Assessment of Small Ruminant Breeders in Rural Hebron, Jericho, Bethlehem and Ramallah

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

and the

AGENCY FOR TECHNICAL COOPERATION AND DEVELOPMENT

Project funded by the Canadian International Development Agency

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EXECUTIVE SUMMARY

Since December 2008, the Food and Agriculture Organization of the United Nations (FAO) has been implementing project OSRO/GAZ/803/CAN, entitled "Emergency support to small ruminant farmers in the West Bank and Gaza Strip to maintain the productivity of their flocks". Some activities were implemented in partnership with the Agency for Technical Cooperation and Development (ACTED). The USD 2.5 million project is funded by the Canadian International Development Agency, and aims to improve the livelihoods and skills of small ruminant farmers across the region.

As part of project activities, ACTED conducted an assessment of 243 small ruminant breeder households living in rural and marginalized parts of the Hebron, Jericho, Bethlehem and Ramallah governorates. This survey, which covered both rural farmer and Bedouin households, aimed to produce a comprehensive outline of the problems and vulnerabilities facing these households. As such the following areas were included: Socio-economic Information; Flock Characteristics; Animal Health; Feeding System; Herd Management and Reproduction; Meat and Dairy Production; Water Availability. Six District Level Officials from the Palestinian Ministry of Agriculture (MoA) were also trained as part of project activities (two from Hebron, two from Bethlehem and one from both Dura and Ramallah).

The survey found that Bedouin families appear to be more vulnerable than village farmer households. Although herd sizes are on average higher among Bedouin families, herd depletion rates (sale of adult females) are also higher and more Bedouin families than village farmers rely on breeding as their primary source of income. Furthermore, many Bedouin families have not had access to MoA services, nor are they connected to the Palestinian Water Authority (PWA) water network, and more than half do not own a water cistern. Overall, drought and rising input prices were identified as the two factors with the strongest negative impact on both farmer and Bedouin breeder households in these communities. Owing to the effect of these factors in particular, both Bedouin and village farmer families are currently facing a crisis, with high rates of herd depletion due to their endangered livelihood and decreasing levels of production. Despite this crisis, the survey found that a number of aspects spanning the areas of health, feeding, management, reproduction, production and water availability of these small ruminant breeder livelihoods can be improved.

Based on these findings, key recommendations for future interventions include the following:

- Targeting families whose primary source of income is breeding and who are located in remote locations, in particular Bedouins;
- Encouraging cultivation of drought tolerant feed crops and other alternatives to purchased feed and fodder, such as agricultural by-products or silage;
- Introducing a more accurate measurement of feeding portions (weighing);
- Building basic knowledge of common animal diseases which are easily avoided through better management (e.g. sanitation of sheds) and/or which can be easily cured if identified in the early stages;
- Increasing cistern capacity, particularly in villages not connected to the water network through rehabilitation and expansion of water collecting surface or distributing water tanks to households where cistern rehabilitation is not feasible;
- Build basic knowledge amongst breeders e.g. by conducting training in better reproduction practices, management, health (provision of basic medicines and coordination with the MoA to extend/complement vaccination services), feeding practices and shed upkeep and sanitation; and
- Improve reproduction practices through a pilot project designed to show impact of practices such as checking rams for venereal diseases.

Through making these improvements future interventions can better help to ensure the strengthening and sustainability of small ruminant breeding as a reliable livelihood for vulnerable families.

BACKGROUND

Small ruminant breeding has traditionally been a key source of income and food security for thousands of West Bank inhabitants, in particular those most vulnerable and living in rural areas. Because the sector has always been a 'safe haven' in times of economic insecurity, more and more people in recent years have turned to small ruminant breeding as a source of family consumption after losing jobs in Israel in the wake of the second *intifada*. Within the livestock sector, small-scale breeders who maintain herds primarily for household consumption represent an important group, with over half of small ruminant breeders in the West Bank maintaining a heard size of under 20 heads.[1] Herding remains the primary source of livelihood for the majority of these small-scale herders, on average covering 78 percent of household needs.[2] Another important group is the Bedouin, who, while traditionally having larger flock sizes, have also been most affected by closures, shrinking grazing land availability and water shortages, thus making them a particularly vulnerable group.

Since 2007, the breeding sector and small ruminant breeders in particular have been facing a crisis, due to rising input prices (especially of fodder), longstanding measures that effect small ruminant herding, based on mobility and continuing drought, among other factors. This current decrease in the profitability of 'breeding' has had a strong negative impact on the food security and livelihood sustainability of the most vulnerable, particularly rural families and Bedouin throughout the West Bank: food insecurity in the region rose from 34 percent in 2006 to 38 percent in 2008.[3]

The following assessment examines in detail the situation and problems faced by 243 small ruminant breeders in rural areas of the Hebron, Jericho, Bethlehem and Ramallah Districts. Special attention is paid to more marginalized communities, such as Bedouins and small scale breeders.

OBJECTIVES

Main Objective

Against the background of endangered livelihoods, this assessment focuses on the needs and problems faced by small ruminant breeders in rural areas of the Hebron, Jericho, Bethlehem and Ramallah areas over the last 2 years.

Specific Objectives

(i) Identify general patterns of needs and problems faced by the small ruminant breeder community in the target area; and
(ii) Identify any patterns or differences, according to lifestyle or geography.

[1] "A Review of the Palestinian Agricultural Sector," Spanish Corporation/ARIJ, 2007, p.4.
[2] "Livelihoods in Extinction: A Study on Herding Livelihoods in the West Bank," ICRC, April 2008.
[3] "Joint Rapid Food Security Survey in the Palestinian Territories," WFP, FAO, UNRWA, May 2008.

METHODOLOGY

For purposes of this assessment, a series of personal interviews were conducted with a random sample of 204 small ruminant breeders across the West Bank governorates of Hebron, Jericho, Bethlehem and Ramallah. Interviews were conducted between 18 January 2009 and 15 February 2009 by ACTED field monitors and trained representatives from the Ministry of Agriculture.[1]

Target locations were selected in coordination with the MoA, who provided assistance during the selection of target clusters, villages and households. ACTED met with representatives of the MoA in each of the four governorates to create a total of ten clusters, delineated according to general geographic and community differences. The MoA also provided lists of breeders to ACTED for some of the governorates which were used in selection of target households, as well as some general information about the small ruminant breeder community.

A standard questionnaire was developed through careful editing and review by ACTED and FAO staff members (Annex 1). Prior to conducting the questionnaires, ACTED's Assessment, Monitoring and Evaluation (AME) Manager conducted a questionnaire Training Workshop for the ACTED field monitors and MoA representatives. Over the course of the workshop, participants were introduced to the concept of the assessment and survey questions were reviewed one by one, practiced in pairs and any ambiguities or potential problem areas were discussed. In addition, a pilot survey was conducted on 18 January 2009 in the village of Kureise to test the amount of time each interview would take and make any final adjustments to the questionnaire.

