10. EFFICIENCY OF USE OF INPUTS

This section discusses the current use of inputs in crop production in Central Asia in the context of local "normative" values and levels that are considered typical from international experience.

10.1 Seed

Seed quality has both physical and genetic aspects, but both are required for high crop yield. Some institutes have specialised in breeding varieties adapted to the unusual climatic conditions of the area and some farms for many years have specialised in seed production for supply to the region's farms. Recommended seed rates are shown in Table 10.1.

Table 10.1 Recommended Seed Rates

Crop	Seed rate (kg/ha)
1. Cotton (fuzzy seed)	45-60
2. Cotton (delinted seed)	20-25
3. Wheat	180-230
4. Barley	160-200
5. Rice	180-220
6. Maize grain	18-20
7. Lucerne	16-20
8. Onion	12-16
9. Tomato	0.5-3.0
10 Melons	4-5
11 Vegetables	6
12. Potato	2800-3500
13. Cabbage	0.5-2.5

Source: Ministry of Agriculture and Water Resources, Uzbekistan

In recent years, the standard of management in seed production has fallen, and very often farms are getting seed of poor viability and genetic purity, contributing to declining yields. Seed rates are very often above the level of the norms thereby raising the variable cost, directly through the extra cost of seed, and indirectly through use of extra labour for thinning. Tables 10.2 and 10.3 compare the actual rates used for cotton and wheat with the normative rates. There is no big deviation from normative rates for winter wheat, but for cotton it is higher than normative in all republics. Especially high fuzzy cotton seed rates are observed in Uzbekistan, Tadjikistan and Kyrgyzstan.

Possible reasons for exceeding recommended seed rates for cotton might be as follows:

- low germination percentage and crop establishment due to poor quality of seeds and unfavourable weather conditions
- lack of precision seed drills for the desirable plant population
- hidden consumption on farms of untreated cotton seeds for cattle feeding or manual oil extraction.

Table 10.2 Actual Cotton Seed Rates Compared with Norms (kg/ha)

Year	Indices	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
				Delinted Seed			
	Actual rate	31			26	27	28
	Recommended norm	25	25	25	25	25	25
1996	% of recommended norm	124			105	109	113
				Fuzzy Seed			
	Actual rate		114	99	105	78	99
	Recommended norm	60	60	60	60	60	60
	% of Recommended Norm		189	166	175	130	165
				Delinted Seed			
	Actual rate	32				31	32
	Recommended norm	25	25	25	25	25	25
1997	% of recommended norm	130				125	127
				Fuzzy Seed			
	Actual rate		133	104	92	97	107
	Recommended norm	60	60	60	60	60	60
	% of recommended norm		222	174	154	162	178
				Delinted Seed			
	Actual rate	28			35	29	31
	Recommended norm	25	25	25	25	25	25
1998	% of recommended norm	112			140	116	123
				Fuzzy Seed			
	Actual rate		132	90	84	98	101
	Recommended norm	60	60	60	60	60	60
	% of recommended norm		220	150	139	162	168

Table 10.3 Actual Winter Wheat Seed Rates Compares with Norms (kg/ha)

Year	Indices	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
	Actual rate	200	201	133		215	187
1996	Recommended norm	180	200	200	200	200	196
	% of recommended norm	111	101	67		108	96
	Actual rate	184	226	175	203	228	203
1997	Recommended norm	180	200	200	200	200	196
	% of recommended norm	102	113	87	101	114	104
	Actual rate	200	244		206	233	221
1998	Recommended norm	180	200	200	200	200	196
	% of recommended norm	111	122		103	116	113

10.2 Fertilisers

Good crop yields are very dependent on a high level of soil fertility, which in turn depends on the standard of management and the application of mineral fertilisers to supplement soil reserves where these are deficient. Much research in the past has determined the rates of fertiliser nitrogen, phosphorus and potassium to achieve maximum crop yields on different soil types. Efficiency of fertiliser use depends on the time of application, the nutrient content of the fertiliser and level of soil fertility.

Comparison between the actual rates of fertiliser used and the corresponding normative rates for cotton and wheat is made in Tables 10.4 and 10.5.

