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Sheep Rearing as a Profitable Enterprise: A PRA Study of Kantoli Village in Semi-arid Area of Rajasthan

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ABSTRACT

Participatory Rural Appraisal (PRA) study was carried out in village Kantoli located in Malpura tehsil of Tonk district under Sansad Adarsh Gram Yojna in semi-arid area of Rajasthan during July 2015. Farmers' behaviour towards sheep management technologies and economically viability of sheep rearing enterprise were studied in detail. Study revealed that majority of sheep farmers were adopting vaccinations to protect their sheep from various diseases and they rear sheeps of Kheri breed, but wanted to adopt sheeps of Patanwadi breed. Matrix ranking technique was used to assess the important technologies of sheep rearing as perceived by farmers and also constraints faced by them in this occupation. It was found that majority of farmers were aware of different sheep management technologies. The most needed important technologies were prevention of abortion in sheep, fodder availability for sheep and development of infrastructures such as shed and trough for feed & drinking of water as perceived by sheep farmers. The study also revealed that Kikar (Prosopis juliflora) was very hazardous to sheep. Lack of grazing land, non-availability of drinking water for sheep, Enterotoxaemia (ET) disease and lack of fodder were other serious constraints faced by sheep farmers of Kantoli village in sheep rearing. Cost benefit analysis of sheep rearing was computed based on the data given by sheep farmers and revealed that the sheep rearing is a profitable enterprise. However, by following the sheep rearing technologies, it has the prospect of becoming a very profitable enterprise.

Key words: Participatory rural appraisal, sheep management technologies, sheep rearing, small ruminant.

INTRODUCTION

Adoption is the mental process through which an individual passes from hearing about an innovation to final adoption. Adoption is a sequence of thoughts and actions, which an individual goes through, before he finally adopts a new idea (Rogers, 1962).

Extent of adoption of sheep and goat rearing technologies varies from farmer to farmer according to their knowledge and traditional understandings about small ruminants. Some farmers are innovators who adopt technologies immediately but some farmers are laggards who are slow and last to adopt the innovations. Adoption of innovations depends on situation and needs of the ultimate user.

Participatory Rural Appraisal (PRA) helps in interacting with local communities to understand and to learn from them. It facilitates the process of involvement and harmonization of local stake holders and their indigenous knowledge. It is a way of learning from and working with community members to investigate, analyze and evaluate constraints and opportunities as well as make informal and timely decisions about development initiatives. It is a means of generating different kinds of data, identifying and mobilizing intended groups, evoking their participation and also opening multi-way channels with stake holders. It banks upon their intimate knowledge of the community about local resources and empowers them in decision making, project designing, execution, monitoring and evaluation. It provides an alternative frame work for data collection and analysis, to focus attention on people, their livelihoods, socio economic relationships, local solutions and ecological imperatives (Samra, 1998). PRA, as practiced in the field, has also given rise to different schools of thoughts with difference in style and emphasis (Chambers, 1996).

Rajasthan has the largest (16.03%) share of total goats and third position (13.95%) in sheep population

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after Andhra Pradesh and Karnataka in the country as per 19th livestock census 2012. It shows that the demographic conditions of Rajasthan state are very conducive for small ruminants. According to 19th livestock census of India 2012, sheep population has decreased by 18.86 per cent in Rajasthan and by 9.07 per cent in the country over the 2007 livestock census. The Goat population has also declined by 3.82 per cent in 2012, but it has remained almost static in Rajasthan. Even though population share of small ruminants in Rajasthan state is higher as compared to other states in the country, their population has decreased considerably during the five years from census 2007 to census 2012. Keeping these points in mind this study was undertaken with the main objective to assess the adoption behaviour of sheep farmers towards sheep management technologies and profitability of sheep rearing in semi-arid region of Rajasthan.

METHODOLOGY

A PRA study was carried out in July, 2015 in Kantoli village to assess profitability of sheep rearing and adoption behaviour of farmers towards small ruminants (sheep and goat) management technologies developed and tested by Central Sheep and Wool Research Institute (CSWRI), Avikanagar. Kantoli village was selected purposively in the study because this village has been selected under Sansad Gram Yojana in 2015. Consequently, the CSWRI, Avikanagar also adopted this village recently and provided various sheep rearing technologies regularly free of cost to all 24 sheep farmers according to need and suitability.

