

CHANGES IN MIGRATION AND FEEDING PATTERNS AMONG SEMI-NOMADIC PASTORALISTS IN NORTHERN SYRIA

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INTRODUCTION

The semi-arid and arid areas of Syria (<350mm mean annual rainfall) comprise about 80% of the country, with the principal agricultural commodities being barley and sheep. There are important links between livestock production in the steppe and barley production in the higher rainfall areas (more than 200mm), as barley is a principal feed for the sheep. The steppe, defined in this paper as the area receiving less than 200mm of rain (it covers 55% of the total country), is largely populated by "semi-nomadic" bedouin whose main occupation is the herding of sheep (Jaubert, 1991).

Until the end of the 1940s, most of the bedouin occupying the Syrian steppe were fully nomadic, relying on natural grazing as feed for their flocks. Sedentarization and the extension of cultivation was quite slow, and found only in the western part of the country, up to the line of the Damascus-Aleppo road. Following the introduction of mechanization at the end of the 1940s, cultivation extended rapidly eastward, particularly in the Jezireh Plains and in the north of Syria. By the end of the 1950s, most of the land down to the 200mm isohyet had been brought into cultivation, changing the livestock feeding patterns as more cereal stubble became available for grazing in the summer months.

After a three-year period of drought from 1958 to 1961, when Syria's population of sheep was halved, a system of supplementary feeding was introduced, which radically changed the flocks' feeding patterns (Lewis, 1987:174). The recent and continuing extension of irrigation in the Aleppo and Raqqa areas of northern Syria has also encouraged greater use of irrigated crop residues as grazing.

The changes which are taking place in the semi-nomadic bedouin flocks' feeding and migration patterns, and the historical reasons for these changes, will be the topic of this paper. Most of the discussion will focus on three steppe-based villages in northern Syria, where the International Center for Agricultural Research in Dry Areas (ICARDA) undertook a three-year

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Map 1. Syria

survey between 1978 and 1981 (Thomson, Bahhady and Martin, 1989), and where a follow-up study was done this year. However, this paper will also draw on studies centering on other villages in northern Syria, in order to fully explain the parallels between areas which were settled earlier and those currently being developed.

FEEDING PATTERNS

The feeding pattern for flocks who had a home base in the northern Syrian steppe consisted mainly, by the early 1990s, of hand-fed feed (supplements) in the winter and early spring, some rangeland grazing in the spring, cereal stubble or unharvested cereal crops in the summer and irrigated crop residues in the autumn. (See figure 1).

Natural grazing figures little in the annual feeding cycle, while the proportion of feed coming from supplements can be up to 50 per cent. The increasing use of hand-fed feed is a phenomenon which occurs not only in Syria but throughout the West Asia/North African region. As can be seen from figure 2, the amount of feed which is hand fed has doubled since the 1960s. From the figures available, it was not possible to distinguish between the amount of cereal straw which was grazed *in situ*, and that which was collected and hand-fed during the winter. Therefore the amount of feed which was hand-fed from 1985-89 would also have included part of the 27 per cent allocated to stubble/straw.

For Syria as a whole, from 1985-89, the stubble/straw category was around 45 per cent of the total feeds offered, with natural grazing reduced to around 35 per cent (Nordblom and Shomo, in press). In the sample group on which this paper is based, hand-fed feeds covered all the sheep's metabolizable energy requirements for up to five months during the winter months, and some flocks were offered supplementary feeds at other times of the year as well.

In northern Syria, hand-fed feeds consist largely of barley grain, cereal straw, wheat bran, sugarbeet pulp, cottonseed (cake and hulls, and the seeds themselves) and dry bread. Last winter, straw, bran, sugarbeet pulp and dry bread together constituted 83 per cent of the total feeds offered amongst the sampled flocks.

The cost of feeding a sheep during the year includes the purchase of hand-fed feeds and grazing fees. In the sample group, this could cost as much as 75 per cent of the total sheep enterprise expenditure during a year (this calculation excludes the cost of crop production). If we include the cost of water, transport and shepherd's fees, the winter period, which averaged 44 per cent (161 days) of this past year in the sample group, took on average 65 per cent of the total expenditure.