Table 10.4 Actual Fertiliser Rates Compared with Norms for Cotton

Year	Indices	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996	**Nitrogen (kg N/ha)**						
	Actual rate	27	69	94	64	129	77
	Recommended norm	220	220	210	220	230	220
	% of recommended norm	12	31	45	29	56	35
	Phosphorus (kg P/ha)						
	Actual rate	1	0	0	0	14	3
	Recommended norm	68	68	68	68	68	68
	% of recommended norm	2	0	0	0	20	4
	Potassium (kg K/ha)						
	Actual rate	0	0	0	0	1	0
	Recommended norm	17	17	19	19	17	18
	% of recommended norm	0	0	0	0	5	1
1997	**Nitrogen (kg N/ha)**						
	Actual rate	49	96	83	62	157	89
	Recommended norm	220	220	210	220	230	220
	% of recommended norm	22	44	39	28	68	41
	Phosphorus (kg P/ha)						
	Actual rate	4	0	4	0	19	5
	Recommended norm	68	68	68	68	68	68
	% of recommended norm	6	0	6	0	28	8
	Potassium (kg K/ha)						
	Actual rate	0	0	0	0	7	1
	Recommended norm	17	17	19	19	17	18
	% of recommended norm	0	0	0	0	39	7
1998	**Nitrogen (kg N/ha)**						
	Actual rate	58	72	144	175	162	122
	Recommended norm	220	220	210	220	230	220
	% of recommended norm	27	33	68	80	70	56
	Phosphorus (kg P/ha)						
	Actual rate	0	0	5	0	17	4
	Recommended norm	68	68	68	68	68	68
	% of recommended norm	0	0	8	0	25	6
	Potassium (kg K/ha)						
	Actual rate	0	0	19	0	6	5
	Recommended norm	17	17	19	19	17	18
	% of recommended norm	0	0	101	0	36	28

Table 10.5 Actual Fertiliser Rates Compared with Norms for Winter Wheat

Year	Indices	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996	**Nitrogen (kg N/ha)**						
	Actual rate		64	46	75	58	61
	Recommended norm	150	150	150	150	150	150
	% of recommended norm	0	43	31	50	39	40
	Phosphorus (kg P/ha)						
	Actual rate		0	0	0	16	4
	Recommended norm	45	44	44	44	44	44
	% of recommended norm	0	0	0	0	37	9
	Potassium (kg K/ha)						
	Actual rate		0	0	0	1	0
	Recommended norm	10	10	10	10	10	10
	% of recommended norm	0	0	0	0	7	2
1997	**Nitrogen (kg N/ha)**						
	Actual rate	65	111	66	91	101	87
	Recommended norm	150	150	150	150	150	150
	% of recommended norm	43	74	44	61	67	58
	Phosphorus (kg P/ha)						
	Actual rate	29	0	0	0	31	12
	Recommended norm	45	44	44	44	44	44
	% of recommended norm	64	0	0	0	70	27
	Potassium (kg K/ha)						
	Actual rate	0	0	0	0	3	1
	Recommended norm	10	10	10	10	10	10
	% of recommended norm	0	0	0	0	29	6
1998	**Nitrogen (kg N/ha)**						
	Actual rate		88		98	145	110
	Recommended norm	150	150	150	150	150	150
	% of recommended norm	0	59	0	66	96	74
	Phosphorus (kg P/ha)						
	Actual rate		0		0	36	12
	Recommended norm	45	44	44	44	44	44
	% of recommended norm	0	0	0	0	83	27
	Potassium (kg K/ha)						
	Actual rate		0		0	0	0
	Recommended norm	10	10	10	10	10	10
	% of recommended norm	0	0	0	0	0	0

Nitrogen is the nutrient absorbed in greatest quantity from the soil by the crop for its development, and it is appropriate that it should receive priority for its application as fertiliser. For cotton and wheat, about 40 and 50 percent respectively of the normative rates are being provided, most in Uzbekistan and least in Kazakhstan. By international standards for cotton, particularly at current yield levels in Central Asia, the normative rates are very high and the actual rates are much closer to international rates. The norms for wheat are closer to international values but only for much greater yield expectations. Therefore, based on current yield achievement, local norms would also be considered too high, so that the overall average rates applied to wheat may be about at the financially optimum level. However, rates in Kazakhstan and Tadjikistan, where they are so much lower than the other republics, probably are so low as to be limiting yield.

