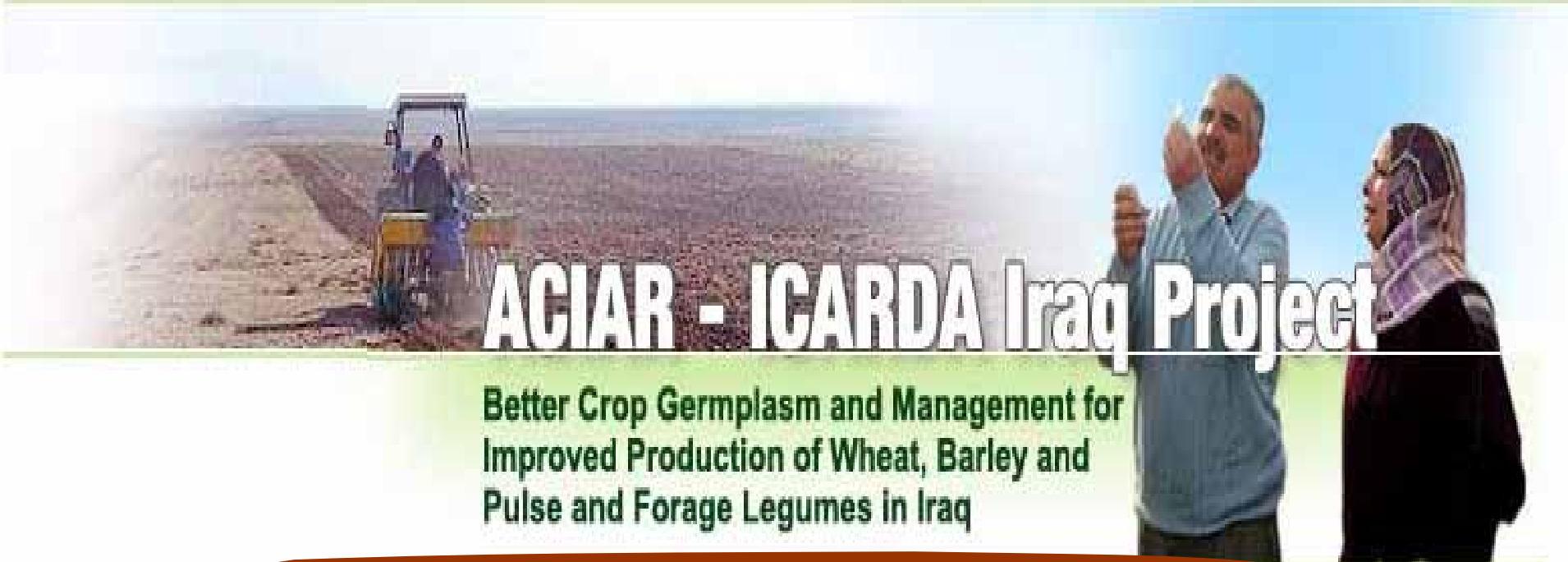




Australian Government  
Australian Centre for  
International Agricultural Research



Department of Agriculture and Food  
Government of Western Australia



# ACIAR - ICARDA Iraq Project

Better Crop Germplasm and Management for  
Improved Production of Wheat, Barley and  
Pulse and Forage Legumes in Iraq