Location of the study: Kantoli is a small village located in Malpura tehsil of Tonk district in semi-arid area of Rajasthan with total 725 families, population 3960 of which 2036 are males while 1924 are females and 534 children (Population Census 2011). The literacy rate of this village was 60.25 per cent compared to 66.11 per cent of Rajasthan and its male and female literacy was 75.70 and 43.64 per cent, respectively (Census 2011). Majority of families in this village were engaged in cultivation, dairying and agricultural labourer. Only 24 families were engaged in sheep rearing while 70 families were also rearing goats along with other livelihood activities. All the 24 sheep farmers were considered as respondents for this PRA study (Fig. 1).

About Participatory Rural Appraisal (PRA): In PRA, off-setting bias is an important methodology for bringing out real facts about the village in neutral or unbiased situation. It aims at off-setting such biases by being relaxed and not rushing, listening and not lecturing, probing and not speeding indifferently and looking for participation of poor and other weaker sections of local communities (Chambers, 1993). According to Robert Chambers (1994) Participatory Rural Appraisal (PRA) describes a growing family of approaches and methods to enable local people to share, enhance and analyze their knowledge of life and conditions, to plan and to act. PRA has sources in activist participatory research, agro-ecosystem analysis, applied anthropology, field research on farming systems, and rapid rural appraisal (RRA). In RRA information is more elicited and extracted by outsiders; in PRA it is more shared and owned by local people.

PRA is a means of generating different kinds of data, identifying and mobilizing intended groups, evoking their participation and also opening multiway channels with stake holders. This banks upon the intimate knowledge of the community about local resources and empowers them for decision making, project designing, execution, monitoring and evaluation. It provides an alternative frame work for data collection and analysis, to focus attention on people, their livelihoods, socio economic relationships, local solutions and ecological imperatives (Samra, 1998). Triangulation is cross checking of information generated during PRA. It is an important component of the exercise in which trustworthiness, credibility, reliability and validity of data are tested through various methods. Data collected are put before a group of people for their conscious view about the facts. The different dimensions for triangulation depend upon interdisciplinary team composition. It concludes method of data collection, location, source of data and the time of generating information. Hence, the PRA techniques were applied in this study to assess the farmers' behaviour towards small ruminant management technologies, constraints faced by them in sheep & goats rearing and also cost benefit analysis of sheep rearing enterprise. Singh *et al.,* (2015) reported that the main constraints in the adoption of advanced dairy production technology as expressed by the members of dairy cooperative societies were low draft capacity of crossbreed male, less area under fodder crops, shortage of water for green fodder production, inadequate and costly medicines, non-remunerative price of milk, low conception rate through A.I., non-availability of mineral mixture. Manhas et al., (2016) in a study on entrepreneurial behavior of dairy farmers of Jammu region found that majority of the respondents have medium level of entrepreneurial behavior.

RESULTS AND DISCUSSION

Adoption of small ruminant technologies tested and developed by CSWRI

Adoption or acceptance of a new idea is not a unit act but a complex process involving a sequence of thoughts and actions. Usually decisions are made after multiple contacts over a period of time with various communication channels (Reddy, 1987). Adoption behaviour varies from person to person according to their knowledge and understandings. Some people in rural villages adopt innovations immediately but some people are slow to adopt innovations. Some people accept innovations and put them into practices quickly, while some others are slow to put innovations in practice. Adoption of innovations also depends on felt needs of the ultimate user (Bagdi, *et al.* 2001). Data presented in table 1 show that all the sheep farmers in Kantoli village were fully aware about the importance of vaccinations and all the sheep farmers had adopted Enterotoxaemia (ET), Sheep pox, PPR and FMD vaccination. Deworming practice was also adopted by all the sheep farmers. Fifty per cent farmers were adopting supplementary concentrate and green fodder feeding of ewes during pregnancy and early lactation and also in scarcity period like summer for proper growth and development of lambs and ewes resulting in better production and income from ewes. The improved technologies developed by CSWRI, Avikanagar like indigenous intra-vaginal sponge technology for oestrus induction and synchronization, fat lamb technology for maximizing mutton production, milk replacer, mineral mixture etc. were not adopted by sheep farmers in Kantoli village due to unawareness or non-availability. It was, revealed that farmers were more aware about vaccination and health technologies and less aware about other emerging technologies like oestrus synchronization, Artificial Insemination (AI) and feeds due to lack of contact by sheep farmers with CSWRI in past.