It should be noted that there is a distinct trend towards increase of fertilisers application in CAR. For example, only 35 percent of recommended norm of nitrogen was applied for cotton in 1996, that of in 1997 and in 1998 was 41 percent and 56 percent respectively. On wheat those figures were 40 percent (1996), 58 percent (1997) and 74 percent (1998).

Phosphorus is by far the most expensive fertiliser nutrient, per kg about double the price of N, and as such its use at heavy rates has to be more carefully justified. The normative rates for both cotton and wheat would be impossible to justify at current yield levels so that it is not

surprising that this fertiliser is being given little priority. It is estimated that average actual rates are only 7 and 26 percent of the norms for cotton and wheat respectively, with Uzbekistan average rates considerably greater than the other republics. No P fertiliser was applied in Kyrgyzstan and Turkmenistan and very little was used in Kazakhstan and Tadjikistan. Section 14 discusses the data on soil analysis and concludes that there is some evidence that soil reserves of P, once abnormally high, may be declining as crops deplete reserves. Of the 1997 soil samples, 18 percent were recorded as being in the "low" class on available P with a response to fertiliser P being very likely in most crops.

Soils of Central Asia are naturally rich in potassium and low normative rates reflect this. However, Section 14 provides some evidence that high levels of soil K may be more the consequence of secondary salinity from the groundwater enriching the topsoil than that soil reserve is intrinsically high. Cotton and potatoes are "gross feeders" of potassium, and care is necessary with these crops that soil deficiency should not become the factor limiting yield. Almost no potassium fertiliser has been used in the area for several years, and it was only on two farms in Uzbekistan in 1997 and in Tadjikistan in 1998 that some was recorded as being applied for cotton.

10.3 Machinery

In Uzbekistan before 1991 there was a policy of heavy mechanisation of crop production, particularly in the "new lands" where resettlement was taking place and labour was in a short supply. This is reflected in the very heavy rates of machinery in the norms for crop production. Since then, financial constraints have prevented farms maintaining normative levels of machinery use. Actual rates used in cotton and wheat are compared with the norms in Tables 10.6 and 10.7.

Table 10.6 Actual Machinery Rates Compared with Norms for Cotton (h/ha)

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996	Actual rate	15.4	21.9	20.7	22.9	19.6	20.1
	Recommended norm	53.0	53.0	53.0	53.0	53.0	53.0
	% of recommended norm	29.0	41.2	39.0	43.2	37.0	37.9
1997	Actual rate	17.3	20.5	15.9	27.7	22.8	20.8
	Recommended norm	53.0	53.0	53.0	53.0	53.0	53.0
	% of recommended norm	32.6	38.6	30.0	52.3	43.0	39.3
1998	Actual rate	16.5	11.4	35.5	23.3	19.0	21.1
	Recommended norm	53.0	53.0	53.0	53.0	53.0	53.0
	% of recommended norm	31.1	21.5	67.0	44.0	35.8	39.9

Table 10.7 Actual Machinery Rates Compared with Norms for Wheat (h/ha)

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996	Actual rate	2.9	2.7	5.2	4.2	4.9	4.0
	Recommended norm	30.0	30.0	30.0	30.0	30.0	30.0
	% of recommended norm	9.8	8.9	17.4	14.1	16.2	13.3
1997	Actual rate	7.9	8.6	8.7	9.5	9.0	8.8
	Recommended norm	30.0	30.0	30.0	30.0	30.0	30.0
	% of recommended norm	26.5	28.8	29.0	31.8	30.1	29.2
1998	Actual rate	4.3	7.7		8.8	8.9	7.4
	Recommended norm	30.0	30.0	30.0	30.0	30.0	30.0
	% of recommended norm	14.3	25.7	0.0	29.4	29.7	24.8

The overall mean use of machinery is about 40 and 25 percent of the norms for cotton and wheat respectively and there is not much variation between farms and republics. These data show the sharp decrease of machinery use on crop production. The reasons of this decrease are as follows:

- deterioration of agricultural machinery during period 1991-1998 and lack of capital for purchase of new machinery
- lack of capital for purchase of spare parts and maintenance
- irregular supply of fuel and lubricants or lack of cash to purchase them.