The cost of hand-fed feeds shows why the bedouin continue to migrate: it is much cheaper to keep the sheep on grazing matter, either natural rangeland or crop residues. As these become available in the spring, the bedouin move from their winter base - their steppe-based villages - towards these types of feed.

However, the availability of natural rangeland grazing has decreased, and in fact in spring of this year none of the sampled flocks relied totally on rangeland for their metabolizable energy needs; during the period of rangeland grazing, supplementary feed continued to be offered.

BEDOUIN OCCUPATION OF THE SYRIAN STEPPE: HISTORICAL OVERVIEW

Before 1860, the bedouin occupying the parts of Syria with a rainfall of less than 350mm were largely nomadic, although some cultivation took place. The bedouin generally obtained grain either through tribute (khuwa) or they would sow and harvest crops on tribal land - if any existed within areas where rainfed cultivation was possible - or create a sharecropping system where sedentary tenants paid rent in the form of part of the harvested crop (Chatty, 1974:233-37).

Different areas of the steppe were controlled by different tribes, although certain pressures would necessitate a change in the pastoral production systems as they existed in particular areas. For example, drought or population expansion would push the bedouin to look for new land to exploit. If other places were already in use by other groups, control of the land could lead to a dispute.

In the late 17th century, with the decline of power and effectiveness of the Ottoman Empire, bedouin tribes from the Nejd (Saudi Arabia) began to drift northward into the Syrian steppe. Within about 150 years, the Aneza and Shammar Bedouin Confederations had conquered the Syrian Desert and Steppe as well as the Euphrates region (Chatty, 1974:57-58). This initial push was probably due either to drought or to overpopulation in the Nejd areas. Since the 16th century, there had only been the Al-Fadl, Mawali and Haddiddiin sheep raising tribes in this northern segment of the steppe. The Shammar met with resistance from the Mawali and the Shammar (who had allied themselves with the Mawali) when they attempted to take control of the Homs-Hama area, so continued moving northeastward, finally using grazing land in the Euphrates and Jezireh areas. In general the animals - sheep, goats and camels - were kept for their milk products - yoghurt, butter, cheese and semneh (clarified butter) - and not often slaughtered for their meat. This was especially true for camels which require a much longer period for herd replacement or herd growth than sheep or goats. The annual cycle of production began during the winter rainy season, when flocks would move south and eastward following the rains, which would start new plant growth. As the rains stopped and the weather grew hotter, the bedouin would move north and westward, sometimes into cultivated areas to graze stubble from rainfed crops (Lewis, 1987:3-6). The major

constraint to the use (and overuse) of the steppe was water availability. Lack of water actually prevented certain parts of the steppe from being exploited.

SETTLEMENT FROM 1860 TO 1958

This section draws heavily on Lewis (1987), who explained that in the mid-1800s, demand for grain increased with the establishment of garrisons in the Syrian steppe (for example at Deir Ez Zor and at Palmyra, as well as in the Aleppo Province) by the Ottoman Turks. At the same time there was a gradual improvement in public security, which allowed an extension of cultivation (Lewis, 1987:38-46).

By the 1860s, the bedouin were being pushed out of this expanding zone of cultivation, which was taking place around the 300mm isohyet in northern Syria. Parts of some tribes, particularly in the Aleppo Province (for example the Wuld Ali, Haddiddiin and Mawali), began to settle and become more semi-nomadic or semi-sedentary. Most members of the tribes continued to herd their flocks, but the settlement of some tribe members gave them certain advantages: a measure of support from the government and "influential friends" in Aleppo, with whom they developed partnerships (Lewis, 1987:43-44).