Although precautions were taken to avoid possible sources of inaccuracy, the following risks should be taken into account:

(i) Some respondents may have exaggerated their answers because they perceived the survey might lead to funding. In order to mitigate this, all field monitors carefully explained to the interviewees that questionnaires were being conducted for purposes of a stand alone assessment and were not linked to funding;

(ii) Households often found it more difficult to recall figures from a year ago or the season before last and thus tended to provide approximations rather than precise data. This was especially the case among households with larger herds. Owing to lack of record-keeping or external records, figures could not be cross-checked.

[1] In total, ACTED field monitors conducted 184 questionnaires. In total, the MoA conducted 27 questionnaires; however, only 20 have been included in the data used for this report, as not all MoA enumerators were able to attend the Training Workshop.

Image 1: Jericho and Ramallah Governorates

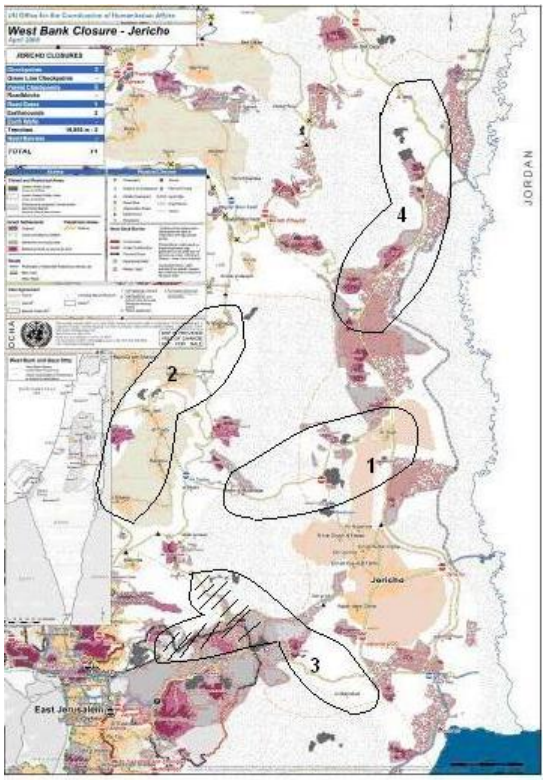


Image 2: Bethlehem Governorate

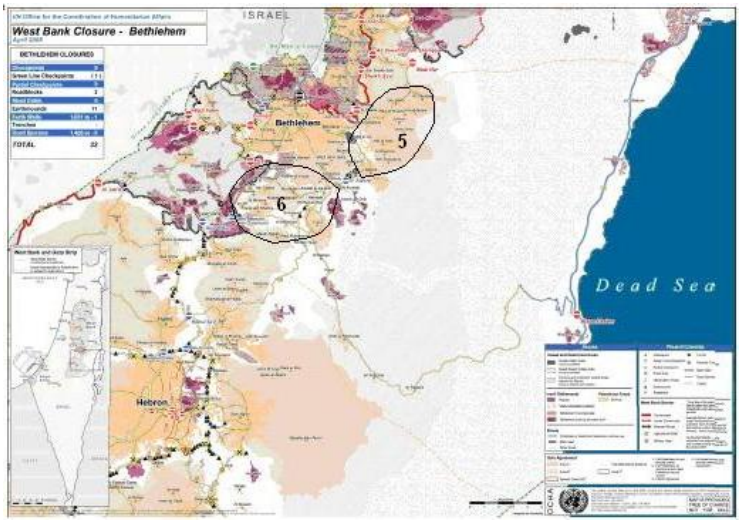
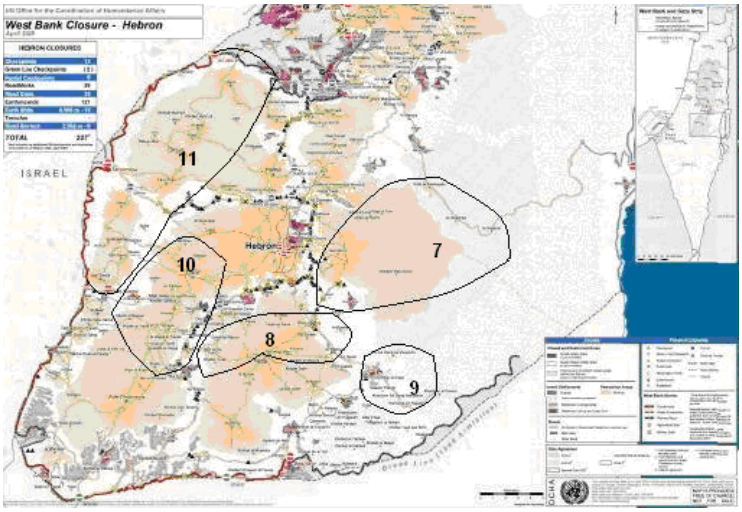


*Image 3: Hebron Governorate**



* Cluster 11 represents the area covered in June 2008 by ACTED during a preliminary needs assessment (see paragraph below for more details). A few locations in Cluster 10 were also covered during the preliminary assessment.

In addition to the above data, a further 39 questionnaires were gathered when ACTED conducted a preliminary needs assessment in June 2008 across the north-western part of the Hebron Governorate. The area covered extends from Beit Awwa up to Surif, including Jab'a and Nahhalin villages, located within the Gush Etzion Israeli settlement block (see Cluster 11 above). The assessment used a preliminary version of the attached questionnaire and targeted breeder households with a herd size of 50 heads or more. An additional six non-structured interviews were also carried out in isolated communities living near to the Separation Barrier.

Although the data gathered in the preliminary survey does not exactly match that gathered in the survey conducted during January and February 2009 owing to the questionnaire being an earlier version, it was felt that these communities should not be re-visited to avoid beneficiary dissatisfaction. This data has therefore been integrated into the overall answers where possible. Where this integration has occurred the associated results have been marked with a star to indicate that this includes the full 243 surveys. Non-starred results are formed solely from the 204 questionnaires carried out during the January - February 2009 survey.