Table 1: Adoption of different small ruminant management technologies by sheep farmers of Kantoli village

Name of Technologies	Number of farmers adopting technology in Kantoli village (n=24)	Percent of farmers adopting technology
Enterotoxaemia (ET) vaccination	24	100.00
Sheep pox vaccination	24	100.00
PPR vaccination	24	100.00
FMD vaccination	24	100.00
Deworming practice	24	100.00
Concentrate feeding	15	62.20
Green fodder feeding	12	50.00

Adoption and preference of small ruminant breeds by farmers

The table 2 showed that majority (83.3%) of farmers were rearing Kheri breed of sheep, while 16.6 per cent Malpura and none of farmer were rearing Patanwadi sheep. Majority (91.6%) of farmers wanted to replace Kheri and adopt Patanwadi sheep and only 8.3 per cent farmers desired to adopt Malpura sheep. This might be due to the fact that Patanwadi animals are heavier, fetch higher price, has higher milk yield and thrive well in the semi-arid regions. Among goats, Sirohi breed was most popular and farmers wanted to continue with this breed due to its good demand for meat, milk and survivability.

Table 2: Adoption and preference of different small ruminants breeds by sheep farmers of Kantoli village

Name of breed	Number of farmers adopted (N=24)	Per cent of farmers adopting	Number of farmers want to adopt the breed	Per cent of farmers preferred to adopt the breed
Sheep				
Malpura	4	16.6	2	8.3
Kheri	20	83.3	0	0
Patanwadi	0	0	22	91.6
Goat				
Sirohi	15	42.8	35	100
(N=35)				
Local breed	20	57.1	0	0

Matrix ranking of important sheep management technologies as perceived by farmers

The data regarding matrix ranking of most needed important sheep management technologies are presented in table 3. The farmers of Kantoli village preferred prevention of abortion in sheep and ranked it first most needed important technology with 88.8 intensity score. The second ranked technology was fodder availability for sheep, which was preferred by famers with 77.7 per cent intensity score. Shed technology and trough for sheep drinking water were third and fourth important technologies needed with 66.6 per cent of intensity scores for each. Sponge technology for oestrus induction and synchronization in sheep was considered fifth important technology by farmers with 55.5 intensity score. Other important technologies like Patanwadi breed ram, Artificial Insemination (AI), feed trough, ET and small pox vaccination were preferred less number of farmers with less than 50 per cent intensity score. It might be due to that the majority of sheep farmers were adopting natural matting with ram for breeding of ewes because of unawareness or non-availability of sponge and AI technologies in the village. They were also vaccinating

their flock against ET and small pox diseases regularly by own efforts. It could be thus concluded that majority of farmers show more concern for prevention of abortion in sheep, fodder availability for sheep and development of infrastructures like shed and trough for feed & drinking water for sheep.

Table 3: Need based important sheep rearing technologies as perceived by sheep farmers of Kantoli village

Technology	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	No. of times preferred	Intensity score %	Rank of Prefe rence
Patanwadi breed ram (T1)	-	T1	T1	T4	T5	T1	T1	T8	T9	T10	4	44.4	VI
Feed trough (T2)		-	T3	T4	T2	T2	T7	T8	T2	T10	3	33.3	VIII
AI (T3)			-	T4	T3	T3	T7	T3	T9	T10	4	44.4	VII
Sponge (T4)				-	T4	T4	T7	T8	T9	T10	5	55.5	V
ET Vaccination (T5)					-	T5	T7	T8	T9	T10	2	22.2	IX
Sheep pox vaccination (T6)						-	T7	T8	T9	T10	0	0	X
Fodder availability (T7)							-	T7	T9	T7	7	77.7	II
Shed availability (T8)								-	T8	T10	6	66.6	III
Drinking water trough (T9)									-	T10	6	66.6	IV
Prevention of abortion in sheep (T10)										-	8	88.8	I

Matrix ranking of constraints faced by farmers in sheep and goat rearing

Matrix ranking is a simple way to compare constraints with each other and give scores how many time one constraint preferred by respondents. This exercise helps to prioritize the problems and needs of a village or a community. Matrix ranking was done to prioritize the constraints faced by sheep farmers of Kantoli village in sheep rearing (Table 4). All the farmers perceived that Vilayati Babul or Kikar (Prosopis juliflora) is the biggest constraint in the area in sheep rearing. It might be due to that it causes many hazards to sheep like spine of Kikar pierced in feet of sheep while grazing and causes serious problem to sheep, grasses doesn't grow under Kikar, reduces grazing land etc. Lack of grazing land for sheep around the Kantoli village was the second most serious constraint considered by sheep farmers with 80 per cent of intensity index. No drinking water facility for sheep was considered third important problem by farmers of Kantoli village with 70 per cent intensity score. ET and lack of fodder availability in the village were considered fourth and fifth important constraints in sheep rearing with 60 per cent of intensity index. Small pox was also considered important constraint in the area by sheep farmers with 50 per cent of intensity index value. Constraints like PPR, abortion in sheep and no trough facility for feed & water were also other constraints faced by them in sheep rearing but at low intensity score less than 50 per cent. FMD and Galsuja diseases were identified by farmers as constraints with no intensity index value. This study revealed that Kikar is hazardous to sheep. The sheep rearing facilities like lack of grazing land, no availability drinking water for sheep and lack of fodder are the most serious constraints of farmers in sheep rearing. ET and small pox diseases were also considered serious problems as compared to other technologies. This might be due to that the farmers are more aware about vaccination and other health issues and taking care themselves.