10.4 Labour

The shortage of machinery has placed greater pressure on the labour resources but due to the lack of cash to pay wages, labour has not always been willing to respond to this demand. This is apparent when the actual labour use is compared with the norms, as in Tables 10.8 and 10.9.

Table 10.8 Actual Labour Rates Compared with Norms for Cotton (mandays/ha)

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996	Actual rate	32.9	75.9	129.8	68.8	67.4	75.0
	Recommended norm	121.0	121.0	121.0	121.0	121.0	121.0
	% of recommended norm	27.2	62.7	107.3	56.9	55.7	62.0
1997	Actual rate	23.9	225.0	56.9	132.5	59.7	99.6
	Recommended norm	121.0	121.0	121.0	121.0	121.0	121.0
	% of recommended norm	19.8	185.9	47.0	109.5	49.4	82.3
1998	Actual rate	28.1	146.4	178.7	163.5	84.0	120.1
	Recommended norm	121.0	121.0	121.0	121.0	121.0	121.0
	% of recommended norm	23.2	121.0	147.7	135.1	69.4	99.3

The pattern by republics is very variable. In Kyrgyzstan, the fragmentation and privatisation of land took place earlier and more completely than in the other republics. Loss of common machinery resources coupled with the personal incentives arising out of land ownership have had a marked impact on the consumption of labour for cotton production, and actual use is almost double the local norm. The average for Kyrgyzstan is at the top end of the range in labour requirement for non-mechanised cotton production of 120-140 mandays/ha from international experience, but it is in line with yield expectation. However, only one third of labour was used for harvesting, rather than half, as would be expected. For example in Uzbekistan actual use of labour on cotton is 49-69 percent of recommended norms, that of in Kazakhstan is even less, from 19 to 27 percent. This is very likely related with low labour wages in these republics.

Table 10.9 Actual Labour Rates Compared with Norms for Wheat (mandays/ha)

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996	Actual rate		4.1	4.9	3.1	5.2	4.3
	Recommended norm	13.0	13.0	13.0	13.0	13.0	13.0
	% of recommended norm	0.0	31.5	38.0	23.5	40.0	33.3
1997	Actual rate	1.7	6.6	28.6	6.4	11.0	10.9
	Recommended norm	13.0	13.0	13.0	13.0	13.0	13.0
	% of recommended norm	13.2	50.8	220.3	49.2	84.3	83.6
1998	Actual rate	0.2	4.3		5.1	8.0	4.4
	Recommended norm	13.0	13.0	13.0	13.0	13.0	13.0
	% of recommended norm	1.6	32.8		39.4	61.5	33.8

Although most farms are using less than half the normative amount of machinery for producing wheat, labour use also is mostly less than half the norms. By international standards, the local norms for both machinery and labour use in wheat are excessively high. For example, the UK average wheat yield is about 8t/ha but uses only about 8-10h/ha of

machinery and only 15 manhours of labour. This machinery use is much the same as is currently used in Central Asia, about 30 percent of local norms, but the labour use is much less at only about 15 percent of local norms. This is clear evidence, that local norms are unrealistic and that financial circumstances have forced farms to reappraise their investment needs in machinery and labour use.

10.5 Agrochemicals

Before 1992, a wide range of different chemicals was available in Central Asia and in some cases, they were applied to crops at excessive rates, causing harm to the environment and human health. The WUFMAS programme has recorded current usage as accurately as possible by the proprietary name of the product, its formulation and the rate applied. These data show that there has been a sharp reduction of application rates during recent years. Comparison between actual rates used and norms is summarised in Tables 10.10 and 10.11.