Table 1: Village Table of Questionnaires Completed Jan – Feb 2009

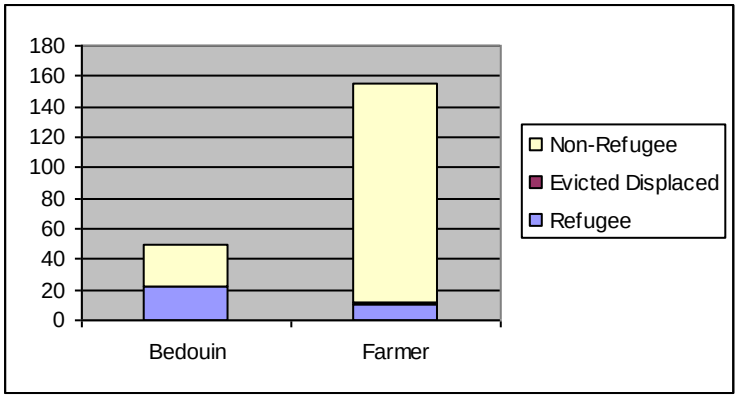
No.	Governorate	Cluster No.	Village	Date	No. Questionnaires Completed	
					ACTED	MOA
1	Dura	10	Kureise	1/18/2009	4	0
2	Dura	10	Khursa	1/20/2009	6	1
3	Dura	10	Al Serra	1/21/2009	5	1
4	Dura	10	Al Tabaqa	1/22/2009	4	2
5	Dura	10	Wad Ash Shajina		4	2
6	Hebron	8	Al Hileh	1/25/2009	5	1
7	Hebron	8	Zif		8	2
8	Hebron	8	Beit Amra	1/26/2009	4	0
9	Hebron	8	Um Lasafa		5	0
10	Hebron	8	El Bweib		5	1
11	Hebron	9	Al Hathaleen	1/27/2009	8	2
12	Hebron	9	Al Zuweidin		3	1
13	Hebron	9	Isolated communities in area		6	0
14	Hebron	7	Bani Na'im	1/28/2009	5	3
15	Hebron	7	Birin		4	2
16	Hebron	7	Ar Rawa'in + neighboring communities	2/5/2009	8	
17	Bethlehem	5	Za'tara (Um Salman)	2/1/2009	4	0
18	Bethlehem	5	Al Haddadieh		5	2
19	Bethlehem	5	Ras Al Wad		4	0
20	Bethlehem	6	Taqqou'	2/2/2009	5	2
21	Bethlehem	6	Marah Rabah		4	2
22	Bethlehem	6	Abu Nujeim	2/3/2009	4	0
23	Bethlehem	6	Marah Al Ma'alah		4	2
24	Bethlehem	6	Al Manshieh	2/4/2009	4	1
25	Jericho	4	Fasaiel	2/8/2009	6	0
26	Jericho	4	Jiftlek		6	0
27	Jericho	3	Tariq Al Khan	2/9/2009	0	0
28	Jericho	3	Al Nabi Mousa		2	0
29	Jericho	3	Bedouin communities by road to Ramallah		0	0
30	Ramallah	1	Al Mu'arajat (Ramallah side)	2/10/2009	3	0
31	Jericho	1	Al Auja		4	0
32	Jericho	1	Al Mu'arajjat (Jericho side)		12	0
33	Ramallah	2	Al Muhgayer	2/11/2009	4	0
34	Ramallah	2	Deir Jrir		4	0
35	Ramallah	2	Taibeh		6	
36	Ramallah	2	Deir Debwan	2/12/2009	4	0
37	Ramallah	2	Kufur Malek		6	0
38	Ramallah	2	Rammoun	2/15/2009	4	0
39	Ramallah	2	Kherbet Abu Falah		5	0
	4	**10**	**39**		**184**	**27**

1. SOCIO-ECONOMIC INFORMATION

1.1 Household Category and Size

Respondents were asked to identify themselves as one or more of the following: Bedouin, refugee, evicted/displaced or village farmer (see Chart 1).

Chart 1 Household Category



23 families (11%) report to be both Bedouin and refugees.
Average household size is 11 family members, with 5 children.[1] Village farmer families are slightly larger with an average of 12 family members, while Bedouin families average 10 family members.
In comparison to the West Bank average of 5.8 family members per household,[2] the families interviewed have a larger than average household size.

[1] Children are defined as family members under 18 years of age. There is no significant difference between the average number of children in Bedouin families and village farmer families.
[2] "Population, Housing and Establishment Census – 2007." Preliminary findings. Palestinian Central Bureau of Statistics. February 2008.

1.2 Employment

Overall, Bedouin households are less likely than village farmer households to have any family member who is employed either fulltime or through temporary labour (see Table 2 below).
Across both categories, households rarely have any family member who is employed fulltime. Only 10 percent of village farmer families have any member who is employed fulltime, while only 6 percent of Bedouin families have any member who is employed fulltime. In comparison, 69 percent of village farmers have family members employed through temporary labour, while only 38 percent of Bedouin families do. In conclusion, employment is not a regular or dependable source of income for the majority of households interviewed.

Table 2 Employment

	Percentage of families with at least one member employed fulltime	Percentage of families with at least one member employed through temporary labor
Bedouin	6	38
Village Farmer	10	69
Average	9	62

1.3 Role of Breeding in the Household

This finding is mirrored by the higher rate of Bedouin families' dependence on breeding as a primary source of income. The respondents were asked which of three categories best characterizes the role of breeding for their household: 'primary source of income,' 'secondary source of income,' or 'family consumption' (see Charts 2.a. and 2.b.). Overall, an average 55 percent* of respondents said that breeding was their primary source of income.

Chart 2.a. Role of Breeding in Village Farmer Household

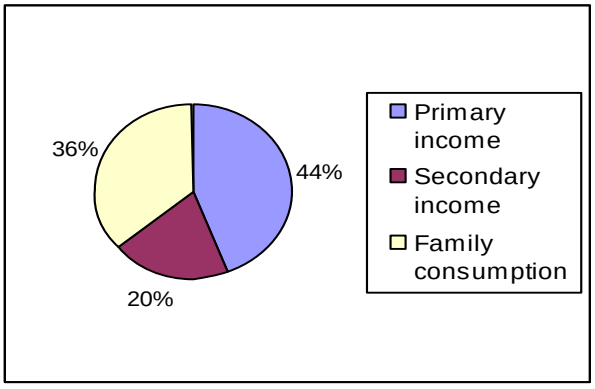
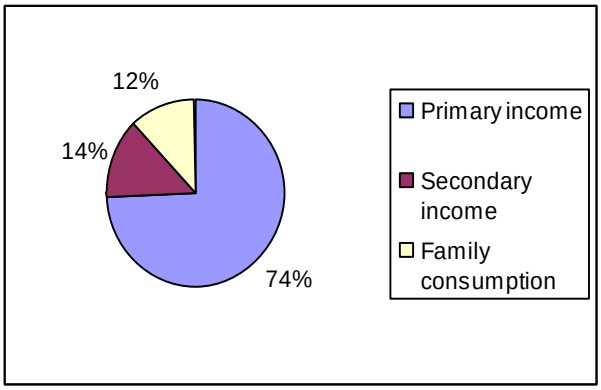


Chart 2.b. Role of Breeding in Bedouin Household



74 percent of Bedouin families identify breeding to be their primary source of income. 20 percent of village farmer households identified breeding as a secondary source of income, as compared to 14 percent of Bedouin families. At the same time, 36 percent of village farmers identify the main role of breeding to be for family consumption, while only 12 percent of Bedouin families do so.

This finding suggests that breeding functions more commonly as a *complementary* source of income for village farmers than for Bedouin families. As village farmers often have a more diverse income base, the current crisis within the small ruminant sector is thus likely to have a deeper and more devastating impact on Bedouin families than on village farmers. Nevertheless, a significant portion of the village farmer community depends primarily on breeding to sustain their livelihood.

1.4 Impact of External Factors on Livelihood

The respondents were asked to rank the key factors impacting their livelihoods on a scale of one to three, where one indicated no impact and three indicated a strong impact (see Table 3).
Village farmer and Bedouin families differed slightly in their impression of factors, but overall **the drought and rising input prices were ranked as the two factors with the strongest negative impact on their livelihood, with both factors attaining total scores of over 580**. Following this with scores around the 450 mark were the issues of lack of access to water, grazing availability and IDF/Settler activities.

