Chapter 2 POSSIBILITIES OF INCREASING PRODUCTION

2.1 Semi-intensive and intensive production systems

The low productivity of Near East rangelands, the need to reduce grazing pressure and the present movement of pastoral people to urban areas would inevitably lead to the establishment of semi-intensive or intensive sheep production enterprises in areas where:

- better grazing can be made available in areas with marginal or higher rainfall;
- forage can be produced under irrigation through the introduction of forage crops in rotation with food crops;
- fallow land in rainfed areas can be replaced by forage legumes; and
- agricultural and agro-industrial by-products are available in large quantities for sheep feeding.

In such areas integration of crop and livestock farming systems would increase the efficiency of land and labour utilization and would lead to increased sheep production.

About 70-90 percent of the local production of mutton and lamb in most Near East countries comes from sheep that are raised in natural grazing areas. The low productivity of these animals is associated with low forage availability and lack of adequate management. It was estimated in 1980 that the lambing crop in the Bedouin sheep of Jordan was 61 percent, weaning weight of lambs at 60 days was 13.5 kg and milk production per ewe was only 45 kg. This level of production can be increased considerably with supplementary feeding of ewes and lambs and better management as has. been demonstrated in government farms in Jordan.

The importance of the rangelands for sheep production will undoubtedly continue in the future. At present, there is a growing interest in the implementation of development programmes which would prevent the deterioration of grazing areas and would increase their animal carrying capacity. One of the main aspects of these programmes is the early offtake of lambs from rangelands and their finishing in organized fattening units in areas close to consumption centres or sources of feed. The advantage of such stratification of production is that the grazing pressure on rangelands is reduced and more forage is available for breeding animals. In addition, meat production from lambs will be increased considerably under proper management and feeding. A good example of this type of intensification is the fattening system that has recently been established in Syria in the form of sheep cooperatives. Experiments in Iraq and Libya have indicated the importance of raising lambs on balanced diets. It has also been shown that lamb rations could include urea and agro-industrial by-products in order to increase meat production per animal at reduced costs.

Considerable work has been carried out in Cyprus on the intensive rearing and fattening of lambs and on the establishment of intensive sheep breeding/fattening units. This work is relevant to the other Near East countries and is described in this chapter. It indicates the level of ewe and lamb productivity that may be expected under intensive feeding and management conditions.

Sheep enterprises in Cyprus may be classed in two categories: the semi-intensive and the intensive system. In the semi-intensive enterprises, the animals are grazed throughout the year on natural vegetation, improved pastures, cereal stubble or crop residues and are fed conserved forage derived from cereal/legume or cereal-grain/cereal-forage rotation systems. The grazing is supplemented with concentrates, the quantity of which

depends on the availability of roughage and the productive stage of the sheep.

In the intensive system, sheep are grazed for only about two hours daily and are fed mostly on cut forage (cereal hay, legume hay or cereal-legume hay mixtures), conserved hay (from alfalfa or sudex) and baled straw. Supplementary feeding is also carried out with concentrates, the quantity of which depends again on forage availability and the productive stage of sheep. Since the preference for both sheep meat and sheep milk is high in Cyprus, sheep production systems are directed towards increasing the level of milk production together with meat production. This is achieved by improving the genetic potential of the animals and applying improved feeding and management practices. In order to increase income in a dual purpose sheep enterprise the marketable milk must be increased by limiting milk consumption by suckling lambs and the early weaned lambs should be reared under intensive conditions of feeding and management. Early weaning and use of milk replacers should not affect the meat output per ewe,

2.2 Early weaning and suckling regimes

The rumen of the lamb starts functioning at 3-4 weeks of age and prolonged suckling is not advisable. The milk consumption of lambs per unit weight gain increases with increasing weaning age as is shown below in the case of Chios lambs.

	Weaning age (days)			
	35	42	60	70
Weaning weight (kg)	12	15	20	21.5
Milk consumption (kg/lamb)	47	53	84	93

Marketable milk yield can be increased through restricted suckling or partial suckling of lambs. Trials with Chios lambs weaned at 35 days (suckled continuously or for.8 hours daily) or weaned at 70 days (suckled continuously or for 12 hours daily) showed that the total milk yield of ewes was similar with continuous suckling but when partial suckling was applied a higher marketable milk yield was obtained. Partial suckling is profitable in the early stages of lactation provided that the milk left to the lamb and the intake of solid feed are sufficient to sustain satisfactory growth. Other experiments where partial suckling was extended to 120 days of age showed that ewes are depleted of their body reserves and re-breeding is delayed. In addition, more feed is required for ewes to replenish the liveweight losses, the solid feed intake by lambs remains low and more labour is involved in handling ewes and lambs. Therefore prolonged partial suckling is not advisable.

