

### **4.3. Approximate estimation of economic effectiveness of water saving irrigation methods, as compared with furrow irrigation**

Expediency of capital-intensive/power-consuming methods for cotton irrigation improvement, such as sprinkler, drip and subsoil irrigation, is estimated through comparison of operation costs with costs of furrow irrigation.

Calculation (estimation) of annual operation costs of water saving irrigation methods in comparison with existing in given zone furrow irrigation is done by formula:

$$3 = (K/T) + \mathfrak{D}_3 + (C_b * M_{6p})$$

Initial data used in calculation are given in Appendix 4.6 ( $M_{6p}$  values) and in table 4.9.

Approximate comparative estimation (in prices of 1984) showed the following (fig. 4.22 and 4.23):

Annual operation costs of subsoil irrigation are 40-45% higher than those of furrow irrigation. Annual operation costs of sprinkler irrigation are 16% higher than those of furrow irrigation. Best results were obtained for drip irrigation. Annual operation costs of drip irrigation are 27% lower than those of furrow irrigation.

Table 4.8

## Comparative characteristics of cotton sprinkler irrigation systems

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Water allowance region	Machine type	Width of scope	Moisture regime	Irrigation depth	Number of irrigations	Irrigation duration	Irrigation interval	Discharge
					[m]	[part HB]	[m <sup>3</sup> /ha]	[irrigation]	[hour /ha]	[day]	[l/hour]
12.Узб(Дожд)	Ц-I-B	Б-V	VI	Frontal machine ДДА 100	110	0.7 HB	700-900	3	1.85-2.4	17-28	80
				ДДА-100 МА	120						130
11.Узб(Дожд)	Ц-II-B	Б-III	II	Frontal machine «Kuban»	778	0.755 HB	410-690	3-4	0.35-0.85	17-28	170
18.Узб(Дожд)	Ц-II-B	Б-III	III	Long stream machine ДДФ	100-110	0.63-0.78 HB	550-1150	6-7	5-11	15-20	30