Table 3 Ranking of Impact of External Factors on Livelihood

	Drought	Rise in input prices	Hard to sell	Lack job opportunities	IDF/Settler activities	No grazing	Access to water
Bedouin (% ranking problem as three)	96%	88%	14%	20%	56%	64%	56%
Village Farmer (% ranking problem as three)	92%	89%	6%	40%	40%	40%	46%
TOTAL SCORE GIVEN	**583**	**588**	**317**	**441**	**452**	**468**	**469**

Interestingly, the lowest total score was assigned to selling products, although a higher percentage of Bedouin than village farmer families ranked this factor as having a strong impact (assigning number three). A higher percentage of Bedouin families also report that IDF/Settler activities and lack of access to grazing have a strong impact on their livelihood. Conversely, a far higher proportion of Village Farmers (40%) ranked the Lack of Job Opportunities as having a strong impact as opposed to only 20% of Bedouin. This is presumably due to the fact that Bedouin are less likely to see breeding as a complementary or secondary source of income and hence may not be looking to supplement their breeding activities.

1.5 Direct Support from Other Sources

A majority of Bedouin families (78%) report having received some form of direct support in the last year. Among these, 67 percent received assistance from an NGO only, 20 percent received assistance from the United Nations Relief and Works Agency (UNRWA) only and 13 percent received assistance from both an NGO and UNRWA. Only one Bedouin family reported having received assistance from the MoA, and this was in the form of a food basket. It is important to note that the type and amount of support varied widely from family to family. For instance, 36 percent of those who received support received assistance in the form of a one-time distribution of flour or food basket. A further 10 percent received assistance only in the form of a one-time distribution of wood and blankets.

In contrast to Bedouin families, only 38 percent of village farmer families report having received any form of direct support in the past year. Among these, 67 percent received support from an NGO only, 12 percent

received support from UNRWA only, 14 percent received support from the PA Ministry of Social Affairs (MoSA) only, and the remaining 7 percent received a support from a combination of the above sources. Among these, 43 percent received support in the form of a food basket (usually from UNRWA) or a small cash contribution (from the MoSA).

Only a very small percentage of respondents have ever received training related to breeding in the past (12 percent of Bedouin families, and 20 percent of village farmers). Among those Bedouin families who received training, 83 percent had received it in all areas asked (management, feeding, reproduction, health and food processing). Among village farmers, 48 percent received it in all areas asked. The remaining 52 percent only received training in two or three areas, usually including management, feeding and health.

In conclusion, **whether a family has received support in the past year is not necessarily an indication of the household's level of vulnerability**, as 'support' often takes the form of a one-time distribution or very minimal dietary or income supplement. In addition, training remains a strong need within the community.

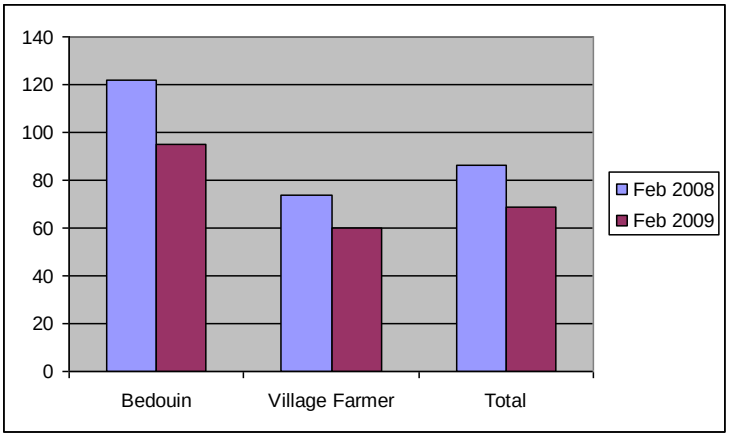
2. FLOCK CHARACTERISTICS

2.1 Changes in Herd Size

The breeders interviewed from the targeted cluster villages were selected as a random sample irrespective of herd size. The overall average herd size is 69 adult female heads per household. Bedouin herds are usually larger than those of village farmers, averaging 95 adult female heads per herd among Bedouin households, as compared to 60 adult female heads per herd among village farmers.

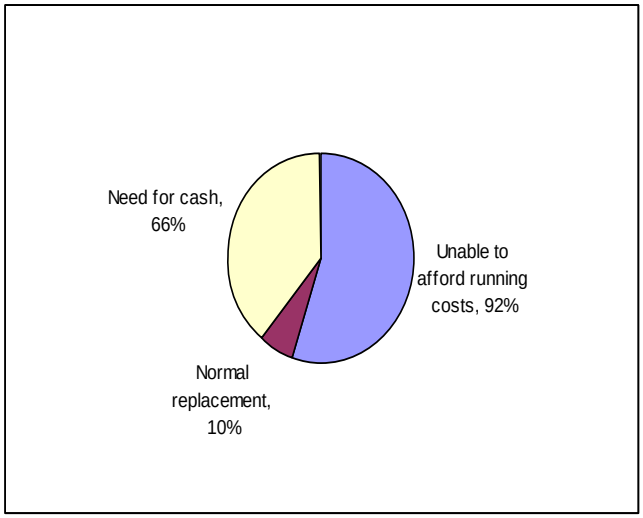
The last year was marked by a significant decrease in herd size by an average of 21 percent* of adult female heads per household (see Chart 3).

Chart 3 Change in Average Number of Adult Female Heads per Household



Bedouin families were most severely affected by this trend, averaging a decrease of 28 adult female heads per household, which is a decrease of 23 percent. Village farmer families averaged a decrease of 14 adult female heads, which is a decrease of 19 percent.

Chart 4 Reason for Sale of Adult Female Heads



When asked whether they had sold adult female heads during the past year, 64 percent of total households responded that they had, while **70 percent of Bedouin families responded that they had sold heads**. Overall, 63 percent* of all families interviewed report having sold heads either for cash or because they could no longer afford the running costs (see Chart 4).

Of the 64 percent of total households who responded that they had sold heads, 92 percent said one reason they had done so was because they could no longer cover the running costs, 66 percent said one reason they had done so was because they needed cash and only 10 percent said it was for normal replacement.

2.2 Small Ruminant Type and Breed

Overall, household herds are predominantly made up of sheep, though many have a mix of sheep and goats. In total, 57 percent of households interviewed have herds composed of both sheep and goats, 33 percent of households have herds composed of sheep only, and 10 percent have herds composed of goats only. In comparison to village farmer herds, Bedouin families tend to have a higher percentage of goats in their herds (see Table 4).