As people settled, more land began to come under cultivation, and more villages were established, such as near El Bab, north of Aleppo, and at Breda (see map 1). But at the same time, the bedouin occupying the rangeland in Syria continued, in general, to be fully nomadic until the 1940s. They neither owned nor cultivated land, although some land was cultivated by share-croppers, using traditional animal-drawn wooden ploughs, at the flock and herd owners' summer camping areas. The land in the steppe was under tribal control, and like other unregistered and uncultivated land it was considered to be "mawat"; in other words, the property of the state (Lewis, 1987:159).

When mechanized cultivation was introduced in the middle of the 1940s, the tribal leaders became interested in agriculture, and the area under cereal cultivation increased rapidly. This was made possible through investment made by private entrepreneurs, who provided the seeds and machinery, as well as capital. The largest entrepreneurs could individually cultivate several thousand hectares with the help of only one labourer. The bedouins received between 25 and 50% of the grain produced, as well as all the straw and stubble. At the same time the entrepreneurs limited production costs by exploiting the land without the use of fertilizers. After a few years, the tribal leaders were able to purchase machinery and manage their own cereal cultivation operations (Lewis, 1987:160).

Cereal cultivation extended rapidly because of a number of factors other than mechanization. Little of the area had any clear owner: no cadastral survey

had been carried out, and boundaries were seldom marked, with the result that tribal disputes over land control were a regular occurrence. Claims of ownership of tracts of land were staked through ploughing and continued cultivation. By independence, and until 1958, Syrian agriculture was dominated by large property holders and private investors, who actively extended cultivation to the detriment of natural rangeland. Then in 1958 there was an Agrarian Reform to redistribute the land to its users, and through this an attempt was made to abolish tribal rule (Masri, 1991). Some bedouin were granted tracts of land from between 10 and 50 hectares in the steppe area. Cultivation, in general, was forbidden, but land was still cultivated and fines were sometimes imposed.

SETTLEMENT FROM 1958 TO 1980

Until cultivation started in earnest at the margins of the steppe, and in the steppe itself, the bedouin had, in general, remained nomadic with no fixed base. Once they became involved in cereal production, their movements reduced as they became fixed in one spot during cultivation and harvest time. After harvest, the flocks were able to graze the cereal stubble, thus allowing a greater period of time in the one spot.

At the same time there was a change in the types of animals being herded. Demand for the camel had already begun to wane following the introduction of motorized transport, but after a three-year drought period from 1958-61, Syria's camel population was greatly reduced to 8000 animals. Since then the number of camels in Syria has further decreased to an estimated 4000 today (Jaubert, 1991). Sheep, and to a lesser extent goats, became the principal animals being herded by the bedouin. This also had an effect on the migratory patterns as sheep require greater access to water than camels, and cannot migrate so far. Furthermore, following the drought, the use of winter supplementary feeding was introduced, thus reducing the need for continued migration in search of feed during the winter.

As a result, the nomadic population became, in effect, semi-nomadic. They established a base in one spot, where they cultivated land, and remained there for part of the year. Most built houses. The rest of the year they continued their traditional patterns by migrating with tents from one grazing area to another.

Thus, the term semi-nomad means someone, who is part of a group, who usually lives in portable or temporary dwellings, but who has a base where some crops are cultivated. Chatty (1974) distinguished between the terms semi-nomadic, semi-settled or transhumant by establishing whether the entire human group moved with the flock or not. In other words, a semi-nomadic group was

one where the whole human group - usually a family - moved with the flock. Transhumant or semi-settled people had only part of the group, or a shepherd, attending to the flock during its migratory route, while the rest remained at the home base.

Before the mid-1940s, water had been the main factor limiting the use of the steppe, as flocks could only move to where water was available, and could only stay in one place as long as there were still supplies of both water and pasture. The number of animals in the steppe was also naturally regulated, as in drier years both water and feed sources diminished, and the animals either died or were sold as meat.

The increasing use of trucks and tractors to transport water and supplementary feed into the steppe area reduced the risk of loss of animals during dry years, and also reduced the need to move so often. This also allowed flock numbers to increase. In addition, trucks allowed previously inaccessible rangeland to be exploited as both water and animals could be easily transported to any part of the steppe (Treacher, 1991).