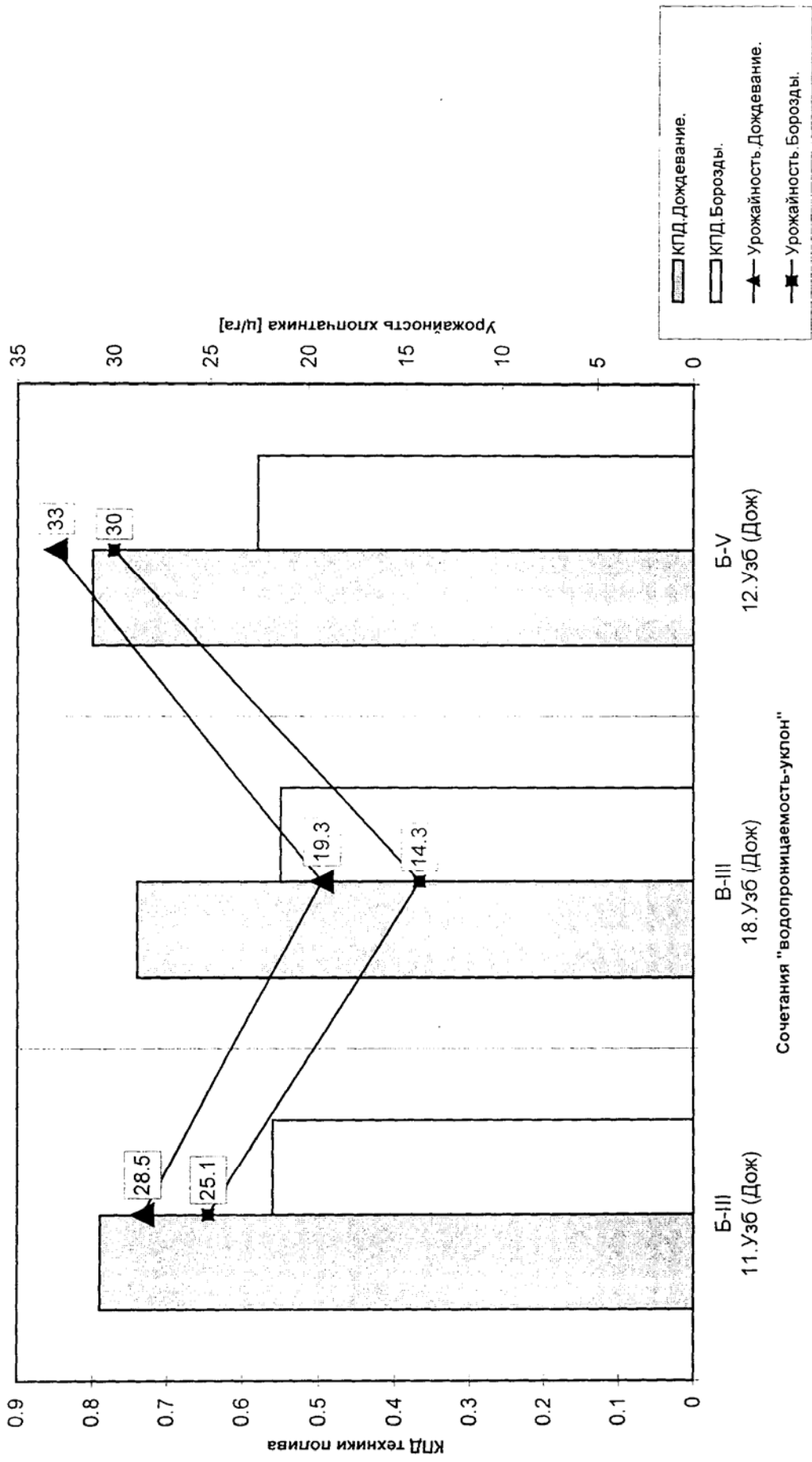


Рис. 4.21. КПД техники полива хлопчатника дождеванием в сопоставлении с орошением по бороздам