Table 4. Sheep versus Goats in Herd

	Feb 2008				Feb 2009			
	Average Total Herd	Average Nb. Sheep	Average Nb. Goats	Average % Goats in Herd	Average Total Herd	Average Nb. Sheep	Average Nb. Goats	Average % Goats in Herd
Bedouin	171	100	71	42	141	86	55	39
Village Farmer	102	87	15	15	84	73	11	13
Average	119	90	29	24	98	76	22	22

In February 2009, goats made up an average 39 percent of each Bedouin herd, as compared to only 13 percent of village farmer herds. There was no significant change between February 2008 and 2009.

Households with sheep predominantly own sheep of the Awasi breed. Only 43 households in total own more sheep of the Assaf breed than of the Awasi breed with the vast majority owning both some Assaf and some Awasi sheep. Among all the households, a total of 61 (21 percent), own the improved crossbreed sheep. Five of these are Bedouin families. Interestingly, 75 percent of households that own that crossbreed sheep, own *only* crossbreed sheep. It is unclear why families prefer certain breeds. Production and cost (e.g. veterinary costs) data gathered in this survey was not disaggregated by type of animal and so a future study could be conducted to investigate whether certain breeds do yield higher economic benefits or are more resistant to semi-arid environments (characterised by limited water supply).

Only four of the 204 respondents report that they do not own all the heads in their herd.

3. ANIMAL HEALTH

3.1 Animal Sheds

Of the total number of households interviewed, only 4 (2%) do not keep their animals in a shed of any kind. The average shed size is 123 m2. Of those who have a shed for their herd, 57 percent of total households keep their herds in a closed shed, 38 percent keep their animals in a semi-closed shed, and 5 percent keep their animals in an enclosed, but open space. Village farmers and Bedouin families differ significantly in the type of shed used for their herds (see Charts 5.a and 5.b).

Chart 5.a. Shed Type, Bedouin Families

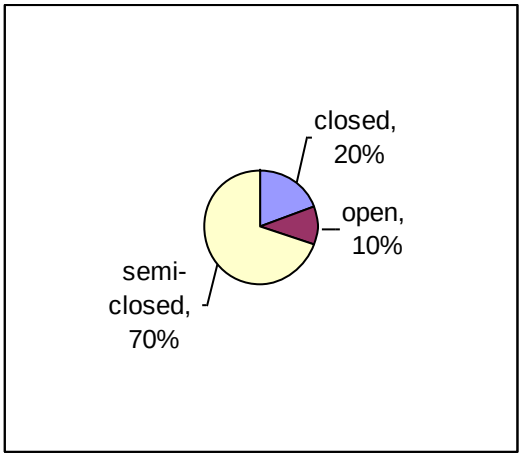
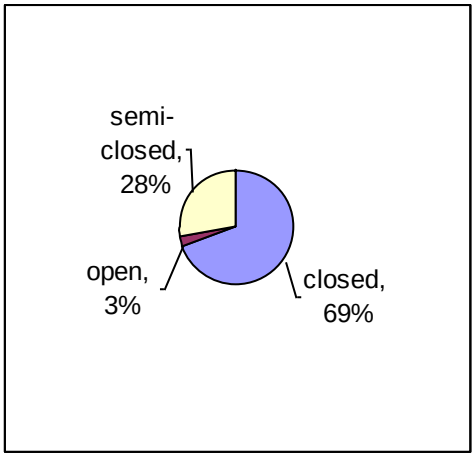


Chart 5.b. Shed Type, Village Farmers



The majority of Bedouin families (70%) keep their animals in semi-closed sheds made of metal sheets, as compared to only 28 percent of village farmer families. On the other hand, while only 20 percent of Bedouin families keep their animals in a closed shed, 69 percent of village farmer families report that they do. Keeping animals in an enclosed, but open space remains the least common option for either group.

Semi-closed sheds are usually preferable to closed sheds as they facilitate ventilation and are better adapted to the seasons. For instance, a closed shed may help to protect from the winter cold, but it is poorly adapted to the heat and humidity of summer. This is important to bear in mind for creation of new sheds, but is not essential as both types of shed have a positive impact on animal health as opposed to open enclosures.

More critically, division of shed space is a key means of ensuring the health and proper care of a herd. 15 percent of households with sheds have no division at all of the space for their animals. 22 of the 30 households are Bedouin families, which means that **44 percent of all Bedouin families interviewed have no division of the shed space for their animals.** Of the total number of households with division of space, 75 percent separate animals for weaning, 20 percent separate animals by age and only 9 percent have any separation for sick animals. In comparison, 95 percent of Bedouin families with division of space separate animals for weaning, and 18 percent separate animals by age; however, **no Bedouin families divide the space in their shed to separate sick animals from the rest of the herd.** Encouragement to breeders to use division within sheds could also be carried out in conjunction with a needs assessment to assess the rehabilitation needs of existing sheds.

3.2 Veterinary Care: Services and Costs

Households use veterinary services on average 13 times per year, with no significant difference between Bedouin families or village farmers.[1] The majority use some form of *private* veterinary services at least once a year (87 percent of the total, 86 percent of Bedouin families), while 40 percent use some form of *MoA* veterinary service at least once a year (see Table 5 for more detail).

Table 5 Number of Households Using Veterinary Services

	MoA only	Private only	NGO	Mobile Clinic	MoA and Private	MoA and Mobile Clinic	Total
Bedouin	6	11	1	18	12	2	50
Village Farmer	8	54	1	33	55	3	154
Total	14	65	2	51	67	5	204

As indicated in the table above, 40 percent of Bedouin families surveyed obtain vet services for their herd from mobile veterinary clinics, 40 percent receive any services from the MoA, and 46 percent use private veterinary services (not including those who use mobile clinics). In contrast, 23 percent of non-Bedouin families use mobile veterinary clinics, 43 percent receive any services from the MoA, and 71 percent use private veterinary services (not including those who use mobile clinics).

Overall, households spend an average 1 723 New Israeli Shekels (NIS) per year on veterinary services and drugs combined. For veterinary services alone (i.e. not including drugs), Bedouin families spend an average 650 NIS per year, while village farmers spend an average 469 NIS per year, keeping in mind that 60 percent of Bedouin families earn less than 1 000 NIS per year, and 26 percent earn between 1000 and 1 500 NIS, while on the other hand 37 percent of village farmers report earning less than 1 000 NIS a year and 32 percent between 1 000 and 1 500 NIS per year. **For veterinary drugs alone, Bedouin families spend an average 2 462 NIS per year, while village farmers spend an average 1 483 per year.** This difference may be due in part to larger herd size among Bedouin herders.