Increase in marketable milk can be achieved by weaning lambs at a young age and applying partial suckling towards the end of the suckling period. In experiments where lambs were separated from their dams at birth or at two days of age, the milk yield, lactation length and the growth of lambs were adversely affected. These effects were more pronounced in the local fat-tail breed than in the Chios breed. It is thus advisable that in the case of the fat-tail breed at least one lamb should remain with the ewe until weaning.

Further trials with suckling lambs until weaning and with growing lambs on solid feed showed that, with the

existing prices of sheep milk and lamb meat compared to those of concentrate mixtures, it is more profitable to wean lambs early on limited quantities of ewe milk, and to fatten them on concentrates until slaughter. These results showed that the conversion of milk to lamb carcass is 10;1, i.e. 10 kg of milk is required to produce 1 kg of carcass whereas the conversion of solid feed to carcass after weaning is 8.25:1.

A 42-day weaning with partial suckling (8 hours suckling daily) during the last two weeks has been adopted at the Cyprus Agricultural Research Institute. The average perfor-mance of Chios lambs and ewes until weaning was as follows;

The Performance of Chios Lambs

	Males	Females
Birth weight (kg)	4.50	4.20
Weaning weight (kg)	15,60	14.00
Milk sucked (kg)	53	51
Carcass weight at birth (kg)	1.9	1.8
Carcass weight at weaning	7.4	6.6
Milk (kg)/carcass gain (kg)	9.9	10.6

The performance of ewes

		Single Lambing	Twin Lambing
Milk yield (kg)		108	134
Commercial milk (kg)		49	41
Liveweight loss (kg)		1.8	2.5
Feed consumption (kg):			
-	hay	34	34
-	concentrates	95	97

The cost of meat production was reduced considerably when weaning was practised at 42 days and lambs were fattened on concentrates until 84 or 140 days of age as is shown below:

	Age at slaughter (days)		
	42	84	140
Carcass weight (kg)	7.5	13.0	21.5
Feed efficiency	-	-	-
Milk or solid feed (kg) per kg carcass gain	10	8	8.5
Cost/kg carcass gain (US $/kg)	5.8	2.1	2.3
Total cost (US $/lamb)	30	42	66

Intensive lamb production provides the opportunity of utilizing edible and inedible offals (slaughterhouse by-products) for animal feeding, thereby increasing total income. Carcass weights and edible and inedible offals of lambs slaughtered at different ages are given below:

	Age at slaughter (days)			
	42	84	100	140
Carcass weight (kg)	7.5	13.5	15	21
Edible offals (kg) (head, liver, sweetbreads)	1.7	2.8	3.3	4.8
Slaughterhouse by-products (blood, feet, digestive tract and gut contents)	3.9	6.8	7.8	9.8
Skin	1.7	3.5	4.0	5.8

2.3 Fattening

The supplementation of a basic concentrate diet containing 16 percent crude protein with a trace element and/or a vitamin mixture (A, D, E) significantly improves the daily gain and feed efficiency of male lambs as is shown by the following results of a trial.

	Basic diet	Basic diet + trace elements	Basic diet + vitamins	Basic diet + trace elements + vitamins
Weaning weight (kg)	17.4	17.0	17.0	16.8
105 day weight (kg)	32.1	33.6	37.0	38.7
Feed intake (kg)	58	59	67	66
Feed/Gain	4.22	4.10	3.94	3.77

Broad beans, common vetch seeds and urea were fed to lambs in order to test the possibility of replacing soyabean meal in the basic diet with other sources of nitrogen. The performance, of lambs was not affected when broad beans (second grade, not used for human consumption) were included in the diet at the rate of 10 or 20 percent. This is indicated by the following results:

	Control diet	Broad beans (10%)	Broad beans (20%)
Weaning weight (kg)	16.2	16.0	16.5
125 day weight (kg)	45.2	45.4	45.1
Concentrate intake (kg)	110	112	112
Feed/Gain	3.81	3.83	3.83

Feed efficiency was slightly reduced when 30 or 49 percent of broad beans or 30 and 43 percent of common vetch seeds were included in lamb fattening diets to replace partially or completely soyabean meal. The performance of lambs was as follows:

	Control diet	Broad beans		Common vetch	
		30%	49%	30%	43%
Initial weight (kg) (49 days)	18.50	18.30	18.30	18.30	18.40
105 day weight (kg)	38.20	37.30	37.0	36.5	37.5
Feed intake (kg)	66	68	67	68	69
Feed/Gain	3.34	3.60	3.58	3.76	3.59

Urea was also used in lamb diets containing 16 percent crude protein to replace 50 percent of soyabean meal

from weaning (6 weeks of age) to 45 kg liveweight. In the first period from 42-84 days, the daily gain and carcass gain of lambs on the urea diet was lower but was equal to that of lambs on the diet without urea during the period from 84 to 140 days. Feed efficiency in both periods was better with the diet containing soyabean meal. Total feeding cost was about US $ 1.4 lower with the diet containing urea.