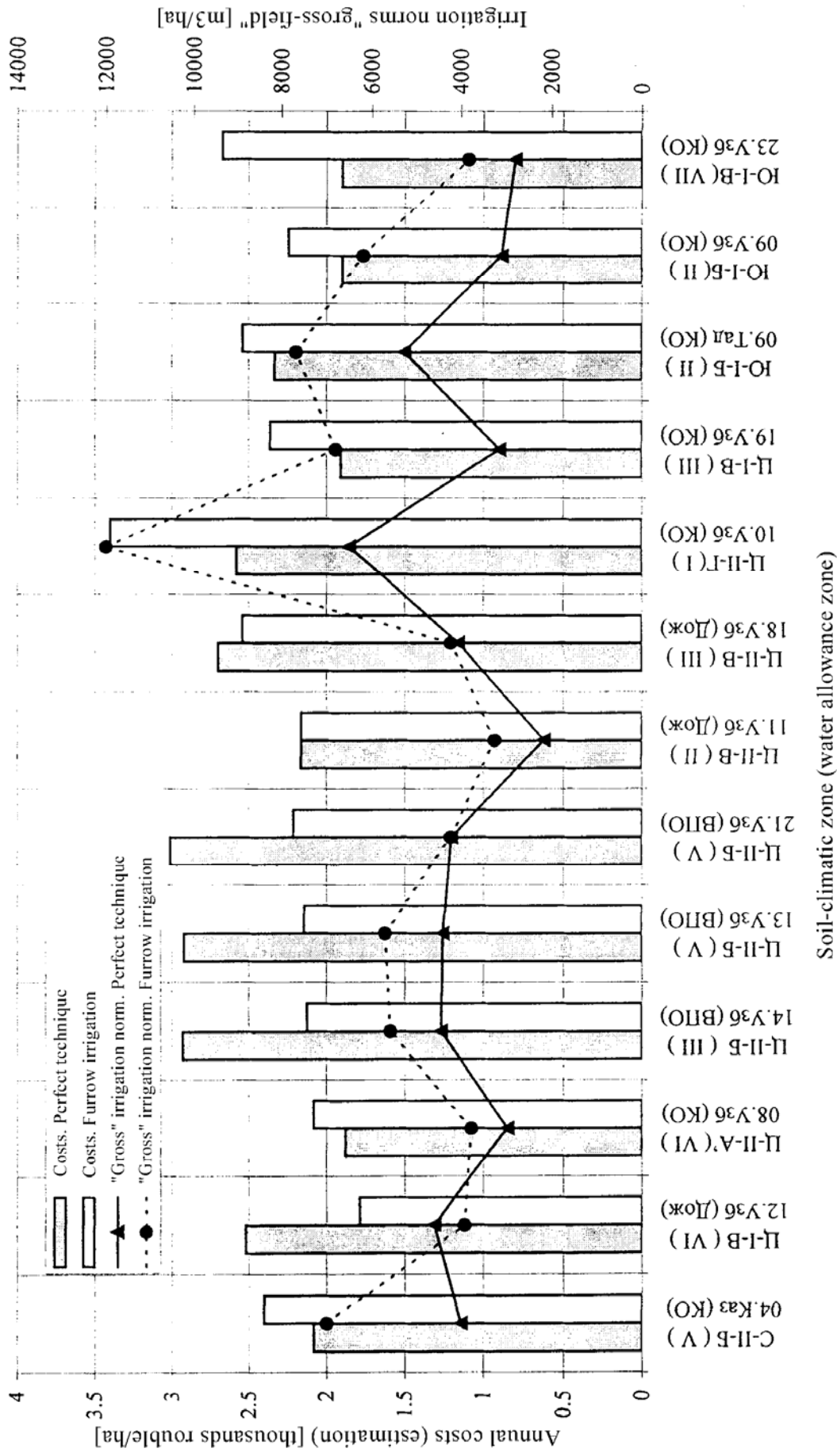
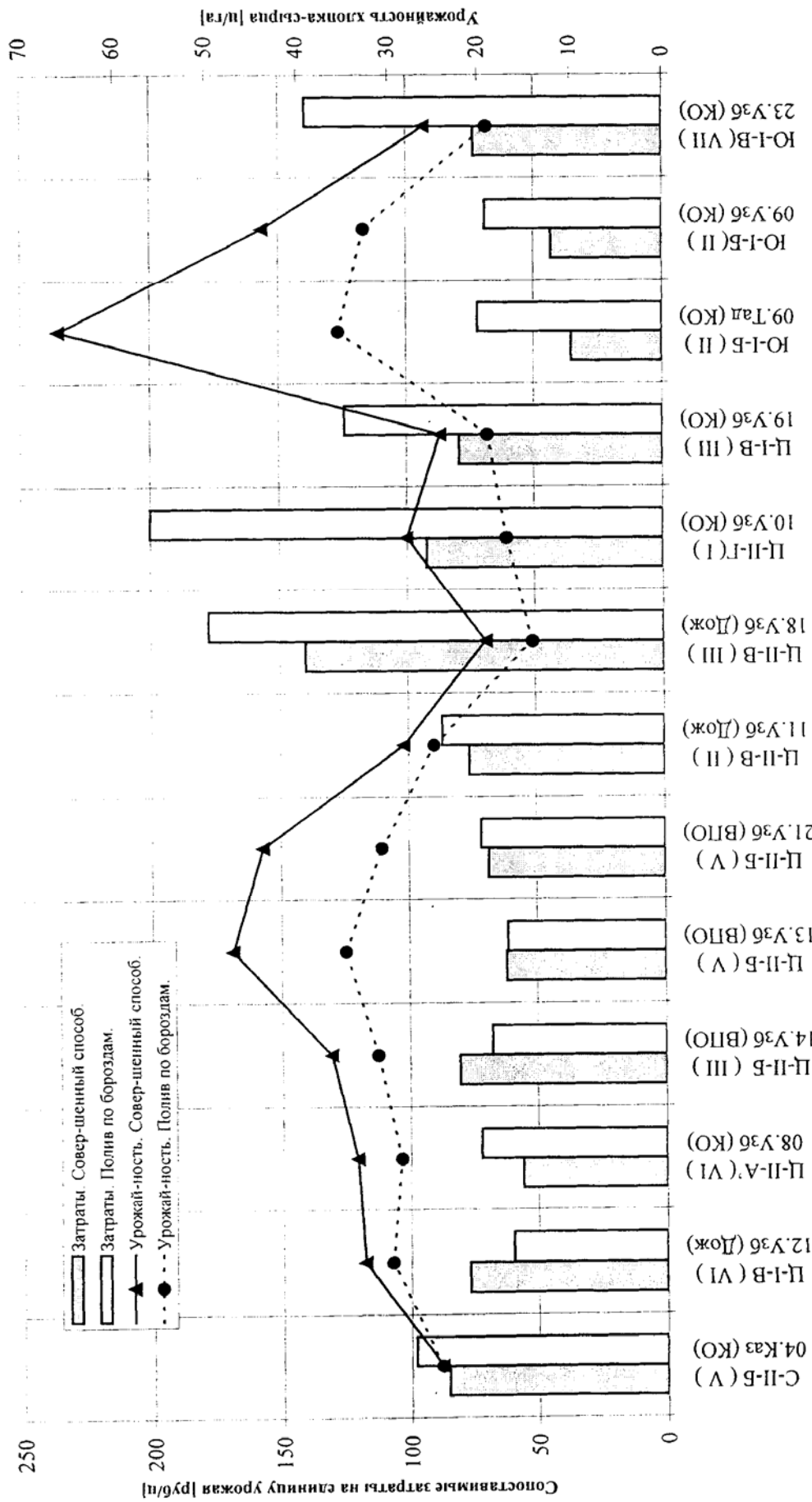


Fig. 4.22. Annual costs (estimation) of cotton irrigation using perfect technique compared to furrow irrigation



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Рис.4.23.. Сопоставимые (приведенные затраты) при орошении хлопчатника совершенными способами полива в сопоставлении с поливом по бороздам

Table 4.9.

Estimation of comparable costs is based on ratio of annual operation costs to crop productivity achieved.

NN	Type of irrigation system	Specific capital investments	Operation costs	Standard operation period	Specific cost of irrigation water
		K [rouble/ha]	Y [rouble/ha]	T [years]	C[roubles/m <sup>3</sup> ]
1	Furrow irrigation from temporary ditches, on-farm network laid in earthen channel	1060	960	25	0.210
2	Drip irrigation	6690	1000	25	0.20
3	Subsoil irrigation	6690	1370	10	0.20
4	Mobile sprinklers	3400	1180	8	0.20