

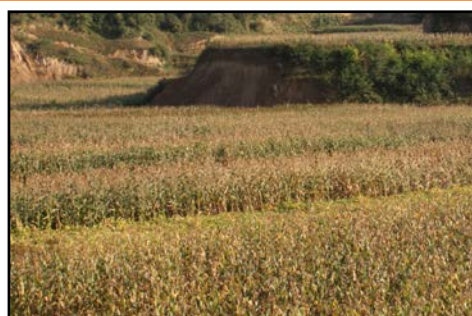


## 12 CHINA – KELAIGOU: CHECKDAM AND TERRACES

On the Loess plateau area in the Yan river basin in China, severe soil erosion is common. This results in deep gully and badland formation on the steeper slopes. To rehabilitate gullies, check dams have been constructed. These limit runoff and sediment delivery downstream and increase water availability for maize. The slopes can be stabilized with terrace constructions. Because of annual rainfall fluctuates between 400 and 1100 mm (average 560 mm), water can be a limiting factor in this region. Soil water conditions are monitored and compared to crops on the slopes, as well as runoff and erosion under different land uses. The erosion is especially important downstream while the conservation measures are thought to be important on site (because of soil moisture increase).

### THE EXPERIMENT: CHECKDAMS FOR WATER HARVESTING

Check dams were constructed in an area covering 6.27 ha in the Mazhuang watershed, Basota country, Yanhe basin, Yan'an which is located in the Loess plateau (top left photo). In the same catchment 18,2 ha are under bench terraces (middle photo). The experiment is to see the effect of check dams and terraces on soil moisture, soil erosion and surface runoff. This area was compared with sloping cropland (24.5 ha, bottom photo). Surface runoff was assessed with a rainfall simulator with a rain intensity of 55 mm/hr. Data was gathered using 2 rainfall events lasting 30 and 60 minutes.



Variable	2008	2009	2010
Meteo		←→	
Moisture		←→	
Yield		←→	
Erosion		←→	
Input		←→	
Output		←→	

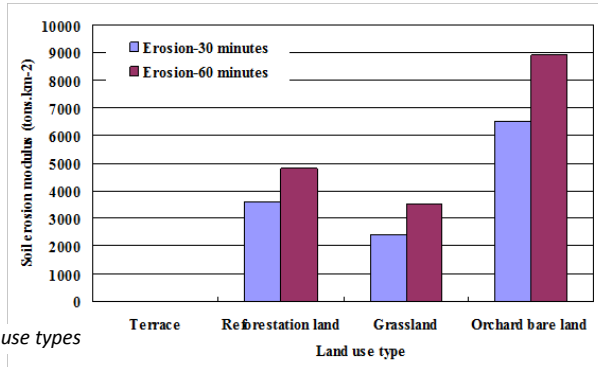


Soil moisture was measured 3 times (before planting field crops in April, mid-august and after harvesting in October). Experiment started in 2009 and data for 2 years are available. The auto weather station was set up in this watershed. The metrological data, soil moisture, yield, soil erosion, input and output of agriculture were monitored.

### RESULTS

The results indicated an increase of soil moisture because the runoff from the up-stream area is detained by the check dams. This also results in minimizing soil losses from the fields. The result is based on 2010. The orchard with a bare soil shows twice as much soil erosion as the experiments under forest and on grass land. Terraces and check dams have of course no runoff because of the flat slope.

Total cost involved in the cultivation in check dam land and on terraces is higher because there is simply more surface to plant (see Table below). But the net income is also higher on the flatter areas because of better yields in all the 3 land use types: the yield of check-dam land, terrace, slope crop land is 7800, 4500, 2400 kg per hectare respectively.



