



Strengthening Backyard Poultry Rearing Approach and results from a pilot project in Jhabua, Madhya Pradesh



South Asia Pro Poor Livestock Policy Programme

April 2016

SOUTH ASIA

Pro Poor Livestock Policy Programme

*A joint initiative of National Dairy Development Board (India) and
Food and Agriculture Organisation of the United Nations*

Website: www.sapllpp.org



**NATIONAL
DAIRY
DEVELOPMENT
BOARD**



**Food and Agriculture
Organization of the
United Nations**

Strengthening Backyard Poultry Rearing: Approach and results from a pilot project in Jhabua, Madhya Pradesh

Photo Credits: Sampark Samaj Sevi Sansthan; Ramkumar Bendapudi; and SAPPLPP

Suggested Citation: SAPPLPP. 2016. Strengthening backyard poultry rearing: approach and results from a pilot project in Jhabua, Madhya Pradesh, South Asia Pro-Poor Livestock Policy Programme, New Delhi, pp v, 53

© SA PPLPP (<http://sapplpp.org/copyright>)

Disclaimer: The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the National Dairy Development Board of India (NDDB) and the Food and Agriculture Organisation of the United Nations (FAO) concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitations of its frontiers or boundaries. The opinions expressed are solely of the author(s) and reviewer(s) and do not constitute in any way the official position of the NDDB or the FAO.

Reproduction and dissemination of material from this Study for educational or non-commercial purposes is authorised without any prior written permission from the copyright holders, provided the source is fully acknowledged. Reproduction of material from this study for resale or other commercial purposes is prohibited without prior written permission from the copyright holders.

Strengthening Backyard Poultry Rearing

Approach and results from a pilot project in Jhabua, Madhya Pradesh

Based on process documentation of "Strengthening Backyard Poultry Rearing" pilot project, Jhabua, undertaken by Ramkumar Bendapudi, Ph.D., Independent Consultant, on behalf of SAPPLPP. The author maybe contacted at rbendapudi@yahoo.com.



SOUTH ASIA

Pro Poor Livestock Policy Programme

A joint initiative of National Dairy Development Board (India) and
Food and Agriculture Organisation of the United Nations



**Food and Agriculture
Organization of the
United Nations**



कंडक...
विस्तार परिषद
गोत धान
द्विभागी
क्रियान्वयन
सहयोग

CONTENTS

Executive Summary	i
Abbreviations	iii
Glossary	iv
List of Tables	v
List of Figures	v
List of Box Items	v
1. Introduction	1
2. Context	1
3. Method of Study	2
4. Project Area	2
5. Project Implementing Partner	4
6. Summary of Activities Undertaken	4
7. Process of Implementation	6
8. Capacity Building Initiative	21
9. Services Provided by <i>Murgi Sakhis</i>	27
10. Major Project Achievements	32
11. Learnings from the Project	45
12. The Way Forward	50
Annexure 1	52
References	53



EXECUTIVE SUMMARY

This report is based on a study commissioned by South Asia Pro-Poor Livestock Policy Programme, to undertake process documentation of a backyard poultry pilot project implemented in Madhya Pradesh, in partnership with Sampark Samaj Sevi Sansthan, Raipuria. “Strengthening Backyard Poultry Rearing” was a pilot initiative supported by SA PPLPP for strengthening *desi* and indigenous poultry based livelihoods in a cluster of villages in Rama block of district Jhabua in Madhya Pradesh, and was implemented over two years from March 2014 to March 2016. The overall objective of the pilot project was to enhance returns from backyard poultry operations, transform poultry-keepers' perception of BYP as a sustainable source of livelihood, and generate evidence in support of policy decision-making.

This study is a systematic review and documentation of the project in the context of poultry rearing, including a documentation of approaches, processes and methods adopted by the various stakeholders involved in project implementation and management.

Project initiatives

The key activities under the project included community mobilization; capacity building; raising awareness about good poultry management practices; establishing local veterinary service systems for poultry; and facilitating linkages with other government and non-government poultry development programmes. Community mobilization and engagement were core project principles, and a consultative approach was adopted throughout while taking key decisions.

The project plan and structure revolved around Community Animal Health Workers, or *Murgi Sakhis*, for delivering preventive veterinary care services for poultry; these were local village women who were trained in providing essential preventive veterinary services, which included vaccination, deworming, and first aid, as well as motivating other poultry rearers to adopt improved management practices. The service delivery and outreach mechanism comprised a network of trained *Murgi Sakhis* and Poultry Extension Groups, of which 1-2 were formed in each project village.

By the end of the project period, the *Sakhis* and interested PEG members formed a collective by the name '*Mabila Murgi Palak Samooh Sangh*', with 11 representative members from the project villages and beyond, to take an initiative in marketing of produce as well as inputs for improved backyard poultry, including feed and equipment.

Training and capacity building of all project-associated actors were ongoing activities, with training events organized for the project staff, *Murgi Sakhis*, and PEG members. Capacity building activities included structured training by domain experts, on-field

practice, review and feedback, and short refresher sessions for consolidation of learnings.

The coordinated and collaborative work of project personnel with various stakeholders, including officials of the state Animal Husbandry department, helped in convergence of various efforts for poultry development in the area, and thereby ensured better services to the poultry rearers.

Achievements

The total number of birds owned by the families in the project area has more than doubled over a period of 18 months (from approximately 7,500 birds in July 2014 to 15,700 in December 2015), in addition to a large number of sales. In monetary terms, the value of birds sold or consumed increased by 130% in the month of December 2015 as compared to July 2014.

The mortality rates declined in adult birds and chicks from 57% in July 2014 to 9% in December 2015, as a result of the improved management practices adopted and availability of services of *Murgi Sakhis*. Most of the poultry-keepers availing their services are now making prompt payments, which is an indication of increased awareness among the rearers about the importance of preventive care and health management in poultry. There was a gradual change in the community perception, from initial skepticism at the beginning of the project to acceptance of, and demand for *Murgi Sakhi* services as the project progressed.

Along with increased household income from poultry, estimated as INR 10,800 per annum, differences are also observed in terms of improved nutrition, with an estimated four-fold increase in local consumption of eggs.

Way forward

The current legal framework, defined by the Veterinary Council of India Act, 1984, does not provide any recognition to the services of *Murgi Sakhis*, even though there is increasing appreciation of their role by mainstream veterinary service providers. For compliance with the existing legal and institutional requirements, the services of *Murgi Sakhis* need formal recognition, either through accreditation, or provision of certificates by an accredited institution, based on standardized training modules.

A more organized approach towards marketing of produce, including establishment of common selling points at strategic locations, by local entrepreneurs, would go a long way in creating a brand image for the birds (especially Kadaknath) from the area. Further capacity building of poultry rearers and PEG members is required for functioning as formal groups, on topics such as preparation of business plans, procedures to be followed to avail loans, maintenance of records, repayment procedures, and so forth.

ABBREVIATIONS

A&NLM	Administration and National Livestock Mission
AHD	Animal Husbandry Department
BPL	Below Poverty Line
BYP	Backyard Poultry
CAHW	Community Animal Health Workers
DADF	Department of Animal Husbandry, Dairying and Fisheries
ET	Enterotoxemia
FAO	Food and Agriculture Organisation of the United Nations
GALVmed	Global Alliance for Livestock Veterinary Medicine
GoI	Government of India
INR	Indian Rupees
KVK	Krishi Vigyan Kendra
LIT	Low Input Technology
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MP	Madhya Pradesh
MPRLP	Madhya Pradesh Rural Livelihood Programme
ND	Newcastle Disease (Ranikhet)
NDDB	National Dairy Development Board
NGO	Non-Government Organisation
PEG	Poultry Extension Group
PPR	<i>Peste des Petits Ruminants</i>
R2B	Ranikhet Disease Vaccine Living, based on a strain of virus which causes Ranikhet disease (R2B strain)
SAPPLPP	South Asia Pro Poor Livestock Policy Programme
SHG	Self Help Group

GLOSSARY

<i>Anganwadi</i>	Pre-school, for children below 6 years of age
<i>Bigha</i>	A unit of land area equivalent to 0.4 acres
<i>Desi</i>	Indigenous; in the context of breeds, usually ‘non-descript’
<i>Gram Panchayat</i>	Local self-governance institution at the village level
<i>Gram Sabha</i>	All members of a Gram Panchayat; a meeting of all members of the Gram Panchayat
<i>Haat</i>	Local market
<i>Jan Samvad</i>	A forum for interaction between government officials and local communities
<i>Kharif</i>	Crop grown during the rainy season
<i>Murgi Sakhi</i>	Friend of poultry; Community Animal Health Worker, particularly for poultry
<i>Nukkad natak</i>	Street drama
<i>Rabi</i>	Winter crop (sown after monsoons)
<i>Sakhi</i>	Female friend
<i>Sarpanch</i>	Elected head of the Gram Panchayat

LIST OF TABLES

Table 1:	Project villages and prevalence of poultry rearing	3
Table 2:	Village-wise follow-up meetings held in April-May 2014	8
Table 3:	Unit charges for services rendered by <i>Murgi Sakhis</i>	9
Table 4:	Number of PEGs formed in project villages	11
Table 5:	Summary of formal training received by <i>Murgi Sakhis</i>	22
Table 6:	Training of PEG members and representatives	26
Table 7:	Adoption of improved practices (December 2015)	31
Table 8:	Services provided by <i>Murgi Sakhis</i> in September 2015	34
Table 9:	Status of Kadaknath units (as in September 2015)	38

LIST OF FIGURES

Figure 1:	Project Timeline	5
Figure 2:	Planning and implementation process	15
Figure 3:	Deworming and vaccination of birds by <i>Murgi Sakhis</i>	28
Figure 4:	Poultry population in project cluster	32
Figure 5:	Mortality rates in poultry in project cluster	32
Figure 6:	Percent changes in households by flock size	34
Figure 7:	Poultry population <i>vis-à-vis</i> number of birds purchased and sold	35

LIST OF BOX ITEMS

Box 1:	Poultry Extension Groups in Village Khedli	11
Box 2:	Collaboration with AHD, Madhya Pradesh	18
Box 3:	Ramila Ben's Transformation into a <i>Murgi Sakhi</i>	29
Box 4:	Kadaknath: Challenges in Commercialization	38
Box 5:	Transition of a <i>Murgi Sakhi</i> into an Entrepreneur	41
Box 6:	<i>Murgi Sakhi</i> Services under Difficult Conditions	46



1. INTRODUCTION

The poultry sector in India is dominated by commercial production, led by the private sector. Outside the commercial sector, poultry rearing among rural households is most often limited to backyard scavenging flocks; these are kept mainly for production of meat and eggs for household consumption, or sold in local *haats*.

The real value of smallholder poultry farming models lies in their contribution to reducing malnutrition through increased availability and affordability of animal protein (and with these, micro-nutrients) for rural households (Pica-Ciamarra and Otte, 2009). One of the lessons learnt while studying a rural poultry value chain in the state of West Bengal in India was that poverty is not just about income. The authors hold that the poorest reposed “psychological faith in poultry to save families in times of medical emergencies or fees payments; thereby establishing symbiotic links between poultry rearing and enhanced quality of life of poorest” (SA PPLPP, 2009). Backyard poultry (BYP) farming with improved birds provides a solution to food insecurity, especially to the needy villagers, thus paving the way for sustainable agriculture in rural areas of India (Pathak and Nath, 2013).

As BYP has traditionally not been high-value, commercial production, access to veterinary services did not get much focus. But given that rural backyard poultry is within the domain of women, and forms an important support system with several tangible and intangible benefits, for both livelihood and nutrition, it is important to not lose the system due to a lack of basic veterinary services, such as vaccination and deworming. There is also scope for strengthening the system as a sustainable livelihood option for rural, agrarian households, thus contributing to overall economic betterment.

2. CONTEXT

The project “Strengthening Backyard Poultry Rearing” is a pilot initiative supported by the South Asia Pro-Poor Livestock Policy Programme (SA PPLPP) for strengthening *desi* and indigenous poultry based livelihoods in a selected village cluster in Rama block of district Jhabua in Madhya Pradesh, with Sampark, an NGO, as the local implementing partner. SA PPLPP is a joint initiative of the National Dairy Development Board (NDDB) and Food and Agriculture Organisation of the United Nations (FAO). The objective of the programme is to strengthen capacities and knowledge of stakeholders for implementing sustainable small holder small ruminant and poultry rearing interventions. It has supported implementation of three pilot projects in Madhya Pradesh and Rajasthan to demonstrate successful models and establish proof of concept for purposes of policy advocacy.

The expected outcomes from the project “Strengthening Backyard Poultry Rearing” are (Source: Project proposal, 2014):

- i. To transform poultry rearing from its existing subsistence rearing to supplementary livelihood activity, which results in higher incomes for poultry rearers;
- ii. Improvement in the knowledge base and practices related to poultry rearing;
- iii. A sustained reduction in mortality rates among poultry flocks; and
- iv. Availability of healthy chicks at the village level.

This report is based on a study commissioned by SA PPLPP, to undertake process documentation of the BYP pilot project implemented in Jhabua, in partnership with Sampark. The objectives of this study were to:

- i. undertake a systematic review and documentation of the project, including a documentation of approaches, processes and methods adopted by the partner agency (Sampark) and village institutions, Community Animal Health Workers (*Murgi Sakhis*), and other stakeholders in project implementation; and
- ii. identify and document cases which offer scope for learning

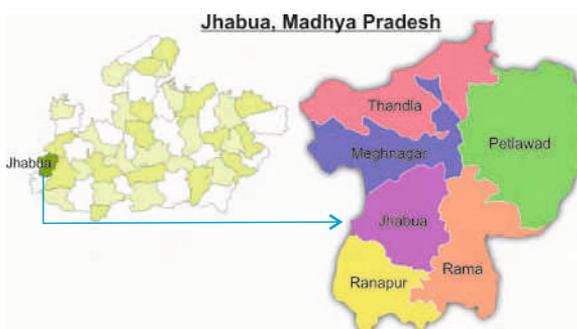
The study was undertaken between November 2015 and January 2016.

3. METHOD OF STUDY

The study is based on a review and analysis of the baseline survey report, monthly progress reports, information from registers, and other reports produced by the implementing agency, viz., training reports, case studies and process documents prepared during the course of the project. Primary data and information was collected through interactions with key informants (project implementing team, Animal Husbandry department (AHD) personnel, poultry rearers, and *Murgi Sakhis*).