The normative values shown are only nominal, as actual rates depend on the levels of weed competition and damage caused by pests and diseases. Quite high quantities of insecticides were used on cotton (the average by region in 1996 was 85 percent of norm, that of in 1997 and 1998 was 68 percent and 37 percent respectively), however, it should be admitted that in Turkmenistan and Uzbekistan these were not high.

No herbicides were recorded as being used on cotton in 1996 –1997 even though the norms recommended their use in all republics. Low use of defoliants on cotton was recorded in Tadjikistan and Turkmenistan, suggesting that high labour rates will be used for harvesting. Practically no biological control is used in Kyrgyzstan and Tadjikistan.

In all republics actual use of agrochemicals on winter wheat was low as compared with norms. The main reason is probably the lack of finance to buy chemicals and equipment for their application and poor assortment of chemicals available on local market.

Table 10.10 Actual Agrochemical and Biological Control Rates Compared with Norms for Cotton

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996				**Insecticide (kg/ha)**			
	Norm	2.0	2.0	2.0	2.0	2.0	2.0
	Actual rate	2.70	3.10	1.63	0.10	0.06	1.72
	% of norm	135.1	155.0	81.4	5.2	3.1	85.9
				Gabrobrachon (units/ha)			
	Norm	500.0	500.0	500.0	500.0	500.0	500.0
	Actual rate	184.0	0.0	0.0	0.0	0.0	36.8
	% of norm	36.8	0.0	0.0	0.0	0.0	7.4
				Trichogramma (g/ha)			
	Norm	1.0	1.0	1.0	1.0	1.0	1.0
	Actual rate	0.79	0.00	0.00	0.00	0.00	0.16
	% of norm	79.05	0.00	0.00	0.00	0.00	15.80
				Defoliant (kg/ha)			
	Norm	8.0	8.0	8.0	8.0	8.0	8.0
	Actual rate	2.18	7.96	0.00	0.87	3.77	2.95
	% of norm	27.19	99.50	0.00	10.90	47.10	36.90
				Herbicide (kg/ha)			
	Norm	3.0	3.0	3.0	3.0	3.0	3.0
	Actual rate	0.0	0.0	0.0	0.0	0.0	0.0
	% of norm	0.0	0.0	0.0	0.0	0.0	0.0
				Fungicide (kg/ha)			
	Norm	1.5	1.5	1.5	1.5	1.5	1.5
	Actual rate	0.00	0.00	0.00	0.00	1.65	0.33
	% of norm	0.0	0.0	0.0	0.0	110.0	22.0
1997				**Insecticide (kg/ha)**			
	Norm	2.0	2.0	2.0	2.0	2.0	2.0
	Actual rate	0.24	5.10	1.40	0.00	0.07	1.36
	% of norm	12.0	255.0	70.0	0.0	3.5	68.1
				Gabrobrachon (units/ha)			
	Norm	500.0	500.0	500.0	500.0	500.0	500.0
	Actual rate	307.36	0.00	0.00	0.00	10.00	63.47
	% of norm	61.47	0.00	0.00	0.00	2.00	12.70
				Trichogramma (g/ha)			
	Norm	1.0	1.0	1.0	1.0	1.0	1.0
	Actual rate	0.98	0.00	0.00	0.00	0.03	0.20
	% of norm	98.11	0.00	0.00	0.00	3.30	20.30
				Defoliant (kg/ha)			
	Norm	8.0	8.0	8.0	8.0	8.0	8.0
	Actual rate	12.63	6.74	0.00	0.00	2.20	4.31
	% of norm	157.83	84.30	0.00	0.00	27.50	53.90
				Herbicide (kg/ha)			
	Norm	3.0	3.0	3.0	3.0	3.0	3.0
	Actual rate	0.0	0.0	0.0	0.0	0.0	0.0
	% of norm	0.0	0.0	0.0	0.0	0.0	0.0
				Fungicide (kg/ha)			
	Norm	1.5	1.5	1.5	1.5	1.5	1.5
	Actual rate	0.00	1.68	0.00	0.00	0.00	0.34
	% of norm	0.0	112.2	0.0	0.0	0.0	22.4