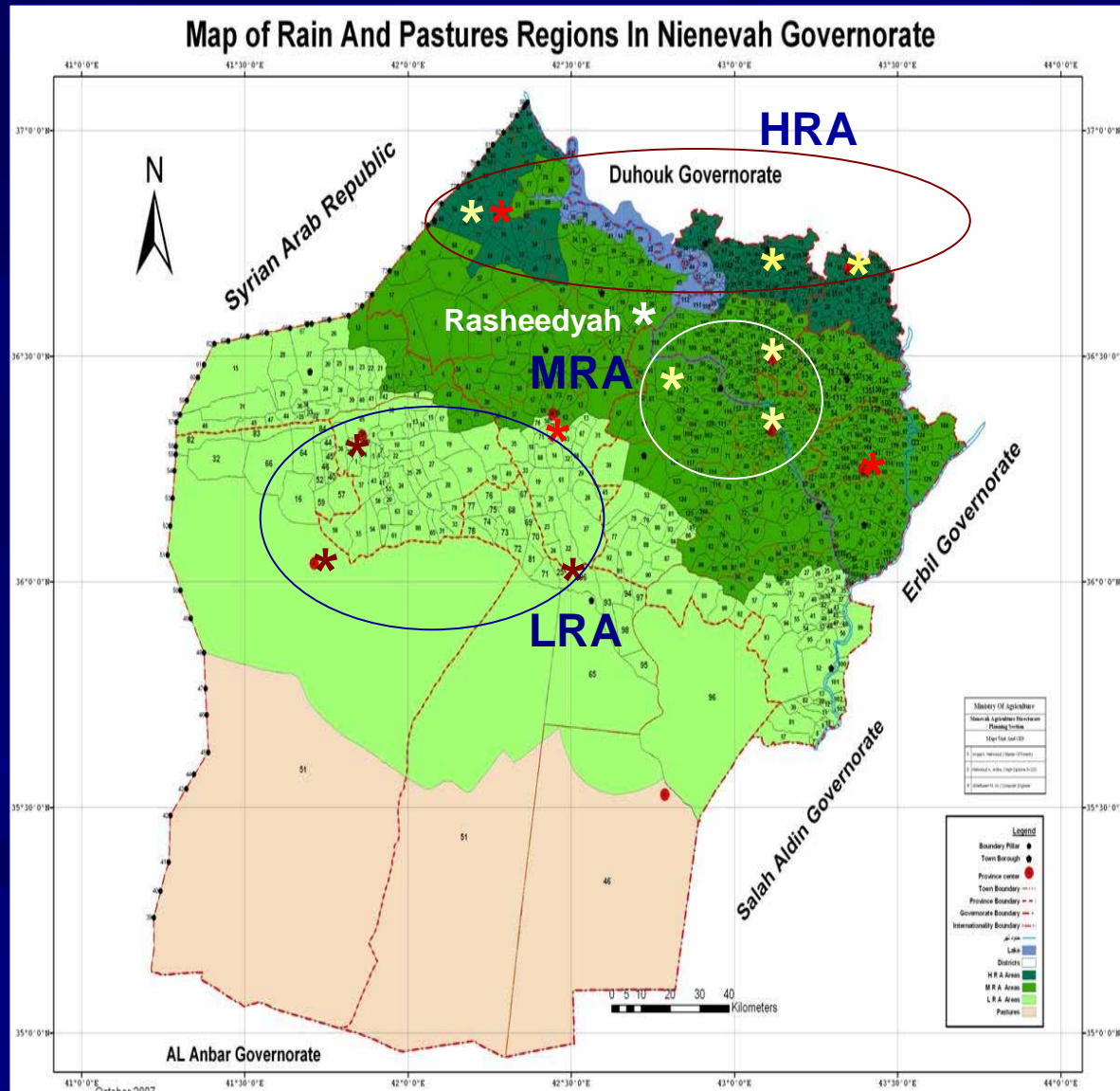
**On-farm Trials/Demonstrations**

# Project team

## (DOA Ninevah & Mosul University)

Dr .Salih M. Bader Dr.Abdul Sattar Alrijabo	MOA \Coordinator Project Project Manger	Jaffer Siddiq Saeed	DOA Plant production
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Hayder N. AL-Sammak	Typing tables & Figures / Computer Dep.(DOA)		

# Ninevah - Project area



## LRA (< 200 mm)

- Tel Abta
- Al-Hadra
- Mahlabia

## MRA (200-400 mm)

- Tel-Kef
- Basheeka
- Hamdaniah

## HRA (> 400 mm)

- Al-Koush
- Al-Sheikhan
- Rabiah

## SI Sites

- Hamidat (LRA)
- Al-Namroud (MRA)
- Rabiah (HRA)

# Project main activities

- Research (Evaluation of field crops at Rasheedyah)
  - Cereals (Bread and durum wheat, Barley)
  - Food legumes (Chickpea, Lentil, Faba bean)
  - Forage legumes (Vetch)
- On-farm trials/demonstrations
  - Chisel vs. Discplow vs. Selected crop varieties (2005-06)
  - Chisel vs. Discplow vs. ZT direct sowing vs. Crop varieties (2006-07)

# Measured parameters

- plant height (cm)
- Spike tall (cm)
- Straw biomass (gm/m<sup>2</sup>)
- No. spikes/m<sup>2</sup>
- No seeds /spike
- Weight of 1000 grains (gm)
- Specific weight (kg/hectoliter)
- Weight of grains (gm/m<sup>2</sup>)
- Grains Yield (kg/hectare)