4. PROJECT AREA

Jhabua district is situated in the western part of the state of Madhya Pradesh. The district has six development blocks – Ranapur, Jhabua, Thandla, Meghnagar, Petlawad and Rama. The project area is located in the Rama Block, at a distance of 15 km from Jhabua district headquarters. On its western periphery is the Jhabua development block, in the north is Petlawad and towards the south and east is Dhar district. The national highway connecting Indore and Ahmedabad passes through the Rama block. There are a total of 55 panchayats and 122 villages in Rama.



The villages for the project were selected based on the presence of poultry rearers and proximity to market centres. The names of the villages, number of households, and number of poultry-rearing households in each, are as shown in Table 1.

Sl.	Village name	Number of hamlets	Number of households		
			Total	With poultry	Percent of total
1	Saad	9	382	360	94
2	Keljhar	3	76	76	100
3	Wagnera	5	83	50	60
4	Hatyadeli	10	177	120	68
5	Chhapri	11	250	188	75
6	Khedli	8	89	45	51
7	Bhanwar Pipaliya	5	122	65	53
8	Nawapada	4	170	170	100
9	Bhainsakarai	6	83	83	100
10	Kokawad	8	97	63	65
11	All project villages (10)	69	1,529	1,220	80

Source: Sampark records, 2013

All of the 1,529 households in the 10 project villages are tribal, belonging to the Bhil and Pateliya communities. The two major sources of livelihood, at the time of project baseline, were migration and agriculture. For 64% of the households, migration was the main livelihood activity, and for 34% it was agriculture (Baseline survey, October 2013).

The baseline assessment showed that, in the project villages the average land-holding is 1.6 acres, and primarily comprises rainfed land. The major crops grown in the area are maize, soyabean and black gram. With respect to livestock, on an average each family had at least 2 large animals (mainly cows) and 3 goats. Poultry rearing is a traditional activity, with most households (80%) in the project villages having poultry flocks. Of these, 94% had a flock size ranging from 1 - 5 birds, and every household had at least 3 birds. Average income from poultry rearing was estimated as INR 2,226 per annum per household.

Poultry was primarily reared under a scavenging system with some supplementary feed given in the form of grain (wheat or maize). Mortality was found to be the highest among chicks on account of both disease and predation. In the majority of

cases, no health care was provided to the flocks. In a few rare cases, medicines were procured from the local chemist, or traditional home remedies were used. Households were unaware of the possibility or availability of vaccines for birds. Even though the region is the native breeding tract of the Kadaknath breed, the baseline assessment showed that the breed was reared by only one percent of all households, whereas 99% households reared the local/ non-descript breed (*desi* birds).

5. PROJECT IMPLEMENTING PARTNER

Sampark, as an organization, was established in 1987 by a few social workers in Petlawad tehsil of Jhabua district in Madhya Pradesh, and was formally registered in 1990 under the Societies Registration Act. Since its inception, Sampark has been engaged with the tribal communities in the area through various developmental activities pertaining to water resource management, sustainable agriculture, tribal rights and policy advocacy. The approach of the agency has been based on community mobilization around issues of debt and improvement in livelihoods. For the backyard poultry development project too, the approach of community engagement was similar, which made wider acceptance of project activities feasible.

6. SUMMARY OF ACTIVITIES UNDERTAKEN

Project implementation commenced in March 2014, and was initially for a period of 15 months. Subsequently, the duration was extended up to March 2016 for consolidation of production gains and putting sustainability mechanisms in place for continuity of benefits in the future.

The key activities and sequence of events during the project implementation period are as presented in Figure 1. In the figure, the boxes above the reference line indicate the planned activities initiated on a timeline. Activities such as training and preventive veterinary services by *Murgi Sakhis* were ongoing activities throughout the project. The boxes below the reference line show the additions and modifications to initial project activity plans, as well as the linkages established at different points of time, in order to meet emerging challenges, and capitalize on opportunities in furtherance of project objectives. As the project evolved, linkages were established to achieve convergence with various government agencies and programmes, and to maximize the benefits to the poultry rearers in the area.

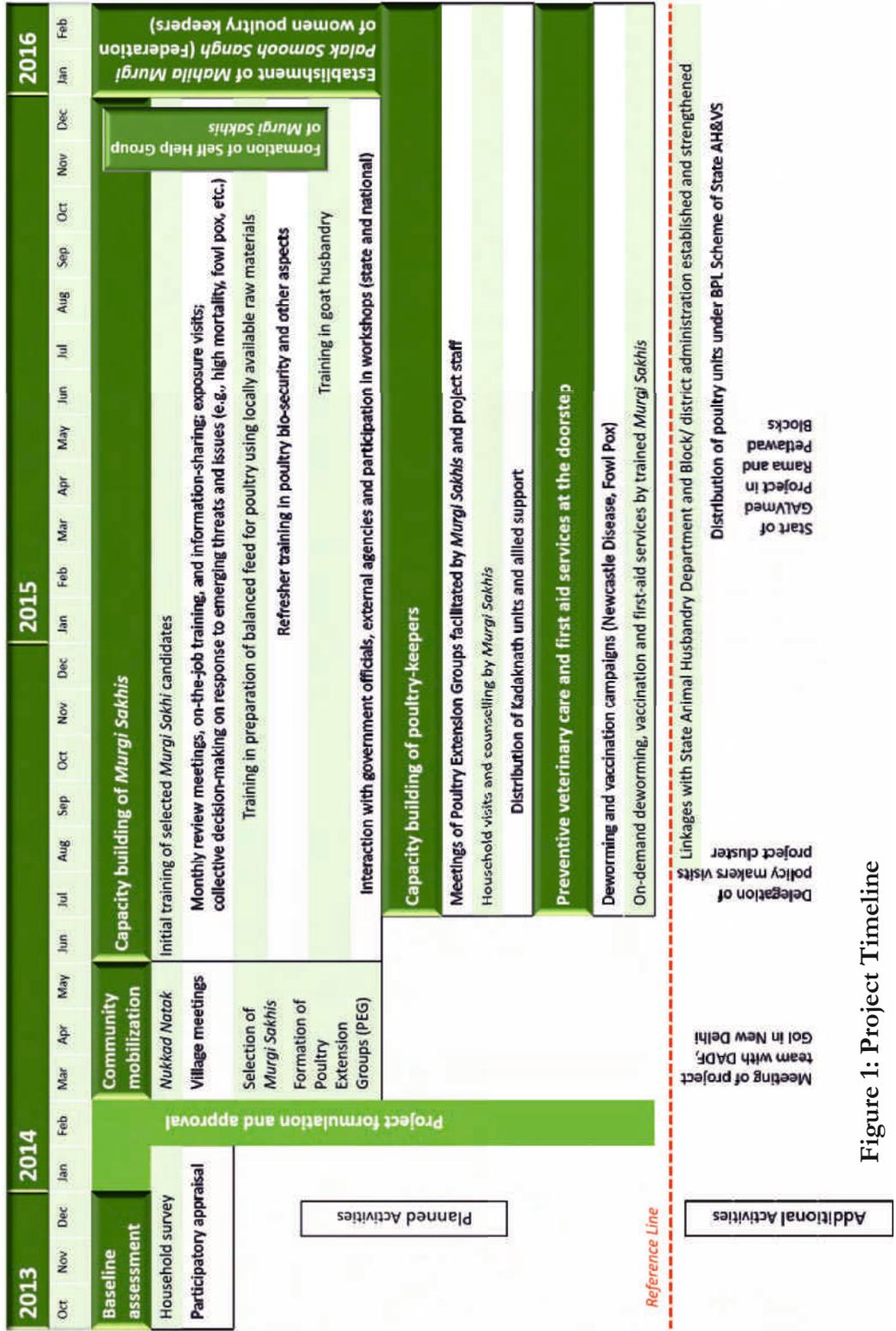


Figure 1: Project Timeline

7. PROCESS OF PROJECT IMPLEMENTATION

7.1 Project initiation phase

A baseline assessment was conducted in 12 villages in October 2013, wherein information was collected about the various characteristics of the villages, households residing in them, and their poultry rearing practices. This was followed by interactions with the district and block level AHD personnel, the Ranikhet Eradication Centre, Jhabua, and the Project Manager of the Kadaknath Breed Improvement Unit at the Krishi Vigyan Kendra (KVK) at Jhabua. Simultaneously, dialogue was initiated with poultry rearers in the villages to understand and prioritize their needs and concerns.

Based on the findings and information from above, a project proposal was developed with a focus on strengthening poultry-based livelihoods. It was then discussed and finalized in consultation with the SA PPLPP team at New Delhi. After sanction of the project in March 2014, a presentation outlining the baseline findings and implementation plan was made to senior officials at the Department of Animal Husbandry, Dairying and Fisheries (DADF), at New Delhi. The Joint Secretary-Administration & National Livestock Mission (A&NLM), DADF, GoI, who chaired the meeting, stressed that in selection of CAHWs (*Murgi Sakhis*), preference should be given to local women with basic literacy skills, so that there is higher possibility of their services continuing even after the project period. He also referred to the local veterinary college at Mhow for technical support; most importantly, he assured the cooperation of the state AHD during implementation of the project.

7.2 Project implementation team

The project plan and structure revolved around *Murgi Sakhis* for delivering preventive veterinary care services for poultry. There was one or more *Murgi Sakhi* for each village, and they were supported technically and logistically by the project team (Sampark staff). There were two organizers located in Rama Block to coordinate day to day activities with *Murgi Sakhis* in a cluster of 5 villages each. The two Cluster Organizers reported to the Project Coordinator, who was based at Petlawad. The Director, Sampark, provided overall guidance and direction to the project team. The project team received continuous inputs and technical guidance from SA PPLPP and DADF, GoI as well as the AHD, Government of Madhya Pradesh.

7.3 Process of engagement

7.3.1 Community mobilization - campaign mode

1) *Nukkad natak*

Local folk artists were hired to convey the key messages concerning BYP and the project through the medium of *nukkad natak* (local street dance and drama). The *nukkad natak* team was identified and selected based on their experience in the area and their knowledge about poultry. Before performing in the villages, an orientation-

cum-training was organized, in which roles of each member of the performing team were specified according to a script prepared in consultation with the project team, to elaborate on issues and opportunities in poultry rearing and management. The key messages included:

- i. importance of poultry for the well-being of the households (income and nutrition)
- ii. problems associated with current poultry rearing, such as high mortality rates due to disease and other factors
- iii. types of diseases, their symptoms, and how they spread
- iv. importance of good management practices for maintaining healthy flocks (shelter, cleanliness of surroundings, provision of clean drinking water, balanced feeding, vaccination, and deworming)
- v. the role of *Murgi Sakhis* who could provide doorstep veterinary health services to poultry-keepers in the village; and
- vi. suggested criteria for selection of *Murgi Sakhis*



Nukkad Natak in progress

The planning of these performances involved prior consultation with local village leadership, and their consent. One day before the scheduled event, the elders and *Sarpanch* of the village were consulted, apprised about the programme, and their suggestions sought on the location for conducting the *nukkad natak*; the location was decided such that it would be centrally located and accessible from neighbouring hamlets and villages. The performances were conducted in the late evening to facilitate maximum participation of the residents.

2) Follow up village level meetings

After the *nukkad natak*, follow-up meetings were conducted the next day, when issues raised during the *nukkad natak* on poultry rearing and management were discussed. This gave an opportunity for the field teams to interact with the community and elaborate on the project objective and activities; explore the possibility of forming Poultry Extension Groups (PEG) of interested poultry rearers; and identify candidates for taking up the role of *Murgi Sakhi*. These meetings and consultations continued over a period of two months, as indicated in Table 2.



Follow-up meeting in a project village

Table 2: Village-wise follow-up meetings held in April-May 2014

<i>Sl.</i>	<i>Village name</i>	<i>Number of meetings</i>	<i>Number of participants</i>
1	Nawapada	5	181
2	Bhanwar Pipaliya	6	248
3	Bhainsakarai	3	157
4	Keljhar	3	117
5	Saad	8	500
6	Khedli	5	171
7	Kokawad	5	213
8	Hatyadeli	5	226
9	Chhapri	5	267
10	Wagnera	7	214
11	All project villages	52	2,294

7.3.2 *Murgi Sakhis* for service delivery

1) Selection of *Murgi Sakhis*

At the village meetings, one to three women were nominated by the community members for the role of *Murgi Sakhi*. The following criteria were established for their

short-listing and selection:

- i. the candidates must be women, and residents of the village
- ii. interested in and actively practising poultry rearing
- iii. name should be proposed by the community, and acceptable to all
- iv. support of, and acceptance by, the candidate's family
- v. some degree of literacy was preferable
- vi. not practising migration
- vii. preferably in the age group of 25-35 years

Scores were assigned to the nominated candidates, with points assigned to each criterion, e.g., literacy (5 points), interest in poultry rearing (10 points), support of family members (10 points), community acceptance (5 points), location/ place of residence (3 points), age group (2 points) and not going for migration (15 points), with a total score of 50 points. The final selection of 17 *Murgi Sakhis* was based on the scores obtained by the candidates.

At the end of the project, it was found that the criteria that mattered the most were interest in poultry rearing, and support of family members. In addition, the candidate's personal drive and commitment to self-improvement was also found to play an important role.

2) *Roles and responsibilities of Murgi Sakhis*

The *Murgi Sakhis* are responsible for providing essential preventive veterinary services, which include vaccination, deworming, and first aid, as well as motivating other poultry rearers to adopt improved management practices. In addition, they are expected to undertake general coordination of project activities at the village level, keep records of work done, participate in monthly review meetings, submit monthly reports to the project implementing partner, and participate in project decision-making.

The major door-to-door services rendered by *Murgi Sakhis* are vaccinations, deworming and other primary health care. Initially the services of *Murgi Sakhis* were provided free of charge to the poultry rearers. Once the poultry rearers realized the benefits from the services, and as the demand for services increased, the project team

<i>Type of service</i>	<i>Service charges (Rupees per bird)</i>
Vaccination R2B (for birds > 1 month old)	2
Vaccination F1 (for birds < 1 month old)	1
Deworming	1
Primary health care	5

discussed with the *Murgji Sakbis* about charging for the services, in order to sustain the services beyond the project period. The unit charges for each type of service were mutually agreed, and are as indicated in Table 3.