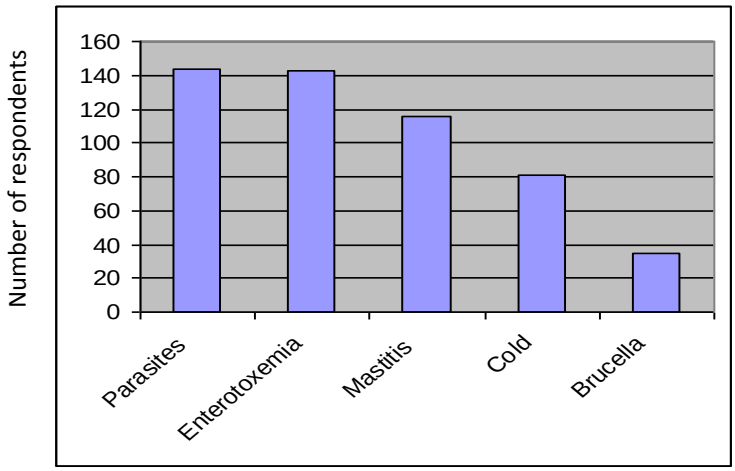
3.3 Health Related Problems

Abortions in animals are fairly common among the breeder households interviewed, averaging eight per household in the last reproductive season. Of the total number of households interviewed, 80 (39%) report an increase in abortion cases in the last year. 54 (26%) report no change in the number of abortions, and 70 (34%) report a decrease in the number of abortions. 20 households (10%) report that their abortions are linked to disease, but this figure merely represents household awareness of the presence of disease.

According to the households interviewed, parasites and enterotoxaemia are the two most prevalent diseases, followed closely by mastitis (see Chart 6).

[1] Bedouin families responded that they use veterinary services on average 14 times a year per household, while village farmers responded that they use veterinary services on average 12 times a year.

Chart 6 Disease Prevalence



70 percent of respondents report cases of parasites and enterotoxaemia in their herds, and 57 percent report cases of mastitis. Since the MoA is responsible for Brucella vaccinations of all small ruminants in the West Bank, the 17 percent who report cases is a surprising figure. When asked whether their herds had been vaccinated by the MoA against brucellosis, 19 households (9%) reported that they had not. This is likely to be due to the fact that many Bedouin and some farming households live in area C which is under Israeli and not Palestinian Authority control. Indeed, among those households that did not receive the Brucella vaccine, 50 percent are Bedouin families.

When asked whether their herds had received any other vaccinations, nearly half responded that they their animals had received no other vaccinations, with a higher percentage of Bedouin than village farmer households receiving vaccinations (see Table 6).

Table 6 Vaccinations Received (other than brucella)

	No vaccines	Enterotoxaemia	Anti-parasite	Foot and Mouth Disease	Sheep pox	Mastitis	Do not know
Bedouin (percentage)	44	34	2	10	22	0	6
Village farmer (percentage)	40	42	5	5	18	1	2
Average (percentage)	41	40	4	13	38	1	3

(40% of total) and sheep pox (38% of total), followed by foot and mouth disease (13%). Fewer than 5 percent of households received vaccinations against mastitis and none responded that they had received a vaccination against scabies. Three percent do not know what kind of vaccinations their herds received.

4. FEEDING SYSTEM

4.1 Source of Food

Cereals and straw/hay are the most common sources of animal food among all households. Both the number of months and the number of dunums available for grazing remain limited owing to the ongoing drought and presence of Israeli settlements. 90 percent of village farmers and 98 percent of Bedouin families report a decrease of available land for grazing during the past year, due primarily to the drought, but also due to Israeli closures and settlements. Despite this, the majority of respondents, particularly Bedouin families, responded that they continue to take their animals out to pastures during most months of the year, even when there is no grass or food available to graze. 58 percent of Bedouin families responded that they graze their animals for 12 months of the year.

Concentrate fodder is used by nearly all village farmers for between 3-5 months per year, but only 32 percent of Bedouin families report using concentrate fodder to feed their animals, and for an average of four months per year. In general, concentrate fodder is typically fed to animals during the winter months, i.e between December and March. Less frequent use of concentrate fodder by Bedouin families is likely due to high fodder prices and more difficult access.

Households were also asked if they ever feed their animals agricultural by-products, i.e. silage. Only one Bedouin family reported feeding agricultural by-products to their herd, while 8 percent (13) village farmer families report using agricultural by-products. Those families which do feed their animals agricultural by-products are located primarily in central Hebron and in northern Jericho in the Jiftlek area. These families feed their animals agricultural by-products on average 2-3 months per year between April and June. **Agricultural by-products, i.e. silage, remain a vastly under-used potential source of nutrient-rich source of food for the animals across all respondent categories and governorates.**

4.2 Feeding Practices

Households were asked whether they weighed the feed or fodder to help determine the portions to give to their animals. The vast majority use traditional methods or vision to determine the portions of feed to give their animals. Only three Bedouin households (6%) responded that they weighed the feed, and only 14 percent of village farmer households responded that they did. **Of those village farmer households that report using concentrate fodder, 83 percent do not weigh the portions they feed their animals**.

More so than for other sources of food, animals are sensitive to the amount of concentrate fodder they consume. ACTED Animal Health Surveys and KAP (Knowledge, Attitude, Practices) Assessments conducted in spring 2008 and winter 2009 have shown that farmers tend to assume that 'more is better' when it comes to concentrate, but in fact excessive amounts of concentrate during certain periods of pregnancy can endanger the ability of the mother to carry out a successful pregnancy.

Respondents were also asked whether they had changed their feeding system over the course of the past three years. "Feeding system" refers to: (a) the number of months each source of food (i.e. concentrate fodder, grazing, cereals, cultivated feed crops, etc.) is used during the year and (b) in what percentages relative to the others. Only 14 percent of Bedouin families and 15 percent of village farmer families said they had changed their system during the past three years. According to the respondents, the main reason for this change was the decrease in available grazing land due to the drought and settlements. A couple of households explained that they had changed their system in reaction to the high cost of fodder, and one household said it had changed its system after receiving training on feeding practices.

Despite worsening external factors and intensifying context of drought, high prices and spreading Israeli settlements, most households report that they have not made any significant change to their feeding system. Most changes made to feeding systems have been passive (i.e. less grazing due to less available grazing land), rather than proactive (i.e. increasing feed crop cultivation, using drought tolerant crops or use of silage to respond to high fodder prices).

4.3 Use of a Salt or Mineral Block

Of all households interviewed, most use a salt or mineral block for their animals. 23 percent of village farmer families interviewed do not use a salt or mineral block, while **48 percent of Bedouin families report *not* using a salt or mineral block for their animals**. This figure is high, especially considering that a salt or mineral block costs on average between 25 and 30 NIS and are available in most private veterinary clinics.

4.4 Cultivation of Feed Crops

Overall, 49 percent* of respondents responded that they cultivate their own feed crops. Of the Bedouin families interviewed, 34 percent own land, (on average 51 dunums per family). All but two of these families use their land to plant feed crops. All Bedouin families who grow feed crops plant wheat and barley. Additionally, 43 percent of these families (six households) also grow vetch.

Not surprisingly, a greater percentage of village farmer households own dunums (69%), with an average of 25 donums per household owning land. Among those owning land, however, 31 percent do not use their dunums to cultivate feed crops (although 13 do use agricultural by-products to feed their animals). The vast majority also grow wheat and barley, with 31 percent additionally growing vetch. These data indicates good potential for expansion of feed crops adapted to dry land conditions.

All households interviewed report a decrease in feed crop production and link it to drought and insufficient rainfall. Four families, or 3 percent of total households cultivating feed crops report an increase in production. Two explain that the increase is because they did not cultivate at all in the past, and two explain that the increase is due to a shift away from purchasing concentrate fodder and towards cultivating more feed. In addition, one family reports no change in the quantity of feed crop produced.