# On-farm Trials/Demonstrations

# Project activities 2005/2006



# Low Rainfall Areas (< 200 mm)

- Locations: Al-Hatra, Tell Abta, Mahalabia
- Tillage+sowing: Chisel, Disc plough(check)
- Barley: Zanbaka, Tadmor, local black barley
- Forage legumes: Vetch+barley mixture



# Medium Rainfall Areas (200-400 mm)

- Locations: Tel-Kef, Basheeka, Hamdaniah
- Tillage+sowing: Chisel, Disc plough (check)
- Durum wheat: Cham-5, Karonia, Om Rabia
- Bread wheat: Cham-6, Adnania, Tellafer, Abo Ghraib, IPA/99
- Barley: Rihan-3, Furat-1, Jazzera-1, Local black barley
- Chickpea: Dijla, Ghab-4
- Forage legumes: Local vetch, vetch-587, Alibar



# High Rainfall Areas (> 400 mm)

- Locations: Al-Koush, Al-Sheikhan, Rabiah
- Tillage+sowing: Chisel, Disc plough (check)
- Durum wheat: Cham-1, Cham-3, Karonia
- Bread wheat: Abo Ghraib, Cham-4, Cham-6
- Chickpea: IPA-SIO, Ghab-4
- Faba bean: ILB, Akwadlje



# Supplementary Irrigation sites

- Locations: Hamidat-LRA, Al-Namroud-MRA, Rabiah-HRA
- Tillage+sowing: Chisel, Disc plough (check)
- Durum wheat: Cham-1 , Cham-3, Om Rabia, Karonia
- Bread wheat: Cham-4, Cham-6, Abo Ghraib, Adnania, Tell Affer-3



# Results

The highest grain yield was obtained from the following varieties according to locations:

## ■ Barley

- Zanbaka in the LRA
- Rihan-3 in the MRA

## ■ Bread wheat

- Cham-6 in the MRA, HRA & SI areas
- Cham-4, Abo Ghraib-3 in the HRA
- Tell Affer-3 in the SI areas

## ■ Durum wheat

- Karonia in the MRA & HRA
- OM Rabia-5 & Cham-3 in the SI areas

Table (1) Results of Barley in LRA

Locations	Treatments	Cv.s	Trait	
			Grains yield (kg/hectare)	
Hatra	Demons.	Local Aswad	930	
		Tadmor	790	
		Zanbaka	980	
	Demons. mean		900	
	Control	Local Aswad	868	
		Tadmor	960	
		Zanbaka	740	
	Control mean		856	
	Tel Abta	Demons.	Local Aswad	715
			Tadmor	741
Zanbaka			1014	
Demons. mean		823.3		
Control		Local Aswad	780	
		Tadmor	663	
		Zanbaka	806	
Control mean		749.6		

**Table (2) Results of Barley in MRA**

Locations	Treatments	Cv.s	Trait
			Grains yield (kg/hectare)
<b>Tel Kief</b>	Demons .	Furat - 1	1960
		Gezira - 1	2160
		Rihane - 3	2200
		Local Aswad	2120
	Demons . mean		2110
	Control	Furat - 1	1920
		Gezira - 1	2080
		Rihane - 3	2140
		Local Aswad	2100
	Control mean		2060
<b>Hammdanya</b>	Demons .	Furat - 1	1120
		Gezira - 1	1016
		Rihane - 3	1400
		Local Aswad	1040
	Demons . mean		1144
	Control	Furat - 1	976
		Gezira - 1	976
		Rihane - 3	1274
		Local Aswad	960
	Control mean		1046.5
<b>Baashiqa</b>	Demons .	Furat - 1	1620
		Gezira - 1	1610
		Rihane - 3	1660
		Local Aswad	1200
	Demons . mean		1522.5
	Control	Furat - 1	1230
		Gezira - 1	1300
		Rihane - 3	1320
		Local Aswad	1020
	Control mean		1217.5