The performance of all the *Murgji Sakbis* was not expected to be the same. A grading mechanism was, therefore, developed in order to assess their performance on a monthly basis, using the following parameters:

- i. Number of birds vaccinated
- ii. Number of birds dewormed
- iii. Knowledge about poultry
- iv. Number and nature of interactions with the community
- v. Participation in PEG meetings; and
- vi. Service charges collected

The *Sakbis* were accordingly graded as A, B and C every month, with “A” being the best. This mechanism also helped in self-assessment of the *Sakbis* and motivated those receiving lower grades to strive to improve their performance. The grading was used by the project staff to plan activities whereby they allocated more time and provided greater support in the field to the under-performing *Murgji Sakbis*. Based on a systematic grading of *Murgji Sakbis* at the end of the project, 3 of the 14 *Sakbis* were found to be in the “A” grade, 5 obtained a “B” grade and 6 were in the category requiring improvement. Details of functioning *Sakbis* and their grades are as provided in Annexure 1.

3) *Training of Murgji Sakbis*

The selected women were provided a foundation residential training on good practices in poultry-rearing in June 2014, followed by a series of other capacity building inputs. Details of the training and other capacity building activities undertaken are provided in Section 8 of this study report.

7.3.3 Poultry Extension Groups

1) *Formation of Poultry Extension Group*

The trained *Murgji Sakbis* went back to their respective villages and initiated the process of forming Poultry Extension Groups. In order to form the groups, meetings were organized at the hamlet and village levels to inform poultry-keepers about the project, and to facilitate selection of women who would be members of these groups. In this process, the *Murgji Sakbi* first contacted other women who were already known to her, viz., members of existing Self Help Groups (SHG). Among the criteria considered for selecting a member for PEG were that the woman is interested in poultry rearing, and is willing to join the group. In all, 34 PEGs were formed with a total of 393 women members, spread across the 10 project villages (Table 4). There are about 10-12 women in each PEG.

2) *Roles and responsibilities of PEG members*

PEGs were conceptualized as a medium for learning and experience sharing among

poultry-keepers who would be the leading role models in the village. Through regular meeting and interaction, it was expected that members would discuss and collectively resolve any issues and challenges faced by them.

The responsibilities of the PEG members included active participation in all the project activities, motivating other women in the village to adopt the prescribed management practices, regularly participate in village-level monthly meetings, practice all which was learnt from the training, and strive to become a model poultry rearer.

Table 4: Number of PEGs formed in project villages

Sl	Village name	Coverage - Murgi Sakbis and PEGs (number)		
		Murgi Sakbis	PEGs	Membership of PEGs
1	Nawapada	2	4	43
2	Bhanwar Pipaliya	1	2	25
3	Bhainsakarai	3	4	44
4	Keljhar	2	2	20
5	Saad	2	8	80
6	Khedli	1	3	38
7	Kokawad	1	3	44
8	Hatyadeli	2	3	33
9	Chhapri	2	3	40
10	Wagnera	1	2	26
	Total	17	34	393

Poultry Extension Groups in Village Khedli

Poultry Extension Groups (PEG) of local women (locally called *Murgi Vistaar Samooh*) were formed by the *Murgi Sakbis*, taking into account criteria such as interest of the women in rearing poultry, and their inclination to participate actively in group meetings, with the aim to enable greater knowledge sharing with other poultry rearers in the village. Such regular interaction with the poultry rearers also helps in better coordination and efficient delivery of services by the *Murgi Sakbi*. There are three such PEGs in Khedli village, facilitated by Ramila Ben, the *Murgi Sakbi* in the village.

Khedli village and its hamlets

Khedli village is situated at a distance of 16 km from Jhabua district

headquarters, and is a kilometre away from the Rama block headquarters. The village has about 90 households, spread across eight hamlets; three of these have PEGs, one each in Bhuriya phaliya, Ratwa phaliya and Babar phaliya.

There are a total of 21 households in Bhuriya phaliya. Except for five households, all others are engaged in rearing poultry. There is a local healer named Makna Ram who provides treatment to livestock using herbal medicines. The hamlet also has an Education Guarantee School. In Ratwa phaliya, there are 13 households and all of them are involved in poultry rearing. There is a small seasonal stream that flows through the hamlet, which provides one-time irrigation to the cotton crop cultivated in the area. Babar phaliya has 10 households and all of them are poultry-keepers. In this hamlet, there is a problem of access to drinking water, and the residents have to fetch it from a hand-pump in the neighbouring hamlet. This is one of the most under-developed hamlets, and the approach road too is un-metalled.

Performance of PEGs

Based on a grading mechanism to assess the performance of the PEGs using criteria such as regular and active participation in monthly meetings, and adoption of good management practices, the PEG from Bhuriya phaliya was found to be the best performing of the three groups in the village.

PEG in hamlet	Number of members	Performance
Bhuriya phaliya	15	A
Ratwa phaliya	13	B
Babar phaliya	10	C

Meera Dalsingh, Deetali Veersingh, Kaali Easwar and Humli are among the members of the PEG in Bhuriya phaliya. Even though initially they were apprehensive about the vaccination of birds and the capability of the *Murgi Sakhi*, over a period of time they realized the benefits of vaccination, and opted for it after seeing the health and growth of birds in vaccinated flocks. Interactions with the project staff, and participation in the village training programmes also contributed to building their confidence in Ramila ben, the *Murgi Sakhi* from their village. They now regularly participate in the monthly meetings called by her.

They shared that previously they never really looked after poultry, and mortality in chicks was very high. They used to feed them grain (wheat or maize), and birds were mostly let out to scavenge. They also never bothered about watering and the birds used to drink water from open drains or puddles. After learning about good poultry management practices, they started providing clean drinking water to the birds, and became conscious about the nutritional value of their feed.

Whereas earlier each household used to possess 10-15 birds, most of them now have more than 30 birds (including chicks). Between July 2014 and September 2015, the total number of adult birds owned by all the PEG members increased by about seven times. Correspondingly, the number of birds consumed or sold also increased among the rearers by 3.2 times (from 43 birds in July 2014 to 138 birds in September 2015).

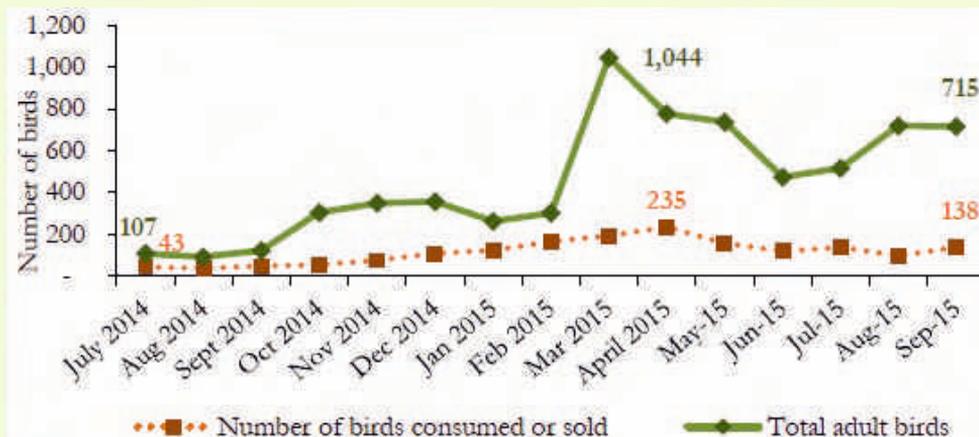


Figure: Number of birds owned, consumed and/or sold by PEG members in Khedli village

The average value of birds consumed or sold per household was approximately INR 400 per month in July 2014; it increased to INR 1,271 per month per household in September 2015 (assuming a sale price of INR 350 per bird). In general, this resulted in additional income to the households, which they said was helpful in meeting agriculture, education and medical expenses.

The story of goat husbandry is still the same as before: vaccination or deworming is not undertaken, and morbidity is high. In emergencies, animals are taken to the nearest veterinary health care centre for treatment. Rearers in the village are aware that the *Murgj Sakhi* has received training for goat husbandry recently, adding that each household among the PEG members has 5-6 goats on average. They expressed that it would definitely help them if similar services as for poultry were also made available for goats in the village. They said they would not mind paying for the services, especially after seeing the benefits in poultry.

7.3.4 *Murgj Sakhi*–PEG Interface

As mentioned earlier, project implementation revolved around the *Murgj Sakhis* who were assisted by PEGs. The planning and implementation processes in the project are as shown in Figure 2. Monthly plan of action for each village is prepared by the *Murgj Sakhis* for their respective villages, in consultation with the project team, and implemented with support of the PEGs in the village. The *Murgj Sakhis* facilitate regular monthly meetings of PEGs, wherein they share information and knowledge gained by them during training by external resource persons, or by project staff during

the monthly review meetings. In these meetings, the *Sakhis* also report and review progress of PEG members in adoption of improved management practices; take stock of prevalent or emerging issues pertaining to poultry; and prepare a schedule of services (vaccinations, deworming) to be rendered during the month.

The PEG members in turn actively cooperate with the *Murgi Sakhis* to get their flocks vaccinated, by keeping the birds ready for the *Sakhi* to administer the drops or the injection expeditiously. Most of the PEG members were found to value the services of the *Murgi Sakhi*, and were willing to pay for her services. This process of two-way information flow ensured *Murgi Sakhis* the support of poultry rearers, and their willingness to follow up on the recommendations provided.



Meeting-cum-training of Poultry Extension Group

PEG meetings are also attended by the project staff whenever demonstration-cum-training (such as feed preparation) is to be undertaken. Whenever any *Sakhi* needs support in the village, the project staff helps out as required; this includes facilitating meetings, record-keeping, and providing other forms of support.

Apart from the monthly meetings with the PEGs, all the *Murgi Sakhis* of the cluster also meet every month at the Project office in Rama block (Kalidevi village), or at the Sampark office at Raipuria, Petlawad. Here, the activities of the project to be implemented during the month are planned, and monthly reports shared with the project team.

The vaccines, dewormers and other consumables required by them were procured with help of the project staff until recently. With experience and training, however, the *Sakhis* are now able to do so on their own.

The *Murgi Sakhis* maintain monthly records of the following data and information:

- i. number of birds that were administered vaccines and dewormers
- ii. number of birds that were provided primary health care, by type of disease/ symptom
- iii. size of poultry flock in each household, including males, females and chicks.

STRENGTHENING BACKYARD POULTRY

Planning and Implementation Processes in a Project at Jhabua, Madhya Pradesh



Figure 2: Planning and implementation processes

For each type of service provided, unit charges are applied and accordingly money is collected from the poultry rearers. The money received is then recorded and information about it shared with the team during the monthly review meetings.

7.3.5 Association of *Murgj Sakhis* and poultry keepers

The idea of a SHG of *Murgj Sakhis* had been floated by Sampark on SA PPLPP's suggestion to enable mutual support, provision of technical inputs, and sustainability of services beyond the project period. The issue had also come up several times during the monthly meetings while discussing the marketing strategies for Kadaknath breed birds. However, the discussion led to the realization of a need for formation of a federation of *Sakhis* and poultry keepers, with a focus on marketing. During a meeting of the *Murgj Sakhis* in November 2015, a small group with representation from 8 of the 10 villages was formed for the purpose (the *Sakhis* from Chhapri and Kokawad are not part of the group as they did not evince much interest).

Later, a few interested PEG members also joined in, and the group was named '*Mabila Murgj Palak Samoob Sangh*', with 11 representative members from the project villages and beyond. An account was opened in the nearby bank in the name of the group. The members elected Ramila (from Khedli) as the President, Dittu Parmar (from Saad) as Secretary, and Sangeeta (from Mokampura) as the Treasurer of the Sangh.

Members of the association have started preparation and marketing of poultry feed for chicks and adult birds; they also procured poultry feeders and watering equipment from Indore, and are marketing them locally. Between January and February 2016, the group sold about 10 quintals of poultry feed (for INR 38,000). The money earned from the sales is deposited in their bank account.

For continuity of mutual support among *Sakhis*, a SHG was also formed, and includes all the *Murgj Sakhis* from the project villages.

7.3.6 Establishing linkages and engagement with stakeholders

The project team actively engaged with the government functionaries, community leaders and members of local governing bodies (Panchayat members), *Murgj Sakhis* and poultry rearers at every stage of the project, from planning to implementation, review and feedback. The nature of this engagement with multiple stakeholders was in the form of inter-personal meetings, workshops, tele-communication and correspondence, invitation to local events, and exposure visits. The interaction with government functionaries helped in getting critical inputs and suggestions for converging with various government programmes, which resulted in major benefits to the poultry rearers. It also kept the functionaries informed about the project processes, and facilitated acceptance of outcomes. A brief description of the most significant events which shaped the course and impact of the project is described in the following paragraphs.

1) *Jan samvad—June 2014*

Jan samvad refers to an interactive meeting of officials with the public. One such meeting of community members with government officials was organized by the project team at Chhapri village on 16 June 2014, wherein officials from KVK, Ranikhet Eradication Centre, and Ajeevika Mission participated¹, and interacted with about 30 community members.

After introductions of the officials, members of the project team explained about the ongoing BYP project, and invited the officials to share their knowledge and enlighten the community.

Shri Ajay Khag explained to the community members about the Ajeevika Mission, its objectives, and intended benefits. Dr I S Tomar shared about the various programmes being taken up on poultry development at the KVK, elaborating on the Kadaknath breed and about the hatchery at KVK that supplies Kadaknath chicks. Dr M S Baghel informed the community members about the free of cost availability of vaccines through the Ranikhet Eradication Centre. The event also offered an opportunity for the *Murgi Sakhis* to share their experiences with the visiting officials.

2) *Distribution of Murgi Sakhi kits – July 2014*

An event was organized on 5th July 2014, wherein each trained *Murgi Sakhi* was awarded a vaccine box and medicine kit comprising dewormers, Oxytetracyclin hydrochloride powder, and an



Trained Murgi Sakhis receiving vaccine kits

assortment of herbal remedies for primary health care. Dr S K Tiwari, Deputy Director, AHD, Jhabua, Shri Nilesh Desai, Director, Sampark, and Shri Ahad Khan from vernacular newspaper *Nayi Duniya* gave away the vaccine boxes and kits to the *Murgi Sakhis*. At the event, the *Sakhis* shared about their training at Sampark, Raipuria, and their learnings. In his address to the gathering, Dr Tiwari hoped that through support of the *Murgi Sakhis* and the vaccination programme, Ranikhet disease would be controlled in the villages, thereby benefitting the poultry rearers. He also assured cooperation of the department to the *Murgi Sakhis* and provision of vaccines as per demand. He then explained to the *Murgi Sakhis* about the dewormers and the correct dosage while providing primary health care to the birds.