However, since the bedouin became semi-nomadic, vegetation degradation of their traditional land appears to have accelerated, forcing them to continuously adapt their systems of production to the changes taking place, particularly their migration patterns.

Cereal cultivation in the steppe extended to the detriment of the best rangeland, while at the same time flock numbers and sizes increased. By the late 1970s, flocks began to be kept for longer periods on smaller and less productive tracts of rangeland; this had the subsequent effect of overstocking the rangeland and causing degradation through overgrazing.

In the drier parts of the steppe barley is only harvested if the season has been an exceptionally good one, climatically, with above average rainfall levels and a favourable distribution. Otherwise, the barley is grazed at the green stage of growth. At the western edge of the steppe around the 200mm isohyet, where cultivation was introduced earlier, there has been a diminution of fallow land and an increase in annual mono-cropping of barley. This has both further reduced the amount of grazing land available (fallow land being an important source of grazing) and increased land degradation as the land has not been receiving any inputs of fertilizer. The incidence of plant disease has also increased (Treacher, 1991).

Villages settled earlier, such as in the Breda area, have been transformed into mainly agricultural areas. The increasing distance to rangeland as drier and drier areas come under cultivation, as well as its increasing scarcity, have affected flock numbers in these areas. In general, flock numbers have decreased to less than 50 sheep, which are kept on supplementary feed, fallow or uncultivable land (for example roadsides) crop stubble and residues from

irrigated land. There has also been an increasing incidence of well digging in order to grow irrigated crops in this area.

Studies by ICARDA in Breda and El Bab have shown that, as more land was cultivated and periods of fallow were reduced, families became more settled, movement to the steppe was reduced or stopped altogether, and sheep numbers decreased (Jaubert and Oglah, 1985). A study undertaken by Jaubert and Oglah in 1983-84 in the Breda area showed that flocks of under 100 sheep were never taken to the steppe, and that smaller flocks were not joined together to form flocks large enough to warrant movement. In 1983, 32 per cent of the flocks in the Breda area were still moving to the rangeland in the spring, but since then this movement has largely ceased.

EVOLUTION OF THE VILLAGES IN THE STUDY

The three villages in the study have been settled during the past 60 years. Mouhaseneh (see map 1), which lies at the edge of the steppe at about the 200mm isohyet, was established about 50 years ago, when a well was dug and the land around it claimed by a tribal leader. Members of his tribe came to work on the land. During the Agrarian Reform in 1958 the land was redistributed to those living in the village. All the land - 225 hectares - is now cultivated, and the village is now considered part of the "barley zone". Like other villages in the barley zone, the houses are grouped together with the cultivated areas to the outside. There are 15 families living in Mouhaseneh.

In contrast, both Bir Amaleh and Hazm Alsurr are larger and more spread out. In general, each family lives on its own, and both cultivated and range land separate individual houses. The populations are larger: in Hazm Alsurr there are about 200 families, and in Bir Amaleh 300 families. These villages were established more recently, as well. Cultivation first began in Bir Amaleh in 1955, when an old Roman well was cleaned out and re-established. At that time, the steppe land was divided amongst the different tribal groupings, and also amongst individual families. As the families came to stay longer and longer periods in the two areas, Bir Amaleh and Hazm Alsurr, they began to build houses on their land. The houses in these two "villages" are therefore widely separated.

When the bedouin were fully nomadic (until the end of the 1950s), family groups generally moved more than ten times in a year. The main reasons for moving were water supplies and for reasons of security. As cultivation began and the families began to settle for longer periods of time in one place, the number of camp moves began to decrease.