Despite the decrease in levels of productivity owing to the drought, it still remains profitable for households to plant rain-watered feed crops. Overall, **each household that planted feed crops was able to feed their herd for an average 2.4 months of the year, thereby saving families the cost of purchased feed for this period.**

5. HERD MANAGEMENT AND REPRODUCTION

5.1 Herd Management

Very few households keep any records of their herds. Overall, only 24 households (one Bedouin and 24 village farmers) report keeping any kind of records. Roughly 33 percent of the 24 households keep records of feeding, 33 percent keep records of the buying and selling of heads, and 33 percent keep recording of matings.

5.2 Reproduction

None of the households interviewed apply artificial insemination (AI), but 68 percent of village farmers and 34 percent of Bedouin families use hormonal sponges. This means that all households use natural insemination through rams to impregnate their ewes. 70 percent of Bedouin families share rams, while 46 percent of village farmers reported that they did. When those breeders that share rams were asked if they checked them for venereal diseases **97 percent of Bedouin families reported that they do not check their rams, and 89 percent of village farmers reported that they do not. Failure to check rams is a key way to spread abortion-causing diseases such as Chlamydia. This explains why ewes and herd reproduction capacity is not optimized.**
Rates of lamb births have decreased only slightly over the last season (see Table 7).

Table 7 Average Number of Births

	Last Season	Season Before Last
Bedouin	82	89
Village farmer	52	54
Average	60	63

This decrease is more significant, when taken into consideration that the fall reproduction cycle (i.e. the 'last' cycle) typically has a 25 percent higher success rate than the spring cycle. This would imply that the reproduction rates in the last season were on average 35 percent lower than expected. It is important to keep in mind, however, that not all respondents follow a 7-month reproduction cycle (one in fall and one in spring).
The mortality rates of lambs and kids born are high, but did not change significantly between the last season and the season before last (see Table 8). Overall, mortality rates reached an average 20 percent* over the last two seasons and across all household categories.

Table 8 Mortality Rates

	Last Season		Season Before Last	
	Average no. Deaths	Percentage Lost of Total Births	Average No. Deaths	Percentage Lost of Total Births
Bedouin	14	17	14	16
Village farmer	10	20	11	21
Average	11	19	12	19

Interestingly, mortality rates are higher among village farmer households than among Bedouin households. On average among Bedouin herds, 17 percent of lambs and kids die after birth, while among village farmer herds, 20 percent of lambs and kids die after birth.
When disaggregated according to sheep and goats, lamb mortality is on average 17 percent for both Bedouin and village farmer households. In contrast, kid mortality among Bedouin herds is on average 16 percent, while for village farmers it is much higher at 32 percent. The reasons for this difference are unclear and perhaps deserve further investigation. This could be linked to the preference of village farmers for rearing sheep.

As indicated in the table below, over 60 percent of cases of post-natal mortality occur during the first two weeks after birth, with the percentage decreasing significantly in ensuing periods. Typically, most new-born lamb deaths are due to starvation or underfeeding which lead to other lethal diseases, this may show that greater care should be paid by breeders to feeding of newborn lambs e.g. the use of powder milk. In addition, lambs and kids are most vulnerable during their first two weeks, as this is the period during which they develop their immune system.

Table 9. Post-Natal Mortality

	Lambs suffering post-natal mortality			Kids suffering post-natal mortality		
	Percentage dying at 2 weeks	Percentage dying at 2 months	Percentage dying after weaning	Percentage dying at 2 weeks	Percentage dying at 2 months	Percentage dying after weaning
Bedouin	77	21	2	79	21	0
Village farmer	64	32	4	61	16	23
Total	68	28	4	67	18	15

Interestingly, the percentage of kid mortality cases among village farmers is higher after weaning than at two months, while Bedouin families report no mortality cases after weaning at all. This may be because Bedouin families tend to read indigenous goat breeds, which are naturally more resistant to environmental factors and different types of pathogens. Another factor may be that Bedouin families tend to wean their kids gradually, as opposed to through one-step weaning, which is common among village families and can place undue stress on kids, thereby leading to mortality.

When asked what was the main cause of lamb and kid mortality in their herd, 48 percent of respondents said that they did not know.

6. MEAT AND DAIRY PRODUCTION

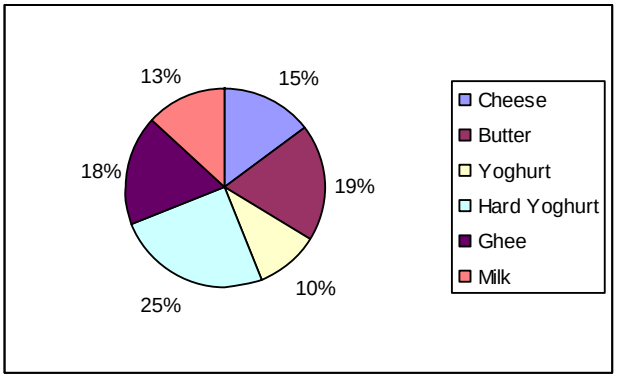
6.1 Lamb Production

Overall, an average of 38 lambs were sold per household during the last reproductive season, in comparison to 43 on average in the season before last. The average is higher among Bedouin families, where 52 lambs were sold on average per household (with 33 lambs on average per village farmer household). Percentage of lambs sold to born is almost the same among Bedouin and village farmer households. During the last season, Bedouin families sold 63 percent of lambs born, and village farmers sold 65 percent of lambs born. This is a decrease in percentage since the season before last, when Bedouin and village farmer families both sold 69 percent of lambs born. 54 percent of households interviewed report a decrease in the number of lambs sold during the last season. This suggests that more lambs are being used for replacement, family consumption or are dying in the first months after birth (see Section 5 for more detail on abortion rates).

Across the board, lambs are usually sold at 3.7 months of age, and at an average weight of 31 kg. The average weight for Bedouin households is slightly below this overall average at 27 kg per lamb.

6.2 Dairy Production

Chart 7 Dairy Production, Total Households



Households produce a variety of different dairy products, including cheese, butter, yoghurt, hard yoghurt, ghee and milk. Of all households interviewed, 50 percent (102) report some decrease in the quantity of dairy produced or consumed over the past year. 33 percent report no change or do not remember,[1] and 17 percent report and overall increase in the quantity produced (see Chart 7).

For both Bedouin and village farmer families, hard yoghurt is the most commonly produced dairy product (an average 25 percent of total dairy produced). Hard yoghurt is followed closely by butter, ghee, cheese, milk and yoghurt.[2]

7. WATER AVAILABILITY

Of the total number of households interviewed, only 52 percent* are connected to the PWA water network. Among those remaining, 13 percent* obtain water through illegal connection to the Israeli *Mekarot* water network and 35 percent* have no connection. Among the Bedouin households interviewed, 31 (62%) have no connection, while 15 (30 percent) obtain water through illegal connections (see Charts 8.a. and 8.b. below).