¹ Dr I S Tomar, Project Coordinator, KVK, Jhabua; Dr Mek Singh Baghel, Ranikhet Eradication Centre, and Shri Ajay Khag, Cluster Coordinator, Madhya Pradesh Ajeevika Mission

Collaboration with Department of Animal Husbandry

Dr S K Tiwari, Deputy Director, AHD, Jhabua, has been associated with the project since its inception. He provided technical inputs and guidance during the course of the project, participated in relevant events, and was supportive of project initiatives in the villages. He was also a resource person during some training sessions for the *Murgi Sakhis*.

Reflecting on the project developments, he elaborated on the Rural BYP programme of the state government for BPL households, which focused on promotion of birds that result in high output with low inputs. For example, coloured birds gain more weight with less input. He explained that under the scheme, which involved 80% subsidy and 20% beneficiary contribution, each BPL family receives a unit of 45 chicks of coloured birds (28 days old), along with an amount of INR 1,200 for construction of a poultry shelter. He explained that the chicks were sourced from private hatcheries in Gujarat, Bhopal or Hyderabad.

Dr Tiwari shared that the government also has a scheme under which support is available for establishment of poultry 'Mother Units' for supply of chicks. Upon fulfilment of selection criteria, the selected participants are offered a training programme of 15 days' duration, and issued a certificate upon successful completion of training. Each Mother Unit is expected to supply about 13,500 chicks. However, he cautioned that there are higher risks involved in operating such a unit, and was apprehensive about *Murgi Sakhis* or poultry rearers taking it up as a profession.

Regarding Kadaknath, he was of the opinion that it was worth promoting activities for conservation of the breed. He said that the meat of Kadaknath is nutritionally rich in iron, protein, and vitamins, and at the same time low in fat.

In the context of the SA PPLPP-Sampark poultry project, he felt that the initiative had facilitated execution of government-supported programmes such as rural BYP promotion for BPL families. This was because the community had already been mobilized, and their awareness about good poultry management practices ensured higher rates of success and returns from the units, thus lending a degree of sustainability to the activities implemented under the scheme. Most importantly, he recognized and acknowledged the role of *Murgi Sakhis* in bridging the gap in last mile service delivery at the village level.

3) *Visit of delegation from New Delhi – July 2014*

On 24th July 2014, Mr Sanjay Bhoosreddy, Joint Secretary (A&NLM), DADF, GoI, and the then FAO India Representative, Dr Peter Kenmore, visited the project area along with the team from SA PPLPP.

They interacted with the PEG members in Saad village in order to interact with the poultry rearers about the challenges faced and the activities undertaken, gain an understanding of poultry diseases occurring in the area, and assess the extent of losses from mortality. The district AHD personnel, who were present on the spot, assured full support to the poultry rearers. The Joint Secretary asked the Deputy Director, Jhabua to consider the project villages while implementing the state rural BYP programme, and also suggested that Kadaknath breed birds could be further promoted in the area. The Chief Executive Officer, Zilla Panchayat, Mr S Dhanaraju, suggested that poultry shelters could be constructed under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS); further, he was of the opinion that a solar-powered hatchery could also be procured to address the issue of lack of brooding in Kadaknath birds. He recommended that Kadaknath chicks be procured from the AHD, or under the Ajeevika Mission of the state government (under the National Rural Livelihoods Mission).



Murgi Sakhis and other poultry keepers interacting with visiting dignitaries

During this visit of senior dignitaries to the project areas, the then district Collector, Mr Chandrasekhar Borkar, also interacted with the *Murgi Sakhis* and was apprised of the services being rendered by them. The district AHD personnel expressed their cooperation in supplying dewormers and vaccines, adding that the demand for the required quantity be placed in advance, so that necessary arrangements could be made for timely availability of vaccines. It was also indicated that the AHD could provide technical training to the project staff and *Murgi Sakhis*.

Overall, this visit galvanized the state and local AHD officials, as well as the district administration, and enabled collaborative work subsequently.

4) *Participation in Gram Sabhas – August 2014*

Gram Sabhas were organized in each village during August 14 – 20, 2014. The opportunity was utilized by the project team to present the poultry project development objectives and activities taken up in the villages before the *Sarpanch*, Panchayat Secretary and community members participating in the Gram Sabha. The services being provided by the *Murgi Sakhis* were also shared and discussed, and members were informed about the proposed service charges, which received approval of the Gram Sabha.

At these meetings, PEG members in project villages were encouraged to put up their proposals for construction of poultry shelters for funding under the MGNREGS to their respective Gram Panchayats. Although approval was granted for construction of 224 poultry shelters under the scheme, it did not materialize because of various reasons, including lack of interest on the part of the Panchayat leaders, and local level politics.

7.4 **Project monitoring, review and learning**

Throughout the project period, primary data was collected by the *Sakhis* and the project team, for the purpose of measurement of progress and results achieved. This was submitted to SA PPLPP in the form of monthly, quarterly and annual reports. In addition, information was also recorded in registers and detailed process reports.

7.4.1 **Monthly reports**

Monthly reports were prepared to monitor the activities and progress at the village level. This involved collection of primary data at the household and village levels, its compilation and analysis.

Household level: Appropriate formats were prepared to collect household information in the context of poultry (number of birds owned, chicks hatched, mortalities in adults and chicks), disease symptoms and number of birds affected, and type of services delivered to the households (vaccination, deworming, primary health care). This information was collected by *Murgi Sakhis* every month.

Village level: Household data was aggregated at the village level to generate village level reports. This was done by the Cluster Organizer and forwarded to the Project Coordinator. After scrutiny and verification, all reports were submitted to SA PPLPP on a monthly basis.

The monthly reports enabled close monitoring of the situation, particularly with respect to diseases, mortality rates, and services rendered. These reports also provided

information for evaluating the performance of the *Murgi Sakbis*, and formulating appropriate response strategies, including service provision and establishment of necessary support systems. At intermittent intervals during project implementation, and towards the end of the project, the data generated through the monitoring and reporting system was used to assess project impact and efficiency. An analysis of the findings was regularly shared with the SA PPLPP Management Board, comprising representatives of NDDDB and FAO.

7.4.2 Maintenance of registers

Village level: Separate registers are maintained for each village for recording minutes of PEG meetings by the concerned *Sakbis*. The project staff steps in to provide support to those *Sakbis* who have difficulty documenting on their own. The *Sakbis* also maintain a record of the types of services delivered and the payments received every month.

Project level: Registers are also maintained by the project staff wherein the minutes of monthly meetings of *Murgi Sakbis* are recorded, along with the decisions taken.

7.4.3 Reports

In addition to the narrative progress reports submitted to SA PPLPP on a quarterly basis, detailed training reports were prepared for every training event. Further, the team also prepared process document reports on an intermittent basis to capture the essence and sequence of activities implemented.

8. CAPACITY BUILDING INITIATIVES

Capacity building of all project-associated and relevant actors has been a key focus of the project; training and capacity building were ongoing activities throughout the project period. Training events were organized for the project staff, *Murgi Sakbis* and PEG members at different points of time in the course of the project. The design of the training plan, and its execution, was through a consultative approach, taking into consideration the learners' interests, literacy levels as well as preferred learning styles. At every stage, inputs and feedback were taken from the trainees to improve delivery and consolidate learnings. While developing the training content and modules, inputs were also sought from the DADE, GoI, SA PPLPP, state AHD officials, and other subject matter specialists.

8.1 Training of *Murgi Sakbis*

Capacity building of *Murgi Sakbis* included both structured training, as well as on-the-job guidance and support. Structured training was provided by external resources persons (veterinarians), officials from KVK, and district AHD personnel. These were followed by on-field practice, feedback, and short refresher sessions at the project cluster level for consolidation of learning; these refresher sessions were facilitated by

project staff with inputs from KVK or AHD officials.



Selected Murgi Sakhis receive training at Sampark campus in Raipuria

Exposure visits to other areas also served as learning opportunities for the *Sakhis* and other poultry keepers. After every training or exposure visit, it is normal practice for the *Murgi Sakhis* to call a meeting of PEG members in their respective areas of work, for wider sharing of the knowledge and information gained from the training. Likewise, a

meeting of *Murgi Sakhis* is called by the project staff before any programme, in order to understand their needs and seek their inputs for planning the event.

Several rounds of training were conducted over a period of two years; the training covered both subject knowledge and practical demonstrations on poultry management, including identification of disease symptoms, information about diseases (especially bird flu, fowl pox, and Ranikhet), types of vaccinations, maintaining vaccine efficacy, deworming, primary treatment, and corresponding skills for the same. A summary of the training programmes conducted for the *Murgi Sakhis* is provided in Table 5.

Table 5: Summary of formal training received by *Murgi Sakhis*

Year	Nature of training	Duration	Resource person/ Designation
2014	Foundation training	3 days	Dr Kornel Das, Consultant, SA PPLPP
	Refresher training I	2 days	Dr Prakash Shinde, Resource Person, Chhattisgarh
2015	Refresher training II	2 days	Dr Pradeep Bose, Pashupati Kalyan Parishad, Rajasthan
	Training in goat husbandry	2 days	Dr Mahesh Chouhan, Veterinary Surgeon, AHD

8.1.1 Foundation training – June 2014

The first training was organized for the selected *Murgi Sakhis* from 3-5 June 2014 at Sampark campus in Raipuria. The training was conducted by veterinary expert, Dr

Kornel Das, Consultant, who was recruited for the purpose by SA PPLPP. The *Murgi Sakhis* were oriented to perceive poultry as a viable source of income that could fill the gap between their total monetary inflows and expenditure. During the training, the *Sakhis* listed out the possible reasons for the death of birds based on their experience and observations. Dr Das then explained the causes as well as management practices to prevent problems and diseases occurring in different seasons. He elaborated on the importance of vaccinations to prevent diseases such as Ranikhet and fowl pox, and emphasized on improved nutrition such as vitamin A-rich feed (mixing of greens with dry ration).

The following topics were covered in the training: type of worms, losses due to worms and preventive care; types of diseases, identification of symptoms of diseases (Ranikhet, Fowl pox, bird flu); importance of vaccination and type of vaccinations given to adult birds and chicks; and importance of maintaining cold chain for vaccine efficacy. Dr Das also shared a seasonal calendar with the *Murgi Sakhis*, specifying when and which type of vaccine was to be administered, depending on seasonality of diseases.

The trainee *Murgi Sakhis* were given practical training to administer vaccines. They practiced use of the syringe, and injected vaccines on fleshy leaves. They were also explained about maintenance of cold chain and storing of vaccine in ice pack in the field. Finally, the *Sakhis* went to a nearby village and injected R2B vaccine to the birds under the supervision of Dr Das. Practical sessions also included a demonstration of how to prepare nutritional poultry feed using locally available material; the importance of housing; and the correct way of feeding and watering (use of equipment such as drinker and feeder).

Following up on the training, a one-day meeting of *Murgi Sakhis* was organized at the Project office in Rama after about a week. The *Murgi Sakhis* shared their experiences from the training, and reviewed the knowledge gained as well as relevance of different topics covered in the training. Once again, they practised administration of vaccinations in one of the project villages to gain further confidence and hone their skills.

8.1.2 Refresher training I – September 2014

The second training for *Murgi Sakhis* was organized for two days on 28-29 September, 2014 of which the first day was at Sampark campus in Raipuria, and the second day in the field at village Nawapada. The main purpose of the training was to clarify the concerns of the *Murgi Sakhis* arising from practice in the field, and secondly, to gain additional knowledge on related topics.

The resource person for the training was Dr Prakash Shinde from neighbouring Chhattisgarh, who had been associated with the Bastar Integrated Livestock Development Programme. The training reinforced the importance of the

precautions to be taken while administering vaccines. *Murgi Sakhis* were also made aware of the importance of repeating the F1 vaccine in chicks after 28 days of the first dose, and that one drop could be put in the eye and a second one through the nose in order to ensure that the medication was delivered. The other key message from the training was that for birds weighing more than 200 g, R2B vaccine should be used instead of F1.

In addition to information about vaccines and their use, *Sakhis* were also trained in use of the candling technique for differentiating fertile eggs from infertile; preparation of poultry feed from locally available resources; poultry shelters; and control of endo- and ecto-parasites in poultry using local remedies.

After the training, the *Sakhis* returned to their respective villages and organized PEG meetings; the information and experiences gained by them were once again shared with the members of the group, and their adoption monitored through household visits by the *Sakhis*. At the monthly review meeting, the knowledge gained from the training, as well as the follow-up action taken, were once again reviewed collectively by the *Murgi Sakhis* and the project team.

8.1.3 Refresher training II – January-February 2015

The third training, which was organized from 31 January to 1 February, 2015, included topics that ranged from poultry rearing practices, to farm and village biosecurity, documentation, and leadership development. A session was also devoted to traditional methods for treating ecto- and endo-parasites, using locally available resources. The resource person for this training was Dr Pradeep Bose from Pashupati Kalyan Parishad, Dungarpur, Rajasthan.

By this time, the project had completed its mid-term review (in December 2014), the *Sakhis* had gained considerable experience, and newer challenges had begun to emerge in the field. The trainer, who had also been the external evaluator at the mid-term review, was familiar with the project objectives, progress and challenges; together with the project team, a training curriculum was designed to address the immediate priorities and concerns, and chalk out the plan for the next phase of the project.

8.1.4 Training in goat husbandry – June 2015

In the monthly project review meetings, *Sakhis* had started raising the need for training to expand outreach of their services to other livestock, based on demand from livestock-keepers in the project villages. Responding to their request, a fourth training was conducted on 13-14 June 2015, with a focus on goat husbandry, and was attended by 12 *Sakhis*. The resource person for this training was Dr Manish Chouhan, Veterinary Surgeon, Kalidevi (Rama), MP AHD.

Topics covered in the training included:

- Good management practices in goat rearing
- Important diseases that cause mortality in goats
- Identification of diseases based on symptoms (for diseases such as foot and mouth disease, *Peste des Petits Ruminants* (PPR), and Enterotoxaemia (ET).
- Type of endoparasites in goats; their causes, and effects on goat health and productivity; use of dewormers for treating endo parasites
- Primary treatment for diarrhoea and other common diseases; and
- Types of vaccines (for ET and PPR), and appropriate time for their administration

On the second day of the training, the *Sakhis* conducted practical session in project village Nawapada, where about 80 goats were given dewormers.