By the end of the 1970s, the migration patterns, in general, had reduced to a minimum level, with around five moves per year. The bedouin were based

in their villages for around six months from the beginning of autumn, in October, until March. During this time the sheep grazed in the steppe and, during the winter months, were hand fed, principally barley grain and straw. Land in the village was also ploughed and seeded during this time. In the spring the flocks were moved eastward into the drier parts of the steppe, with the number of camp movements depending on the grazing available. When the barley crop was ready to be harvested, the group returned to the village and the sheep were put onto the harvested land to graze the cereal stubble. When this feed resource was finished, the flocks either returned to the steppe, grazed fallow land near the village, or were moved further westward, where the bedouin would rent harvested land from agriculturalists in the higher rainfall areas so their sheep could continue grazing cereal stubble.

In addition, the distance the bedouin migrated was less than earlier. In both Bir Amaleh and in Hazm Alsurr, the pattern of movement tended to be within a radius of about 20 to 30 kilometres from the home base; in fact, the flocks were generally kept as close to the villages as possible. It was only in very dry years that the sheep were moved out of the district, either towards the higher rainfall areas to the west, or to the north-east in the Jezireh plains.

CHANGES IN PRODUCTION SYSTEMS SINCE 1980

In the early 1980s, the amount of land planted in barley in the village areas began increasing, thus reducing the amount of grazing land available. One of two things appears to have occurred, depending on location:

1) In the villages at the edge of the steppe, which are also in areas of higher population density, the bedouin have tended to settle and become mainly agriculturalists, with smaller flocks of sheep. This is the case at Mouhaseneh, where the sheep are no longer moved eastward onto rangeland. As most of the land east of the village is now cultivated, the sheep would have to be moved much further in order to utilize the rangeland. An additional problem is that, despite attempts by the government to abolish tribal control in the steppe, tribal control does appear to still exist; therefore grazing areas too far from the village area will normally be under the control of a different tribe.

Bedouin living in these areas now depend mainly on their crops, rather than their sheep, and have been seeking alternative forms of income; either through irrigated cropping from wells or the Euphrates Scheme which is bringing more land under irrigation, or through off-farm labour.

2) Bedouin based in villages in the steppe, such as Bir Amaleh and Hazm Alsurr, have tended to revert to a more nomadic existence. The time they spend at their home base has considerably decreased, and they now tend to move more often and further distances, and most of the movement is to the west and north,

rather than within the steppe. They have also begun to try establishing bases outside of the steppe in higher rainfall areas.

In fact, the semi-nomadic bedouin are now constrained by a lack of grazing, rather than by lack of water. They are forced to move in order to find grazing for their flocks. The amount that rangeland grazing now contributes to the steppe-based sheep's metabolizable energy on an annual basis is estimated at less than 18 per cent (Bahhady, 1981).

Although supplementary feeding can allow them to remain fixed in one place, as already mentioned, the cost precludes this possibility. The bedouin in the study spent an average of 6.7 Syrian Pounds (SL)¹ per day per sheep last winter on supplementary feeds, not including the cost of transporting these to the steppe. Rangeland grazing is free, and grazing stubble and crop residues in the West costs, this year, between less than one and six Syrian pounds per sheep per day, depending on the price the bedouin is able to negotiate. (Grazing fees for barley stubble were as low as 200 SL/ha, while irrigated cotton crop residues cost up to 6000 SL/ha, but provide enough grazing for 1000 sheep days, and water is no problem).

CHANGES IN TYPES OF SUPPLEMENTARY FEED OFFERED

There has also been a change in the type of supplementary feeds offered, due to the increasing cost of some types of hand-fed feed. This could have a detrimental effect on sheep nutrition, as farmers try to find ways of feeding their sheep cheaper products, consequently eventually affecting output, and therefore flock revenue. Table 1 shows the proportions of feed offered last winter, with a comparison of that offered during the earlier survey 10 years ago.

Table 1. Total winter consumption of feeds constituent (kg per head per winter) and comparison of proportions of feeds offered

¹ SL 42 = USD 1.

