district/state budget allocation for small ruminant rearing	AKF Patna	Review of state budgets and budget report	

Note: AKF = Aga Khan Foundation; AKRSP = Aga Khan Rural Support Programme; FMD = Foot and mouth disease; PPR = *Peste des petits ruminants*; PS = *pashu sakhi.*