8.2 Training of Poultry Extension Group members

Training programmes were also organized for PEG representatives. These were usually one day events organized either at the Project office, or in one of the project villages. At these events, information was shared and training provided to the members on topics such as vaccination, deworming, primary health care, watering method, importance of nutrition, and good feeding practices.



Training of PEG members

Participants were informed about various poultry development programmes of the government, and orientated to take up poultry from a commercial perspective to generate higher incomes. Training of PEG members, and subsequent adoption of good practices by them, served as a vehicle for creating awareness on good poultry management practices

in the community. It also facilitated the performance of tasks by *Murgi Sakhis*, as the poultry rearers started valuing their services.

A common theme running through all PEG meetings and training was the need for continuity of *Murgi Sakhi* services, and the importance of reimbursement of their

service charges; members were therefore encouraged to pay for the services rendered by the *Murgi Sakhis*. A total of 21 training events were organized for PEG members, details of which are provided in Table 6.

<i>Location of PEG training</i>	<i>Number of training events organised</i>	<i>Number of PEG members trained (numbers may overlap)</i>
Cluster level	11	383
Village level	10	450

Village level training-cum-demonstrations were organized with a focus on poultry feed preparation using locally available material. For demonstration of feed preparation, PEG members were requested to bring along requisite products for preparing balanced feed. The feed mixture consisted of a proportionate mix of wheat, maize, salt, groundnut cake, mineral mixture, and tetracycline powder; the last was added on the recommendation of resource persons who provided training in feed preparation, and has subsequently been discontinued. The prepared feed was equally distributed among the members, with a request for use and observation of results. Members were also asked to add green leafy vegetables to the feed, as a source of vitamins and phytochemicals.



PEG members learn to make balanced feed for poultry

and making profits (such as a women's group in village Jayada). At the KVK Kadaknath poultry farm, they got an idea about how Kadaknath birds were reared; their feeding practices; and health care.

Exposure visits were also organized for PEG members to learn from experienced poultry-keepers, and to motivate them to adopt good practices. They were given an opportunity to interact with model poultry rearers in other villages and at KVK, Jhabua. It gave them confidence after seeing how other women are rearing Kadaknath birds even in temporary sheds

9. SERVICES PROVIDED BY *MURGI SAKHIS*

The services of *Murgi Sakhis* are aimed at reducing preventable mortality and morbidity, and fall in two broad categories:

- i. Provision of preventive veterinary care services such as deworming and vaccination; and
- ii. Generating demand for preventive veterinary care services, and raising awareness about the importance of good poultry management practices

9.1 Preventive veterinary care

As part of their preventive veterinary services portfolio, the thrust of the *Murgi Sakhi* services was on vaccination and deworming, starting July 2014. They were assisted by the project team in the initial stages, but soon started functioning independently as far as administration of dewormers and vaccination was concerned.

9.1.1 Vaccination

At the start of the project, Ranikhet (Newcastle disease) was the only major disease identified which was planned to be prevented through vaccination. However, in the course of the project, fowl pox also emerged as a major threat and the same was appropriately addressed.

1) *Ranikhet (Newcastle disease)*

Soon after start of project implementation, links were established with the state AHD to procure vaccines at no-cost through the government system. For prevention of Ranikhet, which is the major epidemic affecting poultry in India, the available vaccine with the department was R2B, which was an injectable. This was administered to birds that were more than 2 months old. For chicks (>7 days old), F1 was being used. The results obtained were not very encouraging, as there were reports from some areas that birds were being adversely affected (legs were paralyzed, birds turned blind, and some of them died). This led to a dip in demand for vaccination services in the month of September 2014 (refer Figure 3).

The team then explored and focused on identification of the reasons behind the undesirable outcomes, and sought inputs from the experts. Dr Kornel Das opined that a probable reason could be discrepancy in the maintenance of cold chain due to infrastructure or refrigeration issues, which would adversely affect the efficacy of vaccines. Dr Ramvaran Singh Dhanoria, in-charge of Kadaknath poultry farm at Jhabua felt that the reason might be mishandling of vaccines by the *Sakhis*, such as a delay of more than 2 hours in administering after preparation (dilution) of vaccine, over dosage, or discrepancies in cold-chain maintenance at the field level. Advice was also sought from Dr Bhagwan Manghnani, state poultry in-charge (MP AHD) located in Bhopal. After consultations with the department and a review at their end, the state AHD personnel indicated that there were no issues in their delivery system.

After further consultation with Dr Kornel Das, there was a switch from F1 and R2B to a vaccine by the name “Lasota”, which was recommended by experts. The vaccine was non-injectable, thermostable, and administered as eye drops. Provisions were made to procure the Lasota vaccine from manufacturers and/or wholesale suppliers; from September 2014 onwards, Lasota vaccine is being used for protection from Newcastle Disease (Ranikhet). After the change of vaccine, there were again a few cases of curled feet and death of birds. This was brought to the notice of SA PPLPP and the DADF, GoI, who referred the matter to the state AHD. On receiving the directive from the central government, the district AHD officials were directed to investigate the matter. Immediately thereafter, a team from the district visited the project villages, and collected carcasses of the affected birds, which were sent for post-mortem to the diagnostic laboratory in Bhopal. The findings did not show anything unusual, but there were also no further reports of birds being affected. Lasota continues to be the vaccine of choice for Ranikhet in the area.

2) *Fowl pox*

Fowl pox emerged as a major crisis in the months of March-April, 2015. In response, a fowl pox campaign was mounted in the project area, and vaccines were sourced from the state AHD between May and July 2015. In four villages, in addition to procurement of vaccines from the government system, the government vaccinator and respective *Murgji Sakhis* also worked together while administering vaccines. After the epidemic blew over, the responsibility has been solely with the *Murgji Sakhis*.

9.1.2 Deworming

For deworming, Albendazole has been the drug in use. It was administered to a large number of birds initially, but there was a lull between September and November 2014, as most of the birds in the project villages had already been administered dewormers by August 2014. Following a quarterly cycle, deworming picked up again in December 2014, and has subsequently been done on demand from the poultry-keepers.

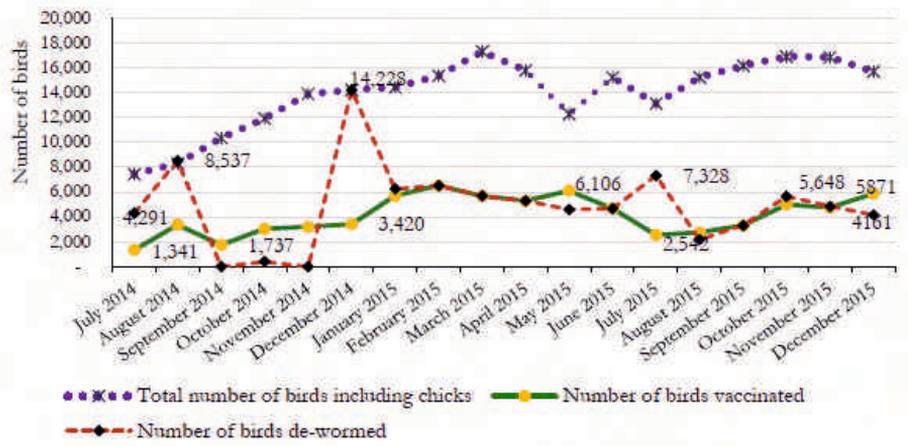


Figure 3: Deworming and vaccination of birds by *Murgji Sakhis*

Ramila Ben's Transformation into a *Murgi Sakhi*

Introduction

Ramila Ben is working as a *Murgi Sakhi* in Khedli village. She hails from the Pateliya community and lives in a joint family of eight members comprising her parents, brothers and sisters-in-law. They practice agriculture, which is rain-fed, with maize and cotton as the main crops. The family also owns livestock, which includes 2 buffaloes, 2 bullocks, 3 goats and 20 birds (including chicks).

Ramila's name was nominated for selection as a *Murgi Sakhi* by the community members at the village meeting conducted during the project initiation stage. Thereafter, she was trained in poultry management practices, administering vaccinations, dewormers and other primary veterinary care activities specific to poultry. She says that the trainings made her realize the importance of poultry management. Until then, she was unaware that poultry birds required any attention to management practices such as feeding, watering and health care.

Role of *Murgi Sakhi*

Even though she was nominated to be *Murgi Sakhi* by the community, there was initial hesitation and scepticism on their part to get their birds vaccinated or treated by her. To make some headway, Ramila started with providing services within her own circle of relatives; when other poultry rearers started noticing the differences in health and mortality between treated and untreated flocks, they were motivated to get their own flocks vaccinated and dewormed.

Ramila is a graduate with a Bachelor of Arts degree, and is employed as a teacher in the local government school. In terms of workload, she expressed that she manages the responsibilities with support from her family members. As she is unmarried and stays in a joint family, household chores are mostly taken care of by her mother and sisters-in-law. She helps with agricultural activities as and when required.

As a *Murgi Sakhi*, she spends about 3-4 days per month in discharge of her responsibilities, covering one hamlet in a day in the morning hours. Her work includes coordinating and facilitating capacity building of three PEGs located in three different hamlets: Ratwa phaliya, Bhuriya phaliya and Babar phaliya; and providing services to a total of 72 poultry-rearing households. On an average, she caters services to about 200 birds (including chicks) every month.

Over time, the actual time required for completion of tasks has reduced, as the members are now familiar with her work, and they keep the birds ready for administering the doses at the time of her visit; in making payments, the old members are prompt, but collection of fees from is still a challenge from the newer ones, who are prone to default especially when their birds are healthy, and they feel that her services are no longer required.

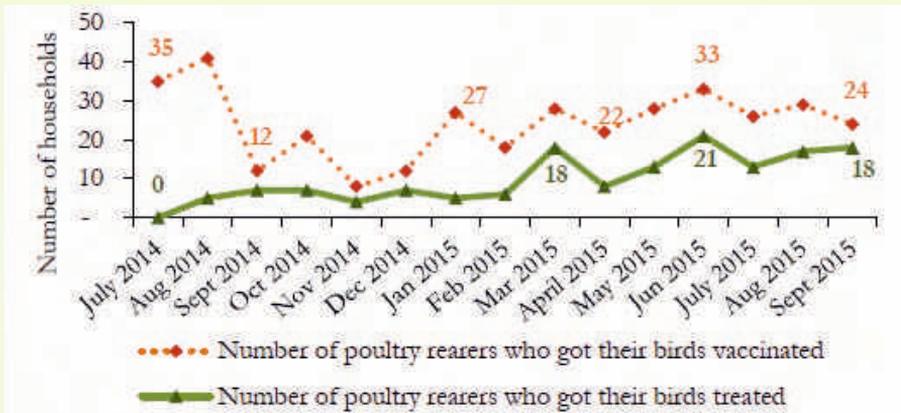


Figure: Households availing services of *Murgji Sakhi Ramila ben*

Apart from the above demand-driven services, Ramila also conducts monthly meetings with the PEGs, wherein she shares information on improved poultry management practices, as well as planning of vaccination and deworming for the following month. The minutes of the meetings are documented for reference and records. In addition, she maintains detailed records of household-wise number of birds, mortality, and improved practices adopted by the PEG households availing her services, as per formats provided by the project team.

Impact

The impact of her work can be seen from the increased number of birds owned by the PEG members, and the decline in poultry mortality rates; the chick mortality rate in village Khedli decreased from 70% in June 2014 to 11.3% in September 2015.



Murgji Sakhi Ramila ben (second from left) with PEG members

Ramila has been consistently rated as 'A' grade on the performance monitoring system applied by the project team, for her commitment and delivery of services. Recently, she had an opportunity to attend a training at Petlawad in which she

learned about good practices of goat husbandry, including vaccination and deworming. She feels confident about extending these services to goats in her village, but also expressed the need for a few more rounds of training to gain greater familiarity with goat health care.

Despite the increase in her work and responsibilities, Ramila is confident that she would be able to manage the demands on her time with support from her family. She also said that now that the members are familiar with her work, they would be more receptive to her services and hence it would not be difficult.

9.2 Facilitating adoption of improved practices

Murgi Sakbis have been instrumental in facilitating monthly meetings with their respective PEGs, and have been successful in impressing upon them the need for adoption of improved management practices for their flocks, especially with respect to their feeding, watering and shelter. The results are evident in the numbers of households adopting improved practices (Table 7).

Table 7: Adoption of improved practices by PEG members (December 2015)

<i>Improved practice</i>	<i>Number of households</i>
Watering	226
Shelter	320
Feeding	197
Preparation of feed	145

9.3 Planning, reporting and review

The learning loop is completed with the participation of *Murgi Sakbis* in monthly review and planning meetings, where they share with other *Sakbis* and the project team about work done during the month, challenges faced, diseases emerging, and generate an indent for consumables. Based on the requirement, each *Sakbi* prepares her monthly plan at this meeting, which is then implemented with support from PEGs and project staff. At these forums, the *Sakbis* also receive their honorarium from the project for services which were not strictly client-based (e.g. household data collection). All the *Murgi Sakbis* received a fixed monthly honorarium of INR 1,000 for one year, between July 2014 and June 2015.

10. MAJOR PROJECT ACHIEVEMENTS

10.1 Reduced poultry mortality

The total number of birds owned by the families in the project area has more than doubled over a period of 18 months, from approximately 7,500 birds in July 2014 to 15,700 in December 2015 (Figure 4), in addition to a large number of sales. This increase may be attributed to decreased mortality rates, as well as purchase and integration of new chicks and birds obtained through various schemes.

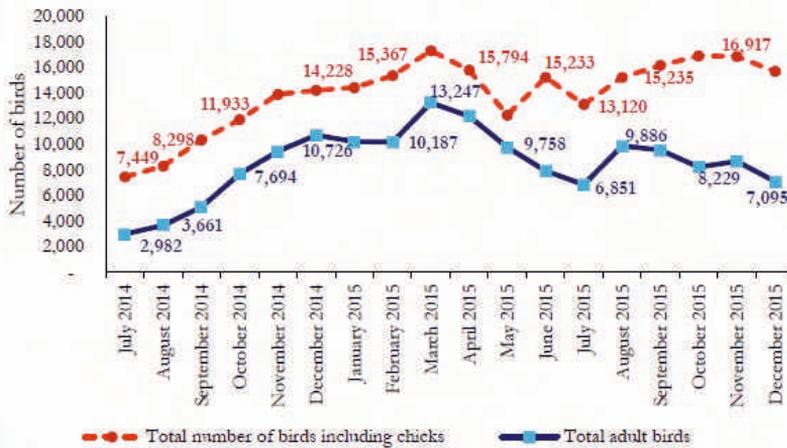


Figure 4: Poultry population in project cluster

As can be seen from Figure 5, the mortality rate has been declining since the *Sakbis* started providing services, particularly the administration of vaccines and dewormers. It spiked again during the month of March 2015, when large numbers of infected chicks were inadvertently supplied from a government nominated private hatchery as part of the state government Rural BYP scheme for BPL households. This also resulted in rapid spread of the disease among existing flocks, and caused an alarm among the rearers.