Chart 8.a Connection of Bedouin Households

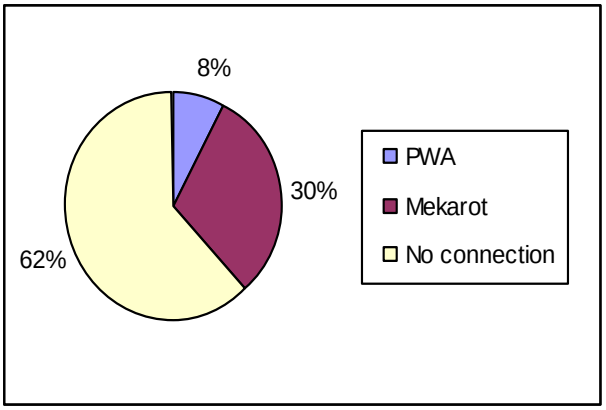
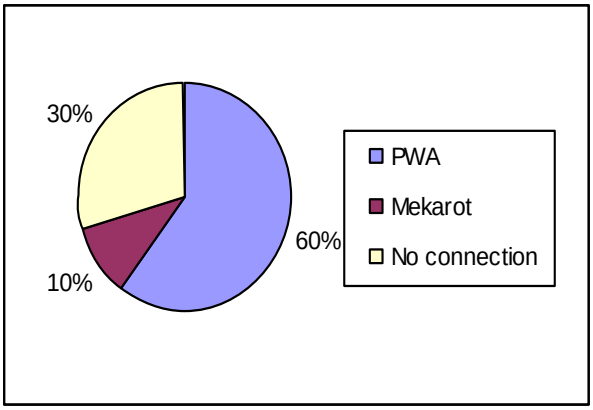


Chart 8.b Connection of Village Farmers



[1] Questions 66, 67, 68, and 69 of the questionnaire regarding quantity of dairy produced and market prices were the most difficult to answer by the respondents. Many could not remember the quantity/price produced the year before, and could provide only a very general estimation of amounts. For this reason, only a very general analysis of the data collected from these questions is provided here.

[2] Production of dairy among Bedouin and village farmer families is surprisingly similar, which percentages of each item produced differing only by one to three percentage points. The main difference in dairy production between Bedouin and village farmer families is that village farmers produce more cheese than milk, and Bedouin families produce more milk than cheese.

When the data is disaggregated by governorate and cluster, it becomes clear that water availability can differ greatly from region to region, and even village to village within the same governorate (see Table 10).

Table 10. Water Availability by Cluster/Governorate

Cluster	Governorate	PWA Network (percentage)	Mekarot (percentage)	No Connection (percentage)
1	Jericho/Ramallah	0	20	80
2	Jericho/Ramallah	87	0	13
3	Jericho/Ramallah	33	0	67
4	Jericho	0	100	0
5	Bethlehem	100	0	0
6	Bethlehem	79	21	0
7	Hebron	23	0	77
8	Hebron	50	0	50
9	Hebron	27	60	13
10	Hebron	21	0	79
Total No.	**4**	**97 HH**	**31 HH**	**76 HH**

50 percent or more of households interviewed report that they are not connected to the water network in Clusters 1 and 3 in the Jericho/Ramallah governorates, and clusters 7, 8, 9 and 10 in the Hebron governorate. In Jericho, these are primarily communities living in Area C or Bedouin families living in areas demarcated as Israeli military zones. In Hebron, the clusters are across areas A, B, and C. Most households interviewed in the Bethlehem clusters (5 and 6) report being connected to the PWA network.

A total of 147 households (72 percent) purchase some water during the year through trucking. 88 percent of Bedouins purchase some water during the year through private trucking, while 46 percent it all 12 months of the year (compared to 10 percent of non-Bedouins).

Across all villages and communities, no increase in the price of trucked water in the last year is reported, nor has there been any significant change between 2007 and 2008 in total quantity purchased for either Bedouin or village farmer families. However it is important to keep in mind that both 2007 and 2008 were severe drought years, and that no change in rates of purchase reflects neither a 'normal' nor 'stable' situation.

Of the total number of households, most (63 percent) own a water harvesting cistern. Cistern size usually ranges between 30 and 100 m^3, though five village farmer households report owning a cistern whose capacity is greater than 300 m^3 (agricultural cisterns). **Although a higher percentage of Bedouins than village farmers are not connected to the water network, fewer than half of Bedouin families (42%) own cisterns.** In addition, cistern size is an average 10 m^3 smaller among Bedouin families than among village farmer households.

Overall, Bedouin families appear to be the most vulnerable to the drought, in terms of connection to the water network, ownership of cisterns and water harvesting capacity.

RECOMMENDATIONS

Socio-Economic Information/Criteria of Vulnerability

- *Target families whose primary source of income is breeding;*
- *Target families in remote locations, particularly Bedouin;*
- *Herd size should not be taken as a de facto indicator of vulnerability, but rather weighed among other factors depending on the category of the household (Bedouin or other); and*
- *Rather than discounting any household that is receiving or has received in the past year support from another organization or the Palestinian Authority, a more nuanced approach should be taken that examines the type and kind of assistance received (i.e. one-time food basket distribution or other).*

Animal Health

- *Detailed assessment of shed needs for rehabilitation and support to those not using sheds to create sheds where possible;*
- *Improvement of sheds through introduction of division of space to separate animals, accompanied by training on shed sanitation and ventilation;*
- *Provision of veterinary support, basic medications and/or essential vaccinations in those areas which are hard to reach by private veterinary doctors and the MoA; and*
- *Build basic knowledge of common diseases which are easily avoided through better management, e.g. sanitation of sheds, and/or which can be easily cured if identified in the early stages.*

Feeding System

- *Encourage cultivation of drought tolerant feed crops and other alternatives to purchased feed and fodder, such as agricultural by-products or silage;*
- *Encourage a re-examination and discussion of traditional feeding practices and systems for adjustment to new context and circumstances (maybe within the frame of breeders' groups and their feed processing centres);*
- *Encourage sharing of lessons learned and best practices between breeders to encourage exchange and to build capacity in a more lasting and sustainable way;*
- *Training on feeding practices to increase efficiency of use, and distribution of weighing scales; and*
- *Distribute salt or mineral blocks and encourage use in families where it is not used.*

Herd Management and Reproduction

- *Encourage record-keeping;*
- *Conduct training in better reproduction practices management, health, feeding practices and shed upkeep and sanitation;*
- *Checking of rams for diseases, such as Chlamydia; and*
- *Improve reproduction practices through a pilot project designed to show impact of practices such as checking rams for venereal diseases.*

Meat and Dairy Production

- *Increase meat and dairy production through improved management, reproduction, health and feeding (again, possibly through breeders' associations acting as service providers).*

Water Availability

- *Increase cistern capacity, particularly in villages not connected to the water network and for Bedouin households through rehabilitation and expansion of water collecting surface; and*
- *Distribute water tanks to households in villages not connected to the water network and Bedouin households which do not yet have water tanks.*