

10. CROP YIELDS AND GROSS OUTPUT

10.1 Definition

Crop gross output is the product of the yield of a crop and its farmgate price, and normally is expressed per unit area (per hectare). As a rule, only the quantity of the main product is measured by the farms, and although the bi-products may be used, they are not measured. If there is a tangible benefit from the use of the bi-product, then it has a visible or at least an imputed financial value. In the WUFMAS survey, yields of any bi-products were measured on the sample fields in addition to the main product.

The visible or imputed value of the bi-product depends on the demand for it and its use. For example, straw is used as livestock fodder and bedding, and livestock farms buy it at a low price or receive it through barter deals. Straw is chopped during machine harvesting of small grain cereals, and the residue sometimes is ploughed in as a source of organic matter and sometimes burnt. Crop residues are sometimes grazed by livestock. Cotton stalks commonly are used as a fuel, according to accepted practice, particularly when wilt disease has been observed in the crop. Until recently, it was prohibited to collect cotton stalks in the farms of South Kazakhstan as they represent a source of soil organic matter. In Uzbekistan, Turkmenistan and Tadjikistan cotton stalks are collected for fuel and partly ploughed in.

10.2 Crop Prices

Prices for crop products are discussed in Section 9.

10.3 Crop Yields

Each sample field has five sample plots in which measurements are made on the soil and groundwater, and on the growing crop and at harvest. Plot sizes were smaller in 1997 due to complaints from enumerators that excessive labour was required to harvest the whole plot by hand and separate production into the main product and bi-products. It was also difficult to weigh large quantities on the small scales provided. In 1997, sample plot sizes mostly were 3m x 3m for broadcast crops, and 2 rows x 10m for row crops.

The yield of the whole sample field also was recorded after harvest by farm staff. The yield of the whole field generally was 80-90 percent of the yield in the manually harvested plots but there were cases where the ratio was over 100 percent. Random unrepresentativeness of sample plots is inevitable but is not thought to be the main factor responsible for the difference. There are several possible reasons, some of which may act variously on it. The main reason is likely to be that hand harvesting of plots is more efficient than both machine harvesting and hand harvesting of the field by farm staff. Sample plots in some cases were harvested more frequently and some time in advance of the field, so differences arise from either further development of the crop or drying of the product. There is known to be some unauthorised harvesting of crops by local people before the formal harvest. Labour shortage is known to lead to the abandonment of yield, particularly of cotton. Hand threshing of grain is less efficient than by machine and this may explain instances of greater yield from the field.

Average yields from the whole field are considered more appropriate for use in gross margin analysis than those from the sample plots. They are shown in Appendix 3 for the main crops and yields of the main products of all crops are summarised by average for each republic in Table 10.1.

Table 10.1 Average Yield of Main Crop Products
(t/ha)

Crop	Kazakhstan		Kyrgyzstan		Tadjikistan		Turkmenistan		Uzbekistan		Overall	
	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997
Apples	20.8	20.8									20.8	20.8
Apricots					3.1	3.4					3.1	3.4
Barley, winter										1.7	1.7	1.7
Cotton, upland	2.5	2.6	2.6	2.4	2.0	1.8	1.8	2.7	2.2	2.3	2.2	2.3
Cotton, pima							2.5			2.1	2.5	2.1
Curcurbits									12.0	9.2	12.0	9.2
Green Gram					0.3	1.0				0	0.3	0.5
Lucerne, mature, fresh	31.8	28.7	27.5	22.7	26.6	25.4	45.5	33.0	37.1	46.0	33.7	31.2
Maize, grain	2.7		2.1	2.0	0	1.3	0		0.2	2.3	1.0	4.5
Maize, silage	25.1		21.0		4.2		12.4		16.2	22.4	15.8	22.4
Oats				2.9								2.9
Onion				5.4								19.0
Rice	3.0	3.4							2.2	3.8	2.6	3.6
Sorghum, fresh											10.8	
Sugarbeet			22.0	23.8							22.0	23.8
Tobacco				3.0								3.0
Wheat, spring	0.4	1.2	2.0								1.2	1.2
Wheat, winter		2.0	4.2	2.7		2.0	1.4	1.7	2.5	2.5	2.7	2.3

Yield of raw cotton varied from nil (where fields had been abandoned on Farm 24 due to lack of water) to nearly 3.8 t/ha on the farms in Surkhandariya, the warmest zone of the basin. The overall average yield was 2.3t/ha, much the same as the average in 1996. As in the previous year, the difference between the averages for republics was not significant (P=5 percent) but between individual farms within republics, the difference was very highly significant.

For several reasons, the yield of lucerne is difficult to summarise. The crop may or may not be harvested in the year of establishment, it may be cut and carted fresh, cut and dried for hay, grazed by livestock in situ, or grown on for seed, and any combination of these may be used in one field during the season. The crop product code is used in the record sheets so that the product is correctly identified and the appropriate price is used when calculating the gross output.

Rice was grown only on the sample fields in Kazakhstan and Uzbekistan in 1997. Yields of paddy ranged from 1.1 to 6.2t/ha and averaged 3.6t/ha overall, with no difference between republic means. Yields were markedly better than in 1996 when establishment was affected by low canal flows in the main producing areas.

Winter wheat was much more important in 1997 than the previous year, 58 sample fields on 22 farms against 37 fields on 36 farms. The difference between republics was again insignificant, and apart from in Kyrgyzstan, there was little difference in average yield between years. Overall, the grain yield was 2.3t/ha.

The numbers of samples of other crops were too few to attach much importance to the values recorded but averages are much the same as in 1996.

10.4 Crop Gross Output

Crop gross margins are very sensitive to the amount of the gross output. Gross output can be larger or smaller in proportion to either or both of yield or price of the product. Estimates of gross output varied more between farm averages of the sample fields with the same crop than between the averages of farms within republics, following the same pattern as yield variation. The averages over farms are shown in Table 10.2.

Table 10.2 Average Crop Gross Output
(US\$/ha)

Crop	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
Apple	1,938					1,938
Apricot			110			110
Barley, winter					201	201
Cotton, pima				993	826	951
Cotton, upland	1,063	1,316	930	800	625	828
Curcurbits					460	460
Gram, green			358			358
Lucerne + Barley, spring		0				0
Lucerne + Wheat, winter	0					0
Lucerne, mature	465	204	153	640	259	342
Lucerne, young	502				64	283
Maize, grain	0	400	260		462	332
Maize, silage					24	24
Oats		604				604
Onion		248	1,013			631
Rice	674				976	807
Sorghum			26			26
Sugarbeet		2,094				2,094
Sunflower, for oil	0					0
Tobacco		1,454				1,454
Wheat, spring	168					168
Wheat, winter	393	530	218	143	332	341
Overall	734	775	514	542	527	606