Table 10.10 Continued…

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1998				**Insecticide (kg/ha)**			
	Norm	2.0	2.0	2.0	2.0	2.0	2.0
	Actual rate	0.29	2.23	0.72	0.00	0.44	0.74
	% of norm	14.7	111.5	35.8	0.0	21.8	36.8
				Gabrobrachon (units/ha)			
	Norm	500.0	500.0	500.0	500.0	500.0	500.0
	Actual rate	470.67	0.00	0.00	0.00	0.00	94.13
	% of norm	94.1	0.0	0.0	0.0	0.0	18.8
				Trichogramma (g/ha)			
	Norm	1.0	1.0	1.0	1.0	1.0	1.0
	Actual rate	0.00	0.00	0.00	0.00	0.71	0.14
	% of norm	0.0	0.0	0.0	0.0	71.4	14.3
				Defoliant (kg/ha)			
	Norm	8.0	8.0	8.0	8.0	8.0	8.0
	Actual rate	7.02	9.87	0.23	0.00	4.07	4.24
	% of norm	87.7	123.4	2.8	0.0	50.9	53.0
				Herbicide (kg/ha)			
	Norm	3.0	3.0	3.0	3.0	3.0	3.0
	Actual rate	0.09	0.00	0.28	0.00	0.00	0.07
	% of norm	3.2	0.0	9.3	0.0	0.0	2.5
				Fungicide (kg/ha)			
	Norm	1.5	1.5	1.5	1.5	1.5	1.5
	Actual rate	0.00	0.00	0.17	0.00	0.00	0.03
	% of norm	0.0	0.0	11.1	0.0	0.0	2.2

Table 10.11 Actual Agrochemical and Biological Control Rates Compared with Norms for Wheat

Year	Rate	Kazakhstan	Kyrgyzstan	Tadjikistan	Turkmenistan	Uzbekistan	Overall
1996				**Herbicide (kg/ha)**			
	Norm	3.00	3.00	3.00	3.00	3.00	3.00
	Actual rate	0.00	0.00	0.00	0.00	0.00	0.00
	% of norm		0.00	0.00			0.00
				Insecticide (kg/ha)			
	Norm	2.00	2.00	2.00	2.00	2.00	2.00
	Actual rate	0.00	0.00	0.00	0.00	0.00	0.00
	% of norm	0.00	0.00	0.00	0.00	0.00	0.00
				Fungicide (kg/ha)			
	Norm	2.00	2.00	2.00	2.00	2.00	2.00
	Actual rate	0.00	0.00	0.20	0.00	0.00	0.04
	% of norm	0.00	0.00	10.00	0.00	0.00	2.00
1997				**Herbicide (kg/ha)**			
	Norm	3.00	3.00	3.00	3.00	3.00	3.00
	Actual rate	0.00	0.38	0.00	0.00	0.03	0.08
	% of norm	0.00	12.50	0.00	0.00	1.00	2.70
				Insecticide (kg/ha)			
	Norm	2.00	2.00	2.00	2.00	2.00	2.00
	Actual rate	0.00	0.20	0.00	0.60	0.00	0.16
	% of norm	0.00	9.91	0.00	30.00	0.00	7.98
				Fungicide (kg/ha)			
	Norm	2.00	2.00	2.00	2.00	2.00	2.00
	Actual rate	0.00	0.28	0.00	0.00	0.14	0.08
	% of norm	0.00	14.09	0.00	0.00	6.79	4.18
1998				**Herbicide (kg/ha)**			
	Norm	3.00	3.00	3.00	3.00	3.00	3.00
	Actual rate	0.00	0.00	0.00	0.00	1.52	0.30
	% of norm	0.00	0.00	0.00	0.00	50.67	10.13
				Insecticide (kg/ha)			
	Norm	2.00	2.00	2.00	2.00	2.00	2.00
	Actual rate	0.00	0.00	0.00	0.00	0.00	0.00
	% of norm	0.00	0.00	0.00	0.00	0.00	0.00
				Fungicide (kg/ha)			
	Norm	2.00	2.00	2.00	2.00	2.00	2.00
	Actual rate	0.00	0.00	0.00	0.00	0.00	0.00
	% of norm	0.00	0.00	0.00	0.00	0.00	0.00