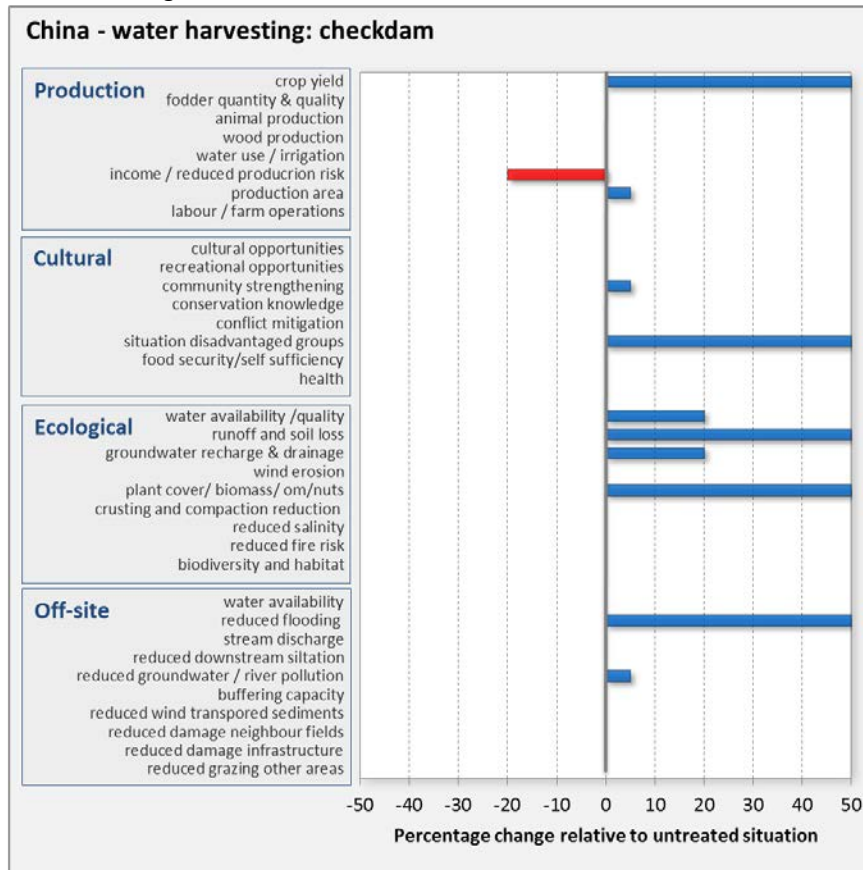
Soil loss in ton/km<sup>2</sup> under various land use types

