Weeds and Weed Control Methods in Sudan

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Weeds are one of the major components of the ecosystem. They comprise an essential vegetation cover to protect the soil from wind and running water erosion (Table 1). In Sudan there is more than 80 million ha suitable for growing crops, but only 12% is utilized. The principal crops are sorghum, cotton, groundnut, millet, wheat, sugar cane and vegetables. Weeds are the major constraint to crop production in all cultivated areas in Sudan. Unrestricted weed growth promotes soil degradation in cultivated lands and reduces yield of the main crops by 50-100% (Table 2). *Striga hermonthica* and *Orobanche ramosa* are the most important parasitic weeds on cereals and vegetables, respectively. Losses in grain yield of sorghum (*Sorghum bicolor*) and millet (*Penisetum glaucum*) due to *Striga hermonthica* damage are more than 70% in heavily infested fields. *O. ramosa* threatens tomato and egg plants main production areas in the northern region and along the Nile bank. Aquatic weeds, on the other hand, reduce the efficiency of irrigation canals by hindering water flow and encouraging siltation. The efficacy of the main canal in Rahad Agricultural Scheme has been reduced from 8.5 to 5.5 million m³ of water per day. Many weeds have been reported as alternate hosts for some economically important pests and as poisonous plants to man and animals. A negative allelopathic potential has associated with a number of weeds including *Cyperus rotundus* and *Cynodon dactylon*. Cultural and chemical methods of weed control are in use (Table 3). However the decision to adopt a particular method is determined by socioeconomic factors. Weeds are not always harmful. Evidence has accumulated that some of the weed species such as *Trifolium alexandrinum*, *Rhynchosia memonia*, *Phaseolus trilobus*, *Cassia senna* and *C. occidentalis* induce suicidal germination of *Striga hermonthica*. This may lead to depletion of *Striga hermonthica* seed bank in the soil and consequently reduces the potential damage inflicted by the parasite. Weeds can also help in recycling soil nutrients and the beneficial effect of one season weedy fallow on the following crop was estimated by 45 Kg N/ha. In addition, weeds are used as human food. In some parts of the country wild Okra, wild Jews mallow, *Sonchus corontus* and wild purslane are used as major food sources. Moreover, some weed species such as *Cassia senna* and *Colocynthis vulgaris* are important in traditional medicinal.

Table 1. Runoff and erosion under various tillage treatments (from Young, 1982)

Tillage system	Runoff (mm = 1/m ²)	Erosion (tons/ha)
No - tillage, dead sod on surface	34	8.9
No - tillage, bare soil surface	73	21.8

Table 2. Crop yield losses and the critical period of weed competition for some selected crops

	Crop				
	Cotton	Groundnut	Sorghum	Onion	Coriander
% Crop losses	77-90	80-100	77-84	50-73	50-70
Critical period of Weed competition*	4 -(6-8)	4-8	3-(6-8)	3-8	2-5

* Weeks after planting

Table 3. Weed control methods in different crops and habitats

Weed control methods	Crop or habitat							
	Cotton	Groundnut	Sorghum	Millet	Wheat	Sugar cane	Vegetables	Rivers and Canals
Hand weeding	+++	+++	+++	+++	+	++	+++	++
Herbicides								
- Pre-em.	+++	+	+	-	-	+++	+	n.v
- Post-em.	-	+	+	-	+	+	+	++
Mechanical weeding								
- Heavy duty	++	+	+	-	++	++	++	++
- Inter row cultivator	++	+	-	-	-	+	-	n.v
-Pre-watering (or rain)+ Tillage	+	-	+	-	+++	++	++	n.v
Solarization	-	-	-	-	-	-	- [*]	n.v
Biological control	-	-	- [*]	-	-	- [*]	-	- [*]
Sowing date	-	++	-	-	-	-	-	n.v
Plant density	-	++	-	-	+	-	-	n.v
Crop variety	-	-	+	-	-	-	-	n.v
Crop rotation	-	-	+	-	-	-	-	n.v

Note: +++ intensively practiced; ++ moderately practiced; + occasionally practiced; - not practiced; -^{*} research in progress; n.v not valid