**Table (3 ) Results of Bread wheat in MRA**

Locations	Treatments	Cv.s	Trait
			Grains yield (kg/hectare)
TelKief	Demons .	Tel Affer - 3	2060
		Cham - 6	1820
		IPA - 99	1550
		Abo Ghraib 3	2030
		Adnanya	1840
	Demons . mean		1860
	Control	Tel Affer - 3	2020
		Cham - 6	1750
		IPA - 99	1620
		Abo Ghraib 3	1980
		Adnanya	1720
Control mean		1818	
Hammdanya	Demons .	Tel Affer - 3	976
		Cham - 6	1400
		IPA - 99	596
		Abo Ghraib 3	556
		Adnanya	664
	Demons . mean		838.4
	Control	Tel Affer - 3	810
		Cham - 6	1240
		IPA - 99	548
		Abo Ghraib 3	476
		Adnanya	592
Control mean		733.2	
Baashiqa	Demons .	Tel Affer - 3	1270
		Cham - 6	1320
		IPA - 99	1210
		Abo Ghraib 3	1250
		Adnanya	1220
	Demons . mean		1254
	Control	Tel Affer - 3	1000
		Cham - 6	1090
		IPA - 99	1025
		Abo Ghraib 3	1050
		Adnanya	1020
Control mean		1037	

**Table (4 ) Results of Durum wheat in MRA**

Locations	Treatments	Cvs	Trait
			Grains yield (kg/hectare)
Tel Kief	Demons.	Sham 5	1850.0
		Om rabia - 5	2040.0
		Karonia	2060.0
	Demons. mean		1983.33
	Control	Sham 5	1830.0
		Om rabia - 5	2000.0
		Karonia	1860.0
	Control mean		1896.66
Hammdanya	Demons.	Sham 5	664.0
		Om rabia - 5	1350.0
		Karonia	900.0
	Demons. mean		971.33
	Control	Sham 5	576.0
		Om rabia - 5	856.0
		Karonia	1260.0
	Control mean		897.33
Baashliqa	Demons.	Sham 5	1720.0
		Om rabia - 5	1830.0
		Karonia	1950.0
	Demons. mean		1833.33
	Control	Sham 5	1340.0
		Om rabia - 5	1520.0
		Karonia	1650.0
	Control mean		1503.33

**Table (5 ) Results of Bread wheat in HRA**

Locations	Treatments	Cv.s	Trait
			Grains yield (kg/hectare)
Al-Qush	Demons.	Cham - 6	850.0
		Cham - 4	900.0
		Abo Ghraib 3	900.0
	Demons. mean		883.33
	Control	Cham - 6	800.0
		Cham - 4	900.0
		Abo Ghraib 3	800.0
	Control mean		833.33
Rabeea	Demons.	Cham - 6	1280.0
		Cham - 4	1152.0
		Abo Ghraib 3	1300.0
	Demons. mean		1244
	Control	Cham - 6	1026.0
		Cham - 4	880.0
		Abo Ghraib 3	1044.0
	Control mean		983.33
Shikan	Demons.	Cham - 6	880.0
		Cham - 4	600.0
		Abo Ghraib 3	768.0
	Demons. mean		749.33
	Control	Cham - 6	960.0
		Cham - 4	580.0
		Abo Ghraib 3	780.0
	Control mean		773.33

**Table (6) Results of Durum wheat in HRA**

Locations	Treatments	Cv.s	Trait
			Grains yield (kg/hectare)
Al-Qush	Demons.	Waha	800
		Cham -3	1000
		Karonia	1100
	Demons. mean		966.6
	Control	Waha	800
		Cham -3	900
		Karonia	1000
	Control mean		900
Rabeea	Demons.	Waha	1368
		Cham -3	1494
		Karonia	1494
	Demons. mean		1452
	Control	Waha	1044
		Cham -3	1062
		Karonia	774
	Control mean		960
Shikan	Demons.	Waha	480
		Cham -3	940
		Karonia	980
	Demons. mean		800
	Control	Waha	440
		Cham -3	720
		Karonia	800
	Control mean		653.3

**Table (7) Results of bread wheat in SI location**

Locations	Treatments	Cv.s	Trait
			Grains yield (kg/hectare)
Rabeea	Demons.	Tel Affer3	1498.0
		Cham 6	1770.5
		Cham 4	1094.0
		Abo Ghraib 3	1503.5
		Adnanya	1889.0
	Demons. mean		1551
	Control	Tel Affer3	1000.0
		Cham 6	1600.0
		Cham 4	700.0
		Abo Ghraib 3	1000
Adnanya		1000	
Control mean		1060	
Hummaidat	Demons.	Tel Affer3	1691.2
		Cham 6	1842.0
		Cham 4	1430.0
		Abo Ghraib 3	1744.0
		Adnanya	1638.0
	Demons. mean		1669.04
	Control	Tel Affer3	1594.0
		Cham 6	1510.8
		Cham 4	1248.0
		Abo Ghraib 3	1594.0
Adnanya		1412.8	
Control mean		1471.92	
Namroud	Demons.	Tel Affer3	2937.5