Components	mean 1978-81	1991/92	proportion	
			1978-81	1991/92
barley grain	42	6	25.1%	2.4%
cereal straw	70	91	41.9%	36.3%
cottonseed cake	10	4	6.0%	1.7%
cottonseed hulls	8	10	4.6%	3.9%
cottonseed	6	4	3.0%	1.7%
* wheat bran	6	59	3.6%	23.5%
* sugarbeet pulp	18	32	10.8%	12.7%
* other feed total	8	44	4.8%	17.8%
bread *		(26)		(10.6%)
other		(18)		(7.2%)
total consumption	167	250		

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"other feed" are compound, wheat grain, bread flour, sorghum grain, lentil straw and bread. 1992 figures have been divided into bread, and other feeds (vetch straw, weeds/grasses and "lundel", a mixture of rubbish from cotton seeds.

(Source: Thomson, Bahhady and Martin, 1989, page 88, for 1978-81 figures)

Last winter, the four commodities which covered 3/4 of the feed offered, on average, to the sheep were straw, wheat bran, sugar beet pulp and dry bread. This is in marked contrast to that offered 10 years previously, when barley grain was the most important commodity after straw. The huge reduction in barley grain, from one quarter of the amount of feed offered (a proportion which did not change much over the three-year period 1979-81) to only 2.4 per cent in 1991-92, was the biggest change in the feeds offered. As 1991 was a dry year, not all farmers harvested their barley crops, leaving their sheep to graze the barley in situ. Therefore they did not have a stock of grain to feed. This problem occurred during each of the three years from 1989 to 1991, all of which were "drier" than normal, so barley grain has probably not constituted a large part of the sheep's winter diets since 1988. Barley grain, at around 10 SL per kilo, was considered too expensive by the farmers to buy, as other feeds were cheaper.

It appears that wheat bran has replaced barley grain - all the farmers fed it to their flocks. The major question here is, what effects would this have on the sheep? Providing the straw intake remains high, and bran does not constitute too large a proportion of the diet, the effect on rumen performance should not change too much. Bread now seems much more important:

during the past winter it comprised nearly 11 per cent of the feed offered, whereas 10 years earlier it formed a proportion of five per cent of the feed offered - unfortunately it is not possible to determine how much of this five per cent consisted of bread. Through government subsidies, bread in town was priced artificially low, and was therefore a relatively cheap source of feed (around five SL per kilo).

What the farmers were feeding to their sheep was dry bread, usually the leftovers from the bakeries at the end of the day. These leftovers consist of unsold bread as well as bits of half-cooked dough.

The proportion of straw being fed did not change much, from 42 to 36 per cent. The proportion of supplementary feed coming from cotton by-products (cottonseed, cottonseed cake and cottonseed hulls) seems to have decreased from 14 per cent in 1978-81 to just over seven percent in this year. However, lundel is also a by-product of cotton, and formed five percent of the total feeds offered. It is a cheap feed, costing only 2.75 SL/kg. In fact, the amount of annual metabolizable energy coming from cotton by-products in many Aleppo and Raqqa Province-based flocks has markedly increased in recent years, due to the increasing use of irrigated cotton crop residues for autumn grazing.

While the differing proportion of feeds being offered last winter did not differ much in their rates of metabolizable energy and crude protein, this does not take into consideration the reduction in natural grazing, which could be having a detrimental effect on the vitamin and mineral content of the sheeps' diets.

Mouhaseneh

The average flock size has decreased over the past 10 years from an average of 100 sheep per family to 48. This is due to a changing farming system from sheep raising to pure cultivation. There is practically no grazing available, and the farmers have become mostly sedentary. Off farm income is playing an increasing role: there is a government farm near Mouhaseneh where some of the people from the village undertake seasonal work. Rented crop residue grazing is also available on this farm. In addition, irrigated land has extended to within a few kilometres to the north of the village. This has given the farmers an opportunity to use more irrigated land for grazing during the year.

However, some problems appear to be occurring. Lack of green plant grazing seems to be affecting the health of the sheep; some flocks are showing mineral deficiencies in their diets, particularly selenium (Treacher, 1991, and Goodchild, personal communication). To compensate for this, some families are spending a considerable amount of time collecting weeds and grasses from roadsides and the edges of the irrigated fields, in order to supplement the

sheep's diets with green matter. In the past 10 years, the sampled families in this group have become sedentary. All the flocks are small, the largest comprising 123 sheep.