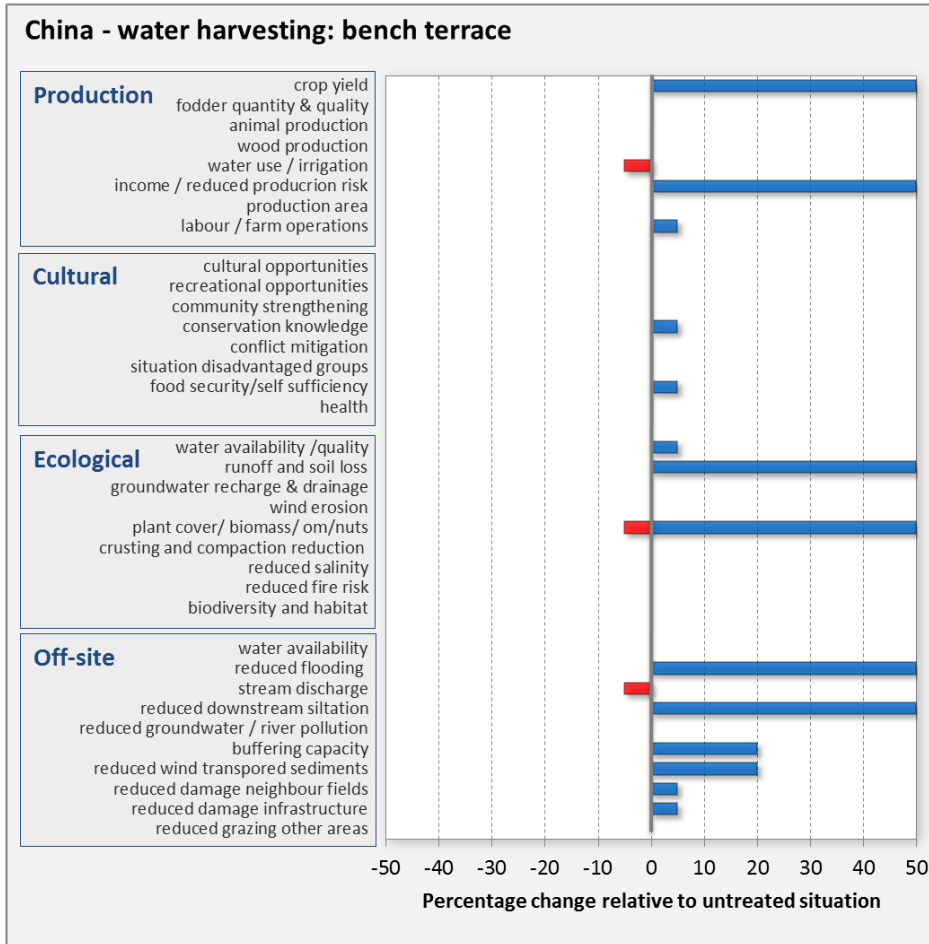
Land use	Seeds	Chemical Materials*	Tillage And planting	Direct input	Labor	Labor cost	Total Input Including Labor	Yield	Value	Net income without labor	Net income with labor
	Yuan	Yuan	Yuan	Yuan	Day	Yuan	Yuan	kg	Yuan	Yuan	Yuan
	a	b	c	d=a+b+c	e	f=e*50**	g=d+f	h	v=h*1.85***	v-d	v-g
<b>Check-dam land</b>	525	4575	525	<b>5625</b>	105	5250	<b>10875</b>	7800	14430	<b>8805</b>	<b>3555</b>
<b>Terrace</b>	420	2700	525	<b>3645</b>	90	4500	<b>8145</b>	4500	8325	<b>4680</b>	<b>180</b>
<b>Slope Crop land</b>	300	1800	525	<b>2625</b>	75	3750	<b>6375</b>	2400	4440	<b>1815</b>	<b>-1935</b>

\* Chemical Materials: fertilizer, pesticides and herbicide; \*\* Price of corn: 1.85 Yuan RMB per kg; \*\*\* Price of labor days: 50 Yuan

## HOW WELL DOES IT WORK?

The results are evaluated from a production, socio-cultural and economic point of view. The bars express the estimated or measured percentage of change with respect to the reference situation. This change can be positive (blue) or negative (red). Note that this evaluation is based on the experiments, on the long term experience of the coordinating team in this area and on consultations with the farmers.





## STAKEHOLDER'S OPINIONS

The stakeholders here include local farmers, village head Soil and Water Conservation Bureau and Agriculture Bureau of Baota County. Farmers have clear planting plans with simple crops such as maize, millets, potatoes and beans. They have a desire to improve the income of the land and they think the soil and water conservation is a very good approach to improve the agricultural conditions (Photo 5). Since the yield of slope land, terrace and check-dam are higher, they would like the local government to invest more to build high quality land.



## CONCLUSIONS

Combatting erosion is possible in many ways and especially interesting to mitigate problems downstream. Measures that drastically improve the onsite circumstances, such as terraces and checkdams are interesting because they create flat land with favourable conditions. This is shown by substantially increased yields. In fact rainfed agriculture with staple food crops on slopes is hardly profitable because of the low yields.

However constructing and maintaining check dams and terraces is expensive. Since Cropland is in short supply (0.1 ha per capita) it is impossible for most people to do this themselves. Therefore they are interested but also regard it as something unobtainable. Many farmers find an income in other types of work such as road and building construction.

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