



Research Report

CRP-DS Action site: Aral Sea (Urgench, Khorezm), Irrigated System

Year 2015-2016

Activity title: Integrated land and water productivity improvement in Aral Sea basin

Reporting Center: ICARDA

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Experiment: Evaluation of wheat varieties under different crop rotations and management practices

Objectives:

- a. To determine if improved winter varieties yield significant higher than the local cultivar
- b. To determine if the three wheat varieties perform relatively differently under three irrigation practices and two crop rotations

Methodology

Number of crop rotation: 2

- Wheat-mungbean-Wheat (W-M-W)
- Wheat-fallow-wheat (W-F-W0)

Management practice

- Farmer's practice (FP) – Traditional planting, conventional irrigation
- Traditional (TP) – Raised bed planting, conventional irrigation
- Optimal practice (OP) – Raised bed planting, IRR irrigation scheduling

Number of wheat varieties: 3

- Yaksart (New wheat variety)

- Elomon (New wheat variety)
- Tanya (Variety used by farmers around the experimental site)

Experimental design

- The experiment was planted in a Split-Plot design with management practices (traditional and optimal) as main-plot and three varieties as subplot treatments. The experiment was conducted under W-M-W and W-F-W rotations side-by-side on the same field. One more treatment as farmer’s management practice under the two crop rotation was included in the experiment. Individual plot size was 300 m².
- The experiment was planted in October 2015 and initial data were collected on crop stand and NDVI (normalized difference vegetative index). It has been suggested that NDVI could be used to predict grain yield in cereals (Raun et al. 1999; Wang et al. 2010; Hazratkulova et al., 2014).

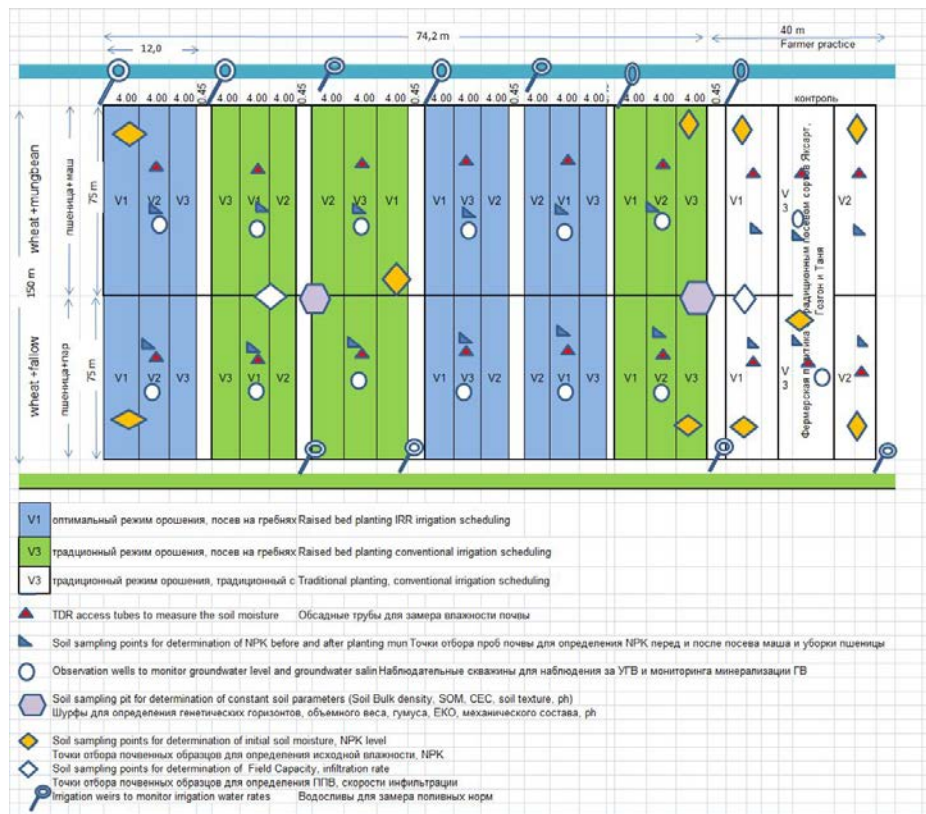


Figure 1. Field lay out of the experiment.

Results

Analysis of variance showed that mean effect of various factors (rotation, management practice, and variety) as well interactions among these factors were non-significant at $P=0.05$ for plant stand and NDVI value (Table 1). The mean plant stand was higher for two new varieties (Yaksart and Elomon) compared to the variety (Tanya) commercially grown by the farmers (Table 2). The results are as expected because difference in management level and crop rotation will be more critical as crop will develop towards advanced growth stages and water and nutrient requirements will increase. Under that condition, a more efficient crop management system will sustain crop growth better than the less efficient system.

Table 1. Analysis of variance table for plant stand and NDVI value at seeding stage in a study of evaluation of wheat varieties, management options and crop rotation in Urgench, Uzbekistan in 2015-2016 wheat growing season

Source of variation	df	Plant stand at seedling stage		NDVI value at seedling stage	
		Mean square	F-Probability	Mean square	F-Probability
Rotation (Rot)	1	1312	>0.10	0.114582	>0.10
Replication/Rot	4	4367		0.050965	
Practice (Prc)	2	3663	>0.10	0.004579	
Prc x Rot	2	581		0.040246	
Error (a)	4	2606		0.002676	
Variety (Var)	2	6212	0.10	0.006414	>0.10
Var x Prc	4	4602	>0.10	0.001002	>0.10
Var x Rot	2	82	>0.10	0.000637	>0.10
Var x Prc x Rot	4	273	>0.10	0.002249	>0.10
Error (b)	16	2377		0.002623	

Table 2. Mean values for plant stand and NDVI value at seedling stage in a study of evaluation of wheat varieties, management options and crop rotation in Urgench, Uzbekistan in 2015-2016 wheat growing season

2015.

Variety	Predicted mean	
	Crop stand	NDVI value
	(m ²)	
Yaksart	300 a†	0.374
Elomon	289 ab	0.336
Tanya	257 b	0.375
LSD _{0.05}	40	0.042

†Means within a column followed by different letters are significantly different based on LSD_{0.05}.

Reference

Raun, W. R., G. V. Johnson, M. L. Stone, J. B. Solie, W. E. Thomason, and E. V. Lukina, 1999: In-season prediction of yield potential in winter wheat. *Better Crops* 83, 24-25.

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