Although 10 years ago these flocks, in good years, still moved to the steppe to graze rangeland, the spread of cultivation in the steppe as well as the reduction in feed available from the rangeland, has stopped this movement. The flocks either grazed standing (green) barley and stubble or fallow land, or were moved onto the government farm to graze crop residues and medicago sativa.

Hazm Alsurr

Bedouin from Hazm Alsurr are from the Haddiddiin tribal group, and have traditionally had strong links with land in the higher rainfall area near Breda. In the past 10 years, many families have begun to spend more and more time in villages in the higher rainfall areas, such as Al Alieh and Abu Jourah, because there is less and less grazing available for their flocks in Hazm Alsurr. They still move to Hazm Alsurr in the spring to graze the steppe, and also to graze cereal stubble or green barley, but more time is spent in the second village, where cereal stubble is grazed in late summer and autumn, and where the sheep are generally kept over the winter, when they are fed concentrates.

Another phenomenon has been an increasing movement towards the Mediterranean Coast. While some bedouin have been spending part of the year grazing irrigated crop residues near the coast for a number of years, the number of pastoralists moving to the coast has increased rapidly in the past four years. At present, about half of the families living in Hazm Alsurr are spending part of the year near the coast. Furthermore, many of them are trying to establish bases there, and have spent the whole past winter there. They prefer to remain at the coast due to a lack of available grazing inland, and because more food and services are available, both for the family and the flock. The sheep graze mainly irrigated crop residues, but also in orchards and on barren land on hillsides.

Therefore, in general, the flocks from Hazm Alsurr are no longer spending the winter at their home base. They are staying either in a second village in the higher rainfall areas, or staying near the Mediterranean Coast. Movement is back to Hazm Alsurr in the spring to graze what rangeland is still available, as well as either green barley or cereal stubble if the family's crop was harvested, and finally in the summer the sheep are moved back out of the steppe to the higher rainfall cultivated areas, to the mountains, or to the coast.

There is little movement further eastward into the steppe by bedouin from Hazm Alsurr. The rangeland used by them is uncultivated land in Hazm Alsurr.

However, there are some bedouin from Hazm Alsurr who remain in the steppe all year around. This year, bedouin in Hazm Alsurr estimated that five percent of Hazm Alsurr's total population did not move out of the district. Most of the time the sheep were hand fed, as well as grazing rangeland except from May to October when the sheep grazed standing barley or cereal stubble and fallow land.

Although the bedouin realize it would be cheaper to move out of Hazm Alsurr for part of the year, they said they preferred to retain a claim to their area by constant occupation.

Bir Amaleh

Ten years ago, the bedouin based at Bir Amaleh remained there for around eight months per year. During the late autumn and winter months, from October until March, the flocks grazed rangeland near Bir Amaleh and/or were fed supplements. The sheep also grazed cereal stubble during the summer. It was in the spring that most of the movement took place, when the flocks were moved south-eastward into the steppe.

During the past four years, Bir Amaleh has remained completely unpopulated for most of the year. Probably the longest period that Bir Amaleh is inhabited at present is in the late spring/early summer when the sheep are grazing either standing barley or stubble. This year most of the barley was grazed green, beginning at the end of April. At that time, all the families were found in the village.

When this source of feed was used up, in June, the flocks were moved out of the steppe. Some went to the Jezireh area and others into higher rainfall areas in the Aleppo Province. There, they grazed cereal stubble and irrigated crop residues. During the past four years, this movement has taken place regularly, and the camp is moved a number of times as the sheep finish grazing in one area and need to be moved to another. There are no fixed places for the sheep to go: the bedouin will visit the area in advance and negotiate grazing terms with the land owners.