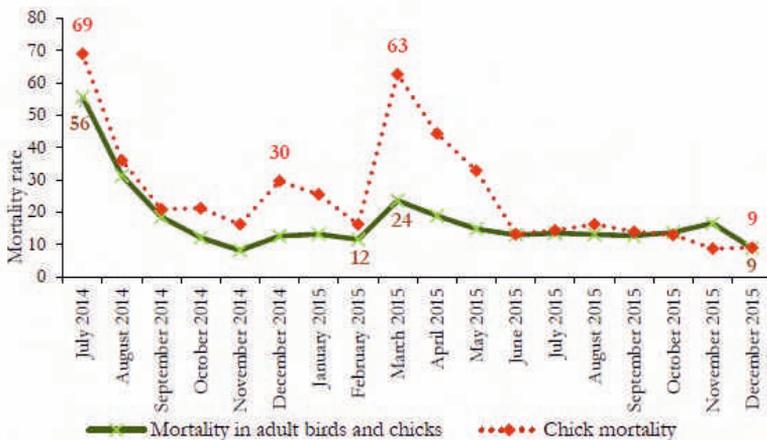


Figure 5: Mortality rates in poultry in project cluster

The project staff consulted the Deputy Director, AHD, stationed at Jhabua. The officer visited the field area and suggested giving vaccinations and dewormers to the surviving and unaffected birds, but there was no immediate improvement in the situation. With appropriate planning and action, however, the situation was slowly brought under control by June 2015.

Corrective measures were put in place while procuring the next lot of chicks. The project staff visited the government nominated private hatcheries at Dahod in Gujarat for sourcing 28 day old chicks as part of the Rural BYP scheme. With consent from the state AHD, reliable private hatcheries were chosen for supply of chicks under the scheme. The project staff directly communicated their quality requirements to the hatcheries. It was indicated to them that chicks (28 day old chicks) of only coloured birds be supplied (and not to mix broiler chicks or less than 28 day old chicks as had happened previously), and that the appropriate vaccination regime should have been complied with. Conditions were set wherein the hatchery would also be accountable for any losses during transportation of chicks to the field area. On arrival of chicks at destination, they were thoroughly screened and examined for any disease symptoms, before being allowed for distribution. Such rigorous monitoring helped in avoiding recurrence of infections in subsequent batches received under the Rural BYP scheme.

10.2 Increased awareness and demand for *Murgi Sakhi* services

There was initial indifference and even resistance from the poultry rearers to availing vaccinations, but after a couple of months into project implementation, they acknowledged the benefits after seeing the results in the flocks of PEG members. As can be seen from Figures 3, 4 and 5, the number of birds receiving deworming and vaccination has increased, as also reflected in reduced mortality rates and increased bird population in the cluster.

The fact that most of the community members are now paying for the services of the *Murgi Sakhis* is an indication of increased awareness among the rearers about the importance of preventive care and health management in poultry. In the month of September 2015, the average service charges earned by a *Murgi Sakhi* amounted to INR 833 in that month, with maximum being INR 1,713 and lowest INR 240². The fees earned from deworming, vaccination and other services provided during the month is as shown in Table 8. Although the average amount is lower than the project-supported honorarium of INR 1,000 per month which was paid initially, it is likely to sustain, and efforts are ongoing to integrate other entrepreneurial activities to enhance the income of *Murgi Sakhis*.

²The maximum charges received were INR 1,713 by the *Murgi Sakhi* in Saad village (Dittu Bai). The lowest was INR 240 in Bhanwar Pipaliya, where the concerned *Murgi Sakhi* was indisposed due to pregnancy.

Table 8: Services provided by Murgji Sakhis in September 2015

Nature of Services	Number of Birds	Service Fees (INR)
Deworming	1,082	2,164
Vaccination	2,749	5,498
First Aid/Primary Health Care	634	3,170
	Total	10,832

However, it should also be noted that the entire amount due to the *Sakhis* had not been remunerated, as a few rearers had availed services on credit. While the total fees due were INR 10,832, only 75 percent of it had been paid by the service recipients. The remaining amount (INR 2,640) was unrecovered at the time of the study. This issue needs to be addressed by enlisting the support of the older and complying PEG members.

10.3 Poultry as a significant income generating option

There has been a perceptible shift in the flock sizes owned by the households. The baseline of October 2013 indicated that majority of the households (94% respondents) owned between 1-5 birds. Household monitoring data showed that there had been a rapid increase in flock sizes soon after start of *Murgji Sakhi* services; as of December 2015, households that owned 6-10 birds comprised 32% of all poultry-rearing households; flock size of 11-20 birds was seen in 19% households, and 19% had flock sizes between 21 and 40 birds (Figure 6).

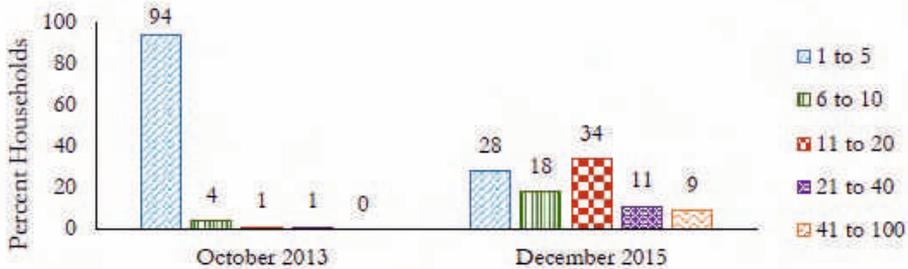


Figure 6: Percent changes in households by flock size of poultry

The increased number of birds has also resulted in increased sales and higher household consumption of meat (Figure 7).

In terms of monetary value, the value of birds sold or consumed in the month of December 2015 (assuming a price of INR 400 per bird) was INR 1,055,600 as compared to INR 476,400 in July 2014 (an increase of 130%). The sales and consumption spiked in the month of May as birds are sacrificed or offered in prayer before starting of agricultural activities in the field, such as ploughing of land, as per

local custom and tradition. It also coincides with the marriage season.

Considering all the bird sales over the project period and assuming an average selling price of INR 400 per bird, *the average household income from poultry is estimated to be above INR 10,800 per annum*, over and above any income and benefits from sale of eggs and/or poultry manure; this represents a five-fold increase over the baseline figure of income from poultry.

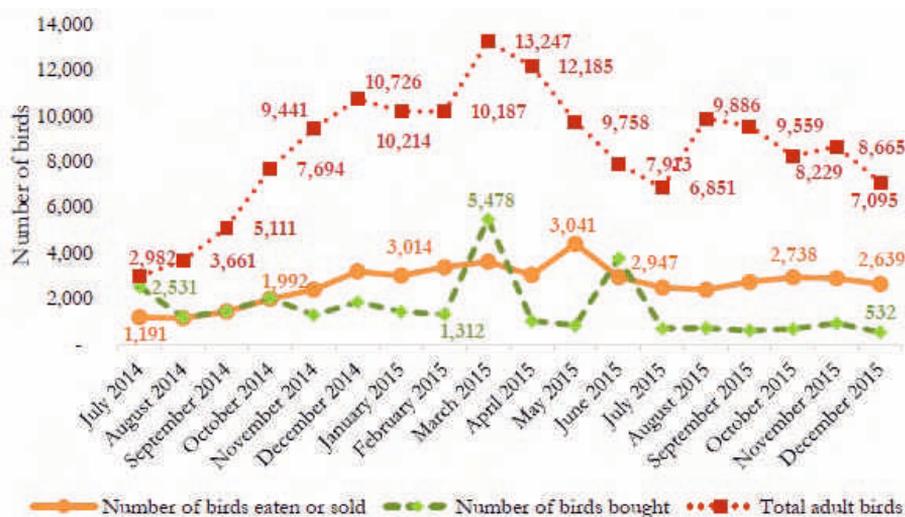


Figure 7: Poultry population *vis-à-vis* number of birds purchased and sold

10.4 Improved nutritional status of households

Pica-Ciamarra and Otte (2009) opine that backyard poultry farming remains important for rural households, as it ensures a steady flow of high quality food (thereby mitigates malnutrition) and, through cash income, reduces vulnerability. This is corroborated by poultry-keepers in the project villages, who indicated that there has been an increase in the household consumption of eggs as well as birds. As indicated in Figures 6 and 7, the number of birds in the area has increased; there are more number of households with bigger flock sizes; and the number of birds consumed has also increased.

As the number of hens increased from 1,225 in July 2014 to 3,159 in December 2015, there would have been a corresponding increase in the number of eggs produced. Assuming a *desi* hen laid about 45 eggs per year (@ 15 eggs per clutch, 3 times a year), the total eggs produced would have been 55,125 in July 2014; with 10% of the eggs being consumed, and the average household consumption of eggs would have been 4.5 per month.

With 3,159 hens in December 2015, and a 30% increase in egg-laying capacity of birds, the total number of eggs produced is estimated to be 184,801. Assuming again

that 10 percent of all eggs produced are locally consumed, the average egg consumption per household in December 2015 would be over 15 eggs per month, which is four times higher than the baseline.

Use of the candling technique, which enables separation of fertile eggs from infertile, has further reduced wastage and contributed to increased access to nutrition.

10.5 Bringing the native Kadaknath breed into focus

Kadaknath is an indigenous breed of poultry endemic to Jhabua and Dhar districts in western Madhya Pradesh. Birds of the breed do not fatten, and retain lean body conformation. The dark coloured meat is considered a delicacy. In the market, Kadaknath birds command a higher price as compared to other breeds; it is priced between INR 800-1,000 whereas a *desi* bird is in the price range of INR 350-



Kadaknath breed of poultry

400. Although the breed has been reared by the locals for a long time, its prevalence and population has declined in recent times, and was usually not found in homesteads before start of the project. There is a Kadaknath breeding unit at KVK Jhabua that supplies duly vaccinated 28-day old chicks at a unit rate of INR 60 per chick.

10.5.1 Distribution of Kadaknath chicks

As part of the project initiative, support was given to selected households that were interested in rearing Kadaknath birds. The purpose was to promote the native breed among the rearers, and also to avail the advantage of higher selling prices which are fetched by the bird. The support included provision of 50 chicks, and material costs involved in construction of a bird shelter. A total of 57 households have been supported with Kadaknath units under the project.

The units were given only in villages with the best performing *Murgi Sakhis* (evaluation based on the grading mechanism for monitoring the performance of the *Sakhis*), and active participation of members in the PEG meetings. Although the beneficiaries were nominated by the PEGs, the criteria for selection of households for Kadaknath units were clearly specified, and included the following:

- i. rearers with at least 15 birds
- ii. not going for migration
- iii. undertaking timely vaccination and deworming of existing flock
- iv. having sufficient area in the homestead for constructing a shed; and
- v. membership of PEG

In villages where more numbers than feasible for support were suggested by the PEG, the final selection was made by the project team. Further, it was agreed that:

- i. after notification of selection, the owner would be required to complete construction of the poultry shed within 20 days
- ii. after the birds are procured, they should be vaccinated and dewormed on time, for which the rearer should inform the *Murgi Sakhi*, and pay her service charges promptly
- iii. as the chicks grow into adults, the rearer should maintain 50 egg laying birds at all times

10.5.2 Shelter construction

The shelters for housing birds were expected to be 10 ft x 12 ft in dimension, which can house about 50 birds each. The estimated material cost of construction was about INR 10,000, of which the beneficiaries contributed 50% in kind, by way of locally available material (viz., bamboo and door). The balance of the material costs was borne by the project; this included flooring (2 bags of cement) and a tin roof.

10.5.3 Training of participants

A one-day training on poultry management was organized for the selected rearers after they completed construction of sheds. Thereafter, the Kadaknath chicks were procured and handed over to them. The entire distribution process happened in a phased manner over a period of 4 months, with recipient households being closely monitored by the *Murgi Sakhis* and the project staff. The aim was to start with the most actively participating villages and households, turn them into models, and gradually reach out to those *Sakhis* and villages where there was scope for improvement.

A total of 57 units were provided in 7 villages, with distribution of 2,850 Kadaknath chicks (Table 9). It is important to note that about 37% of the distributed chicks died of predation, which has implications on the housing, and rearing practices (more risks involved under the scavenging system).



Kadaknath unit in a shed

Table 9: Status of Kadaknath units (September 2015)

<i>Sl.</i>	<i>Particulars</i>	<i>Number</i>	<i>Percent of total</i>
1	Kadaknath units initiated	57	100
2	Chicks distributed	2,850	100
3	Total birds died	1,536	54
3.1	Birds died due to disease	488	17
3.2	Birds died due to predation	1,049	37
4	Total birds sold or consumed	684	24
4.1	Sold as adult birds	481	17
4.2	Birds consumed	203	7
5	Remaining birds in stock	629	22

Note: Apart from the distributed chicks, there were additional chicks which hatched from eggs; these have not been accounted for in the above table.

Source: Monitoring reports submitted by Sampark to SA PPLPP

Birds which were sold fetched about twice as much as the *desi* variety. However, considering the higher input costs, and the fact that marketing continues to be a challenge, the cost-benefit analysis of Kadaknath does not appear more attractive than that of the *desi* variety.

Kadaknath: Challenges in Commercialization

Introduction

Kadaknath is a native breed of poultry, which is endemic to the area. The meat of the bird is considered not only a delicacy, but is also ascribed with medicinal properties, and commands a higher price in the market as compared with the *desi* or broiler breeds. Whereas an adult Kadaknath bird is priced between INR 800-1,000, a *desi* bird sells in the price range of INR 350-400 on average.

One of the project objectives was to facilitate conservation of the Kadaknath breed, and efforts were made to promote rearing of the breed, enable higher returns, and thereby bring in a commercial perspective into the rearers' approach.