Table 4: Problems faced by sheep farmers in sheep rearing in Kantoli village

Problems	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	No. of times prefer -red	Inten sity score %	Rank
FMD (P1)	-	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	0	0	X
Galsuja (Submandibular edema) (P2)		-	P3	P4	P5	P6	P7	P8	P9	P10	P11	0	0	XI
ET (P3)			-	P3	P5	P6	P7	P8	P3	P3	P3	6	60	IV
Lack of fodder (P4)				-	P5	P6	P4	P4	P4	P4	P11	6	60	V
Lack of grazing land (P5)					-	P6	P5	P5	P5	P5	P5	8	80	II
Hazards due to Prosopis juliflora (P6)						-	P6	P6	P6	P6	P6	10	100	I
No drinking water facility for sheep (P7)							-	P7	P7	P7	P7	7	70	III
No trough for feeding & water drinking (P8)								-	P9	P10	P11	3	30	IX
PPR (P9)									-	P10	P9	4	40	VII
Small pox (P10)										-	P10	5	50	VI
Abortion in sheep (P11)											-	4	40	VIII

Cost benefit analysis of sheep rearing enterprise in Kantoli village

Cost benefit analysis of a flock of 50 sheeps with one ram was carried out with capital expenditure of ₹387500/- as a cost of 50 ewes, one ram, shed & trough and operational & maintenance cost ₹128850/- for medicine and labour charges of one person as shepherd for a year as per the data provided by sheep farmers of Kantoli village during PRA exercise (Table 5). Net Present Value (NPV) was found positive at 12 per cent discount factor. Benefit cost ratio (B:C ratio) was

obtained as 1.14 by dividing the present value of all benefits (sum of discounted benefits at 12%) by the present value of all costs (sum of discounted costs at 12%). This is more than one hence the project is economically viable. Internal Rate of Return (IRR) is the discount rate which makes the net present value come out zero. The another way to find IRR is the discount rate which will equate discounted benefits with discounted costs (Ram Babu *et al.*1997). The IRR for the above sheep rearing project was calculated as 28.4 per cent which is greater than the social discount rate of 12 per cent.

Table 5: Cost benefit analysis of a flock of 50 sheep rearing with one ram in Kantoli village

Total cost	Total benefit	Discounted total cost at 12 per cent	Discounted total benefits at 12 per cent	Net benefits	NPV at 12 per cent discount factor	NPV at 20 per cent discount factor	NPV at 25 per cent discount factor	NPV at 30 per cent discount factor
516350	232400	461101	207533	-283950	-253567	-236530	-227160	-218358
128850	232400	102693	185223	103550	82529	71864	66272	61302
128850	232400	91741	165469	103550	73728	59955	53018	47115
128850	232400	81949	147806	103550	65858	49911	42456	36243
128850	232400	73058	131771	103550	58713	41627	33964	27855
128850	232400	65327	117827	103550	52500	34689	27130	21435
128850	232400	58240	105045	103550	46805	28890	21642	16464
Total		934109	1060674		126565	50407	17322	-7944

CONCLUSION

It could be concluded from the study that majority of farmers were adopting Kheri breed of sheep and local breed of goat. Majority of farmers wanted to adopt Patanwadi breed of sheep in place of Kheri sheep and Sirohi goat due to their heavier body weight and good milk production. Prevention of abortion in sheep, fodder and shed availability were considered most important technologies for sheep rearing in this area than other technologies. The study also revealed that hazards due to Kikar, lack of grazing land, no drinking water for sheep and ET disease in sheep were considered serious problems faced by farmers of Kantoli village during sheep rearing. Sheep rearing in a flock of at least 50 sheeps with one ram is economically viable enterprise in semi arid region of Rajasthan.

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