Once the bedouin have moved out of Bir Amaleh, they have tended not to return until some grazing is available. In the past they would return in October and begin to feed concentrates if no grazing was available, but now, as in the case of Hazm Alsurr, the bedouin appear to be trying to establish other bases outside the steppe.

The extension of irrigated land in the Aleppo Province has given some of the bedouin from Bir Amaleh an opportunity to do this. There is enough grazing available from irrigated crop residues to feed the sheep until December, which has enabled delaying starting supplementary feeding. Ten years ago,

supplementary feeding generally began in September or October, whereas last year, despite it following a dry year (when it would be expected that winter supplementary feeding would begin earlier), most bedouin in the sample began winter feeding in December.

Instead of returning to Bir Amaleh to feed winter supplements, in general the bedouin have preferred to remain near the irrigated land. The principal reason for this is because water is readily available, and the transport costs for trucking the feed are considerably reduced. The bedouin remain in their tents during the whole winter, staying on barren land on the roadsides. At one place where some 10 families from Bir Amaleh remained the whole winter last year, construction began on a permanent feed store, as the bedouin were intending to return to there this year.

Most of the bedouin then returned to Bir Amaleh towards the end of February. Some grazing was undertaken near the houses, but winter supplementary feeding was continued. In March the flocks were moved south-east into the steppe. Therefore, on average the families remained in Bir Amaleh for only two weeks to one month at that time.

Most of the families from Bir Amaleh form groups of up to 10 families, who then migrate together. In general, the groups moved in the same direction, but not all to the same area. Some remained fairly close to Bir Amaleh, in land still considered to belong to their tribe (Shammar). However, other groups moved further south to graze land controlled by another tribe (Aneza). They have permission to graze there, but not to cultivate the land or to construct anything. In addition, the wells there are private and water must be paid for.

This year the spring migration lasted from one month to six weeks before the sheep were returned to Bir Amaleh to graze green barley.

During this time supplementary feeds continued to be offered, as grass growth on the rangeland was not enough to sustain the lactating sheep.

FUTURE TRENDS

It seems that sheep-herding bedouin will adopt one of two strategies in the future: they will either continue their more nomadic existence as the increasingly difficult task of feed searching compels them to, or they will settle if the opportunity of an alternative income source presents itself. In July and August this year, three bedouin in Bir Amaleh had wells dug: they intend using supplementary irrigation on about 40 hectares each of wheat this winter, and should permission be granted, they will grow cotton in the future as well. This will restrict their movements, although other families in their group will continue to migrate. But if these wells are a success, it is expected that other families will follow suit.

But how sustainable in the future will the migratory system of production really be? At present sheep flock owners based in the steppe are relying on hand-fed feed for up to six months per year. The use of trucks is also a necessity in this production system: to transport feed, water and the sheep to new grazing areas. Should the price of supplements or diesel increase (diesel, currently at four Syrian pounds per litre (less than 0.1 US\$), is heavily subsidized in Syria), the system of production would need to change extensively in order to survive.

CONCLUSIONS

It appears that rather than settling, the semi-nomadic population of Northern Syria, who are based in the steppe, have become more nomadic in recent years, unless other forms of income can be found. The present constraint to their settling is a lack of available grazing; they are forced to move in order to find enough grazing for their flocks. The migration and feeding patterns have changed in that much more emphasis is on crop residues and stubble, rather than natural grazing. In fact the sheep are now grazing rangeland for about a month each year, and during this time their diet is still supplemented with hand-fed feed.

The practice of cropping barley in the steppe is presently providing spring grazing, as the uncultivated rangeland, undergoing degradation, is not able to sustain the current numbers of sheep in the steppe. However, for how long can the cultivated land sustain continuous cropping?

Finally there is the question of sustainability of the migration system, as it is so sensitive to price changes in diesel, concentrates and grazing fees.

Should these increase too much, semi-nomadic sheep herding, barely profitable now, will no longer be so.

Acknowledgements

The authors wish to thank Peter Smith and Tom Nordblom for their comments on early editions of this paper.

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