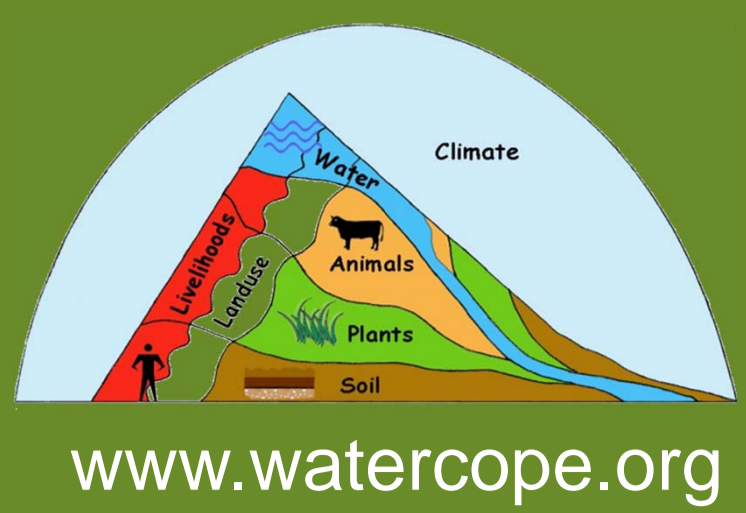


Water Use Efficiency of Different Crops in Qinghe

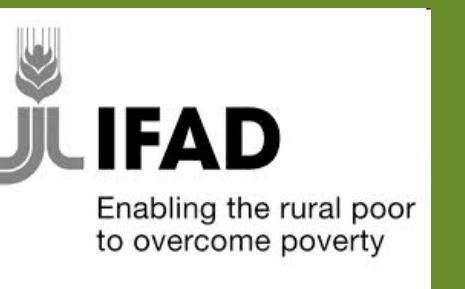
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Introduction and Objectives

The Qinghe watershed is located in the inland arid regions of Northwest China. Wheat, seabuckthorn, alfalfa, hey, potato, greenhouse (mushroom), watermelon, and sunflower were planted in Qinghe irrigation area. Our aims is to study the water use efficiency (WUE) and respective income possibilities of different crops. It will provide basic material and the scientific foundation to recommend the most suitable crops and irrigation techniques.



Figure 1. Different crops in Qinghe

Results

- Different crop has different irrigation quota, irrigation quota of wheat and alfalfa were higher.
- Costs for drip irrigation were higher than for conventional irrigation; compared with conventional irrigation modes, WUEs of crops were increased in drip irrigation, wheat increased from 3.8 to 5.2 ¥/(mm·ha), and potato from 18.0 to 33.1¥/(mm·ha).
- Greenhouse (mushroom), watermelon, potato, sunflower and seabuckthorn had high income and WUEs, but wheat was the main crop in Qinghe, though its income and WUE is the lowest.

Table 1. Basic parameters of assessed crop species

Crop	Irrigation mode ^a	Irrigation quota (mm)	Cost (¥/ha)	Yield (kg/ha)	Price (¥/kg)	Income (T,¥/ha)	Income (¥/ha)	WUE (¥/(mm·ha))
Wheat	1	1650	9705	5700	2.8	15960	6255	3.8
Seabuckthorn	1	675	9030	3150	6	18900	9870	14.6
Alfalfa	1	900	1800	7500	1.5	11250	9450	10.5
Hay	1	750	1350	4500	1.2	5400	4050	5.4
Potato	1	750	16500	37500	0.8	30000	13500	18.0
Greenhouse	2	450	60000	6000	25	150000	90000	200.0
Wheat (d)	2	954	10125	5400	2.8	15120	4995	5.2
Potato (d)	2	489	17400	42000	0.8	33600	26268	33.1
Watermelon	2	232	12150	1650	16	26400	22925	61.5
Sunflower	2	576	14025	3300	8	26400	17768	21.5

^a Irrigation mode: 1 = Conventional irrigation, 2 = drip irrigation

Materials and Methods

- Irrigation information from questionnaires, official irrigation records, and internal measurements were collected
- Yields, amounts of irrigation, costs (seeds, fertilizers, pesticides, manures, laborers) and marketable yields of the prevalent crops (wheat, seabuckthorn, alfalfa, hey, potato, greenhouse (mushroom), watermelon, and sunflower) were recorded

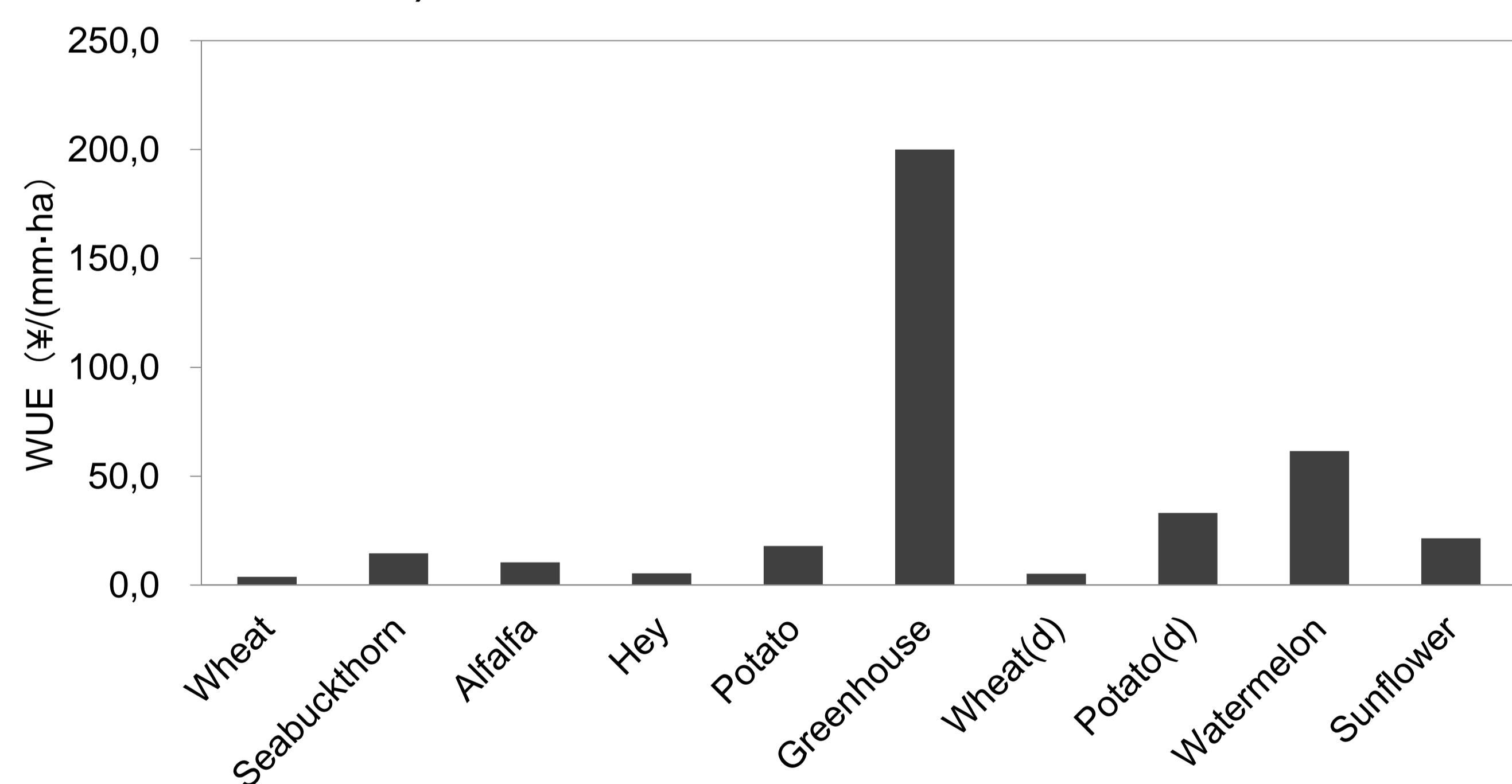


Figure 2. WUE of selected crops

Conclusions

The different cultivations led to different water use efficiencies which led to very different economic returns per unit land and water. In order to increase the economic and ecological benefits, it is necessary to optimize the planting structure. For instance potato and watermelon planting should be increased while wheat planting should be decreased.