In pursuit of the objective of conserving Kadaknath, exposure visits to Kadaknath farms and private enterprises were organized by the project, and poultry-keepers encouraged to take up Kadaknath rearing. Subsequently, the project supported selected households for taking up the activity; the support included provision of 50 chicks, and partial support for material costs involved in

construction of a shelter for the birds. The participating households were also provided special training in care and upkeep of Kadaknath units. A total of 57 Kadaknath units have been initiated with about 2,850 chicks distributed among selected poultry rearers across 7 project villages.

Procurement of chicks

There is a Kadaknath hatchery at the KVK, Jhabua that supplies vaccinated 28 days old chicks at a unit rate of INR 60 per chick. The demand for the chicks is so high that one has to make advance payments and wait for several months for delivery of chicks. Almost all the rearers indicated that procurement of Kadaknath chicks is a constraint since the hatchery at KVK is the only source of supply, and unable to cope with the demand. This is proving to be a bottleneck for any plans of expansion of Kadaknath rearing in the area. Since Kadaknath hens are poor brooders, the rearers attempted to hatch their eggs by keeping them with the clutch of eggs produced by *desi* hens, which was partially successful.

Higher input costs and losses from predation

Based on their experiences, *Murgi Sakbis* shared that it is more expensive to feed the Kadaknath as compared to *desi* birds; further, management of the Kadaknath unit also requires more time and other inputs. Because of the higher procurement cost of Kadaknath chicks, rearers prefer complete confinement of the birds in shelters, which also contributes to higher rearing costs. However, a permanent shelter not only protects the birds from predators, but also from accidental poisoning caused by consumption of pesticide-treated seeds used in agriculture fields.

Predation has by far been the single most important cause of losses. As seen in the figure below, in almost all the villages where Kadaknath units have been initiated, there were significant losses on account of predation, ranging from 21% in Bhanwar pipaliya to 61% in Nawapada.

There are instances where the entire unit of Kadaknath chicks was lost in a single night due to predation; this happened in the case of Ramila ben, in Khedli, where the shelter was raided by a mongoose in the dark. Baddi bai, from Bhainsakarai, also lost her entire unit to predators. Shanti bai, *Murgi Sakbi* of Bhainsakarai, said that even though they try to protect the chicks as best as they can, the predators somehow manage to inflict damage; she lost about 20-30 birds. When asked about how the losses occurred despite the birds being inside a shelter, it was learnt that predators such as mongoose manage to dig their way inside; after getting there, they simply kill all the chicks. This indicates that the design of the shelters would have to be reviewed and modified appropriately to protect against rodent predators. During the day, when chicks are let out of the shelter, there is the risk of attack from above by birds of prey.



Figure: Status of Kadaknath birds distributed in the project villages

Marketing

Another emerging issue pertaining to Kadaknath birds is that of marketing. At the time of the study, there was no specific market plan for improving sales or returns therefrom; most of the birds were being sold at the farm gate to customers who reached the village by word of mouth, or were redirected there from KVK, Jhabua.

The rearers are aware of the market potential and also about the higher price that a Kadaknath bird fetches in the market as compared to the *desi* variety. But the irregular sales are locking up their funds, which could be available for other investments, as well as resulting in higher input costs on account of prolonged retention of stock. For example, Kamoti bai of Bhanwar pipaliya has managed to sell only 7 birds from the Kadaknath unit raised by her, for a selling price of INR 900 per bird; and these sales were scattered over a period of one month. For the remaining 31 birds which are ready, she is still waiting for buyers.

Although most rearers are interested in continuing rearing of Kadaknath, they expressed concern about potential bottlenecks in increasing production, and an inability to invest in further procurement until they are able to earn from the sale of existing birds. These factors should be taken into account while planning for sustained commercial production in future.

10.6 Empowerment of women

Women are closely associated with BYP, in rearing as well as marketing. They are primarily responsible for the feeding and management of the flocks, with minimal or sometimes no support from other members of the household. This was also reflected in the process of engagement in the project which was based on women being organized into PEGs, and being trained as *Murgi Sakhis* for providing poultry veterinary care services. Across all project villages, it was found that it was women who took the initiative to also rear Kadaknath birds.

During interactions with them, the women shared that the money generated from sale of birds gave them the power and freedom of decision making to spend on books and fees for children's education. It also brought out leadership qualities of women to the fore.

When asked about their motivation to become a *Murgji Sakhi*, most of them said that as they were nominated by the village, it was their responsibility to maintain the faith reposed in them. The sense of social responsibility that they expressed was quite evident.

The *Murgji Sakhis* are also evolving into a cohesive group. For example, when there were issues arising in the payment for services rendered³, the *Murgji Sakhis* planned to make arrangements for advance payments through PEGs in order to purchase consumables, and provide vaccination and deworming services. The modality of implementing the strategy was discussed in one of the monthly review meetings facilitated by the partner implementing agency. It was decided to try the method in three villages of Nawapada, Khedli and Saad in June-July 2015. The *Murgji Sakhis* discussed the plan of advance payments within their respective PEGs, who expressed their willingness to make advance payments of INR 100 each. However, when it came to actually making the payment, only 20-30% of the members obliged, and the remaining backed out. The *Murgji Sakhis* felt that the strategy and arrangement was not quite effective. Poultry rearers, on the other hand, indicated that they were comfortable paying immediately after receiving services, instead of making advance payments.

Transition of a *Murgji Sakhi* into an Entrepreneur

Introduction

The growth and transformation of Surti Bai Parmar, a trained *Murgji Sakhi* from Saad village, makes for an inspiring case of a CAHW turned into an entrepreneur and leader. Her hard work, coupled with the ability to experiment and take risks, fetched rich dividends, and earned her the position of *Sarpanch* of the Gram Panchayat in Saad.

Surti Bai Parmar is a resident of Saad village in the project cluster. She lives with her husband Puniya Parmar, their two sons, and one daughter. They own about 5 *bighas* (2 acres) of land, which is irrigated by water from a shared bore-well. The major crops grown in *Kharif* season are cotton, soya bean and maize; in the *Rabi* season, wheat and pigeon pea are usually grown. The family also owns three buffaloes, two bullocks and three goats. One of the important sources of household income is through sale of agriculture crops, which included 20 quintals soyabean, 3 quintals cotton, 10 quintals wheat, 10 quintals of maize, and 20 kg black gram in the

³Some of the poultry rearers did not make immediate payment for the services of the *Murgji Sakhi* and, therefore, by default they ended up providing services on credit. Later, they were hesitant to approach the rearer for payment for risk of affecting their social relations with them.

previous year. Earlier, her husband used to migrate seasonally to Gujarat for wage labour opportunities, for about 2-3 months every year. Since 2013, he has stopped doing so, looking after the farm and supporting Surti Bai in her activities as a *Murgi Sakhi* and a *Sarpanch*.

Saad village

Saad village is located in Rama block, 27 km from Jhabua district headquarters in the state of Madhya Pradesh. It is one of the bigger villages in the project area with about 382 households, spread over 10 hamlets. Almost 90% of the households have at least one family member who migrates to neighbouring states like Gujarat or Rajasthan; or to Bhopal, Indore and Ujjain within the state. The major months of migration are July-October, December-February and April-June.

Prior to start of the project, veterinary services were non-existent in the village. Most of the time there was high mortality among goats and poultry simply because of lack of awareness about health care and no access to preventive veterinary services. The market centres nearest to Saad are Jhabua (27 km), Kalyanpura (12 km) and Kalidevi (11 km).

Poultry before the project

Before start of the project, Surti Bai had 20 poultry birds (4 hens, 2 roosters, chicks and pullets); there was no separate shed for housing the birds. Not being aware of poultry management practices, the birds were raised under the scavenging system, with little or no care; vaccination and deworming were unheard of, and the birds were provided a supplement of maize and wheat grains once in a day. Home remedies were used for treatment, if and when required; for example, if they contracted diarrhoea, the birds were fed the sap of tender papaya fruit and the juice of neem leaves.

Between February 2013 and 2014, a total of 20 birds were sold by Surti bai's family, which generated an income of INR 6,000.

Selection and training as *Murgi Sakhi*

In the preliminary stages of the project, Surti participated actively and showed keen interest in the baseline surveys, Participatory Rural Appraisal exercises and other meetings. During the village meetings after the *nukkad nata* in her village, her name was nominated by the community members for selection as a *Murgi Sakhi*.



Surti bai receiving training certificate

She attended the foundation and refresher training sessions on poultry disease and management, which were organized by the project. After the training, she facilitated formation of 5 PEGs, covering 5 hamlets in the village. Subsequently, she provided services regularly and was one of the best performing *Murgi Sakhis* in the project cluster.

Murgi Sakhi turns entrepreneur

Surti got an opportunity to visit the Jhabua Kadaknath hatchery during one of the exposure visits as part of the project, and later also received training at the KVK on managing Kadaknath birds. She was motivated to start her own Kadaknath unit afterwards.

With the help and support of her husband, she constructed a 20ft x 30ft shed made out of bamboo, using her own financial resources. Starting with 50 chicks, she gradually increased the number to 250 birds. After sale of the flock, she reinvested the profit for procurement of another 400 chicks from KVK, Jhabua, in August 2014.

From the last batch of 400, 20 chicks died in the initial stages, but 380 birds reached adulthood, with approximate weight of each bird being in the range of 1-1.5 kg. She incurred an estimated input cost of INR 50,000, which included costs of procurement of chicks, feed and veterinary care. All the birds were sold at the doorstep for prices ranging from INR 600-700 per bird. People from as far as Ahmedabad and other places came to her village for purchase of Kadaknath birds, based on information provided by KVK, Jhabua. This generated a gross income of INR 180,000, and a net profit of INR 130,000 (labour costs not included in estimation of profit).

In November 2015, she expanded the housing facilities by adding another shelter, which can accommodate up to 500 birds. She plans to increase production after mobilizing sufficient funds for investment. Based on advice received from poultry experts who visited the project, she plans to use the two



Surti bai at the entrance to her poultry shed

shelters on a rotational basis, leaving one shelter vacant at a time, as a preventive measure to avoid and minimize occurrence of diseases in birds.

From entrepreneur to *Sarpanch*

A large part of the profits earned from the poultry enterprise were invested by Surti bai in campaigning for election as *Sarpanch* during the Gram Panchayat elections in 2014. Her role as *Murgi Sakhi* had already been well-appreciated, and with this campaign she managed to win the elections, becoming *Sarpanch* of Saad. With the new role came additional responsibilities and tasks, and she opted to discontinue the role of *Murgi Sakhi*. The residents of Saad, however, continue to receive services from another able and trained *Murgi Sakhi* in the village, Dittu bai Parmar. Surti bai continues to provide support informally to Dittu bai, and is a constant source of motivation for all PEG members.

10.7 Replication, convergence and scaling-up

The pilot project provided an effective platform to establish linkages with similar other programmes related to poultry health and poultry based livelihoods. It also generated a critical mass of knowledge that helped the community and the project staff to plan and execute tasks more efficiently.

10.7.1 Project with the Global Alliance for Livestock Veterinary Medicine (GALVmed)

The main objective of the GALVmed funded project was to establish a community based private vaccinator system to ensure regular vaccination of all BYP against ND (Ranikhet) to control the outbreak of disease and mortality; establish a dependable supply system of ND vaccine and medicine in project area through private medical retailers; deworming; and improving community knowledge base and rearing practices to develop poultry rearing as a viable livelihood activity.

Experiences gained from the SA PPLPP pilot project helped in reducing the timeline in planning, community mobilization and training of vaccinators, and the project villages also served as a site for exposure visit for communities from other project areas.

10.7.2 Rural backyard poultry development scheme

The Rural BYP scheme for BPL households, being implemented by the State AHD aims to promote poultry as a livelihood option among the BPL families. There was convergence of the SA PPLPP activities in the field with the afore-mentioned government scheme, whereby as many as 148 BPL families from the project villages availed its benefits. Each family received a unit of 45 chicks (28 days old chicks) of Low Input Technology (LIT) coloured birds for rearing, along with an amount of INR 1,200 for construction of poultry shelters; the scheme comprised 80% subsidy and 20% contribution from the beneficiary.

In order to operationalize the scheme, technical support was sought from KVK, Jhabua, and Ranikhet Eradication Centre to assist the *Murgi Sakhis* and PEG members from time to time. As a result, the project staff, *Murgi Sakhis* and members of PEGs received training at the KVK.

11. LEARNINGS FROM THE PROJECT

11.1 Poultry-rearing in the cultural context

Uptake of poultry rearing as a new source of livelihood is also determined by traditionally held notions of communities regarding acceptable and unacceptable livelihood options. Traditionally, the Pateliya community's main focus has been on agriculture and in general, they were not very keen on poultry rearing due to issues related to poultry litter and cleanliness. Therefore, it took more time to impress upon them the importance of poultry as an income source. However, women from the community were interested in taking up poultry with little or no support, and sometimes even after being discouraged by other family members. One prominent example is that of Ramila ben, the *Murgji Sakhi* from Khedli village who belongs to the Pateliya community. Initially, her family members were sceptical about rearing poultry, but later they whole-heartedly supported her. Even the number of birds sold or consumed by the PEG members in Khedli village increased by three times, between July 2014 and September 2015, indicating an increased interest in poultry rearing.

11.2 Opportunities and risks in convergence

There are both opportunities as well as risks while linking up with other agencies, as was seen in the case of convergence with the state AHD. The opportunities include timely support and convergence of resources for the benefit of rural households. This was also evident in the supportive role played by the AHD at the time of fowl pox occurrence. Emergence of fowl pox in the area was unanticipated, and required immediate mobilization of resources for organizing and initiating disease control measures. At this juncture, Sampark sought the support of the AHD to procure and administer vaccines. The existing project structure with *Murgji Sakhis* played an important role in delivering timely services, thereby averting huge potential losses.

There are also elements of risk while collaborating with other agencies; for example, the experience of procuring chicks from a government-nominated private hatchery in Dahod in Gujarat resulted in distribution of infected chicks, which led to spread of infection among other birds, and resultant mortalities. The experience affected the confidence of the poultry rearers, slowed down the community mobilization process, and had an adverse impact on uptake of project-advocated interventions.

The important lessons learnt from this experience, as well as other developments in the course of project implementation, are as follows:

- To procure chicks only from verified hatcheries, after appropriate vaccination of birds
- To ensure that supply of vaccines is through appropriate channels, with maintenance of cold chain at every step of the chain
- To ensure that all birds are provided deworming medication at least 1-2 weeks before administration of vaccines
- To be watchful for any adverse symptoms after administration of vaccine, and

take immediate corrective measures in case any undesirable consequences are observed, including caution in use of the batch of vaccine used.

11.3 Potential increase in workload of women

Most women perform multiple tasks and roles in their lives. Additional activities undertaken as a *Murgi Sakhi*, or rearing of larger flocks in a systematic manner, demands greater time inputs from women, which in turn affects their performance of other tasks and/or leisure time, if any. As documented in the case studies, rearing of poultry was mainly a women's initiative, carried out without any significant contribution from other members of the household. This put the onus on the women to put in extra work in addition to what they already did on a routine basis.

Murgi Sakhi services under difficult conditions

Introduction

Bhainsakarai village, located 37 km towards east of Jhabua district headquarters, has a seasonal stream which flows through the middle of the village. The village is accessible only on foot, as there is no motorable approach road. One can access the hamlets only by walking through fields and on bunds of farmlands.

The village has 85 households spread over six hamlets, namely Tadvi, Arad, Naka, Amlī, School and Maida. These are inhabited by communities belonging to the *Bhil* tribe, with specific sub-tribes being *Maida*, *Damar*, *Maddiya*, *Bhuriya* and *Arad*. The dominant sub-tribe is *Damar*.

Access to services

Even though there is a Panchayat office in Amba just about 2 km away, the villagers have to take a detour of about 20 km to reach the place as there is no direct connecting road. Because of this, no one from the village attends any Panchayat meeting, and any work associated with the Panchayat takes a long time to get done. There is an animal health centre about 7 km from the village in Maachiliya, which is served by a Livestock Assistant.

For any special cases, a veterinary doctor from Jhabua is called upon. For residents of Bhainsakarai, availing veterinary services is a difficult proposition especially during the rainy season when there is high morbidity and mortality in livestock, particularly goats and poultry.



Shanti bai in village Bhainsakarai

There is also a veterinary hospital in Kalidevi (Rama block headquarters), which is about 15 km to the west of Bhainsakarai, but these services

are not accessible to the villagers. There is a vaccinator at the hospital who provides in-field vaccination services, but he visits only those farms, which have large numbers of birds. Otherwise, the livestock keepers are expected to bring their poultry to the hospital to avail any services required. The sum total of the situation is that residents of the village did not have reliable or timely access to veterinary services, resulting in high mortality rates among the poultry and other livestock.

An important market center for the village is Rajgad, which is 22 km away from Bhainsakarai. A weekly livestock market (village *Haat*) is held here every Sunday, which is popular among villagers for sale and purchase of bullocks, buffaloes, goats and poultry.

Murgi Sakhis in the village

There are three women who were trained to be *Murgi Sakhis* in Bhainsakarai, one of them being Shanti bai. Her family includes, besides herself, her 3 sons and their wives. At the time of the study, all the sons had migrated to Gujarat for wage employment.

The family owns about 5 *bigha* land, and the main crop is maize. Shanti bai owns a cow, and recently she also purchased 2 goat kids (female) for rearing. She earns a regular income from her employment as a contract worker at the *Anganwadi* in School phaliya, where she prepares meals for children under the Mid-Day Meal scheme.

Although not literate, Shanti bai was nominated by the community to be their *Murgi Sakhi*. Her initial hesitation was overcome after the poultry rearers assured her of their support. After undergoing training, she began to develop self-confidence in her ability to provide the services expected of her.

Being one of three *Sakhis* in the village, Shanti bai is responsible for two hamlets: Naka and Amla phaliya. She facilitated the formation of four PEGs in these hamlets; the groups consist of between 10 and 12 women members. Most of the members were known to her from her association through SHGs that were formed earlier (some almost 15 years ago) during implementation of the Madhya Pradesh Rural Livelihood Programme (MPRLP).

Services rendered

Shanti bai provides services such as vaccination, deworming and first aid treatment for birds for the PEG members and other interested rearers. As seen from the figure below, the number of birds that got vaccinated and dewormed increased as the confidence of the rearers in the *Murgi Sakhis* increased. The total number of birds vaccinated and dewormed decreased in the village after February/March 2015; this was because one of the *Murgi Sakhis* responsible for two hamlets, (Arad and School) quit her job. Consequently, the responsibility of providing services in

these hamlets has fallen upon Shanti bai and the third *Murgi Sakbi* in the village.

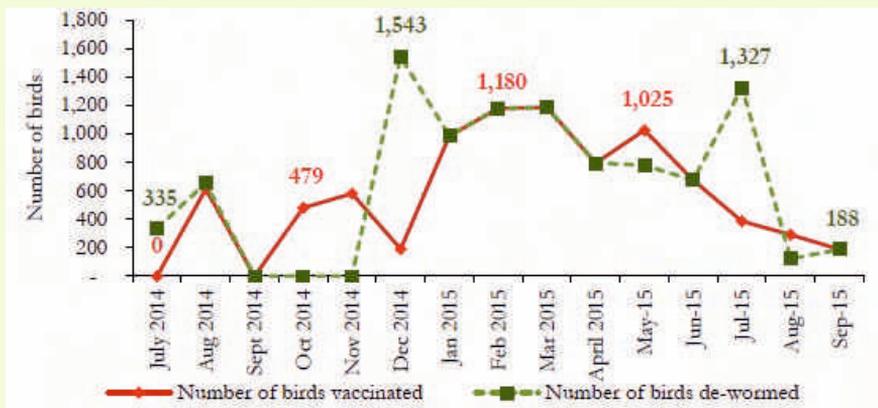


Figure: Number of birds vaccinated and dewormed in Bhainsakarai

In addition to the above-mentioned, Shanti bai also facilitates monthly meetings of PEGs to share information about good poultry management practices (feeding, watering and importance of health care).

Impact

Before the project, each PEG member owned about 2-3 birds, but now there are about 20-30 birds per member. She gave her own example to show how the number of birds increased, and thereby also her income. Whereas earlier she possessed 5 birds, now she has 40 birds, including chicks. In November 2015, at the festival of Deepavali, she earned INR 7,000 from the sale of birds; Kadaknath birds sold at the rate of INR 600-800 per bird, and other *desi* birds at a price of INR 400-500 per bird. Whereas some birds were sold directly from home, she also sold some at the Rajgand livestock market, carrying them in a bamboo basket.

Challenges faced

Shanti bai shared that it is not an easy job for her as the houses of PEG members are spread out and the hilly terrain makes it difficult to reach individual households, especially during the rainy season. It also takes a lot of time to traverse the distance. She said it takes her about 3 hours to cover 8 to 9 households. One of the PEGs which is facilitated by her and which has only 6 member households, takes an hour to reach. It is one of the reasons why she can usually have only one meeting per group every month.

Another challenge is that of procuring medicines due to poor road connectivity; at present, she relies on Sampark staff visits to the village, or her visits to the Project or Sampark office for obtaining the required supplies. She plans to procure medicines on her own in the near future, when she visits the market to purchase food items as part of her *Anganwadi* work.

In Shanti bai's opinion, one of the biggest challenges in the area is that of

protection from predators such as wild cats, predatory birds and mongoose. Sharing her experience of Kadaknath units in the village, she mentioned that there were 9 households with Kadaknath units of 50 birds each, of which nearly 200 (42.4% of total population) had died of predation. The status of the birds is as shown in the figure below. She too lost about 20-30 birds to predators and she is at her wit's end as to the methods that could be adopted for protection of the birds.

Another problem that Shanti bai indicated was that of recovery of payment for services provided. This is becoming an issue mainly with newer members who have started availing her services recently. She said that there were about 6-7 such rearers who constantly deferred making the payments due to her. It becomes difficult for her to follow up for relatively small amounts of INR 20 to 40 per household, given distances, poor connectivity, and the time taken to reach them.

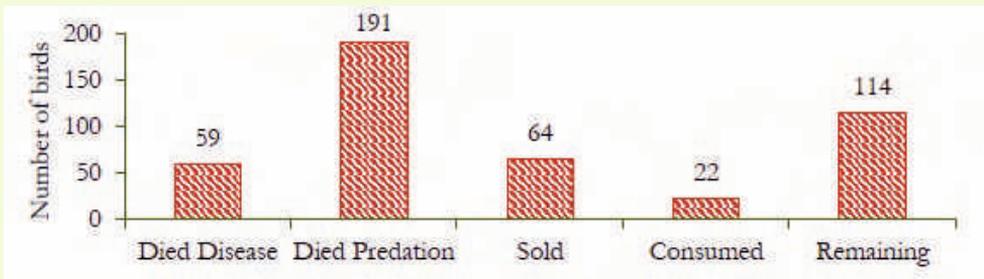


Figure: Status of Kadaknath units in Bhainsakarai

Despite all the difficulties, Shanti bai continues to deliver services and attends almost all the meetings with sincerity. Based on the criteria developed for monitoring and grading the performance of *Sakhis*, against all odds, she is one of the 'A' grade *Sakhis* in the project cluster.

12. THE WAY FORWARD

12.1 Recognition and sustainability of services

The current legal framework, defined by the Veterinary Council of India Act, 1984, does not recognize the services of *Sakhis* by the government or mainstream veterinary system. This puts the *Murgi Sakhis* in a very vulnerable situation and at risk of being exposed to legal action in the event of any inadvertent developments. As seen from the experience from the project, the *Murgi Sakhis* have been appreciated for the services rendered by them, both by the community as well as the veterinary personnel. This recognition and appreciation needs to be formalized, either through some certificate course or standardized basic training by the department, or a recognized veterinary college. Such recognition is desirable in the interest of compliance with the existing legal and institutional requirements for provision of veterinary services in the country.

During the course of the project, a degree of social capital has been developed in the form of good will of the community for *Murgi Sakhis*. A network of *Sakhis* has also been established. The SHG of the *Murgi Sakhis* that was formed would, however, need handholding support and monitoring for some more time. As the group matures, the delivery of services could be improved further through collective planning for procurement of vaccines and dewormers, which would lower the procurement costs.

Advance planning and estimation of requirement would also help the *Sakhis* in approaching the AHD for supply of vaccines, as has been suggested by the veterinary personnel. They could work in close coordination, and under guidance of the AHD officials, to provide better coverage of veterinary services in the area.

Whereas financial sustainability of *Murgi Sakhis* is not a major concern, given that the sums earned by most of them are considered satisfactory, the recovery of fees continues to be an issue. For this purpose, it has been suggested that PEGs play a proactive role in sensitizing poultry-keepers about the importance of making timely payments, and collecting dues owed to *Murgi Sakhis*. At the same time, the SHG of *Murgi Sakhis*, and the newly formed *Mabila Murgi Palak Samooh Sangh*, have initiated entrepreneurial activities, and it is expected that profits from those enterprises will more than offset any minor losses incurred by the *Sakhis* on account of non-payment of service fees by a small percentage of the poultry-keepers.

12.2 Market strategies

Even though there is immense market potential for Kadaknath birds, there is no strategy in place for their marketing. At present, buyers randomly come to the farm gate and purchase 3-4 birds as per their need. If the Kadaknath units are to be developed further, a more systematic approach to marketing would be required. Bulk buyers need to be identified, and important market centers targeted. The nearby

market centres are Kalyanpura (17 km away, on Wednesdays), Jhabua (12 km away, on Sundays), Rajgad (35 km away, on Sundays) and Ranapur (on Saturdays). A more organized approach by the interested rearers and *Murgi Sakhis* towards marketing and establishing common selling points at strategic locations would also go a long way in creating a brand image for the birds from the area.

12.3 Access to credit

Timely availability of credit is another important area that needs attention for increasing production. Linkages with banks or intra-loaning through SHGs could be probable options to access credit. In order to do this, some degree of capacity building of poultry rearers and SHGs is required, on topics such as preparation of business plans, procedures to be followed to avail loans, maintenance of records, and repayment procedures.

As a collective, the SHG of *Murgi Sakhis* could also serve its members by facilitating access to formal credit sources, and maybe developed as a one-stop link for poultry related inputs and services in the area, including for marketing of produce.

12.4 Strategy to increase supply of Kadaknath chicks

The poultry rearers who gained the Kadaknath units as part of the project, showed interest in continued rearing of these birds. But procurement of Kadaknath chicks, and later, finding markets to sell the birds are still considered challenges. For supply of Kadaknath chicks, the hatchery at KVK was found to be inadequate to meet the increased demand for chicks, as indicated by the long waiting list of applicants. Since Kadaknath has poor brooding ability, possibility of selected *Murgi Sakhis* establishing an incubator for eggs (automated - for turning the eggs) could be one plausible solution. But this is conditional upon availability of continuous power supply. Poultry rearers can bring their eggs and use the incubator for a specified fee and take back the hatched chicks.

Annexure 1

Gradation of *Murgi Sakbis* based on performance at the end-of-project

Sl.	Name of <i>Murgi Sakbi</i>	Village	Grade A (Excellent)	Grade B (Good)	Grade C (Satisfactory)
1	Dittu Parmar	Saad	✓		
2.	Ramila Rathore	Khedli	✓		
3.	Shanti Medha	Bhainsakarai	✓		
4.	Sunita Bamniya	Bhanwar Pipaliya		✓	
5.	Savita Goyal	Hatyadeli		✓	
6.	Hudi Parmar	Wagnera		✓	
7.	Sannu Medha	Nawapada		✓	
8.	Bhundri Vasuniya	Nawapada		✓	
9.	Rukhma Bamniya	Hatyadeli			✓
10.	Prem Parmar	Saad			✓
11.	Reshma Kharadi	Keljhar			✓
12.	Jana Damor	Kokawad			✓
13.	Kamla Waskel	Chhapri			✓
14.	Amda Medha	Bhainsakarai			✓
Total			3	5	6

REFERENCES

Pathak P K and B G Nath. 2013. Rural Poultry Farming with Improved Breed of Backyard Chicken, J. World's Poult. Res. 3(1): 24-27, 2013

Pica-Ciamarra U and J. Otte. 2009. Poultry, Food Security and Poverty in India: Looking Beyond the Farm-Gate. Research Report. RR Nr. 09-02. Pro-Poor Livestock Policy Initiative

SA PPLPP (2009) Code: SAGP01, “Linking Business with Pro-Poor Development: A Backyard Poultry Value Chain Increases Assets, Incomes and Nutrition”. Good Practice Note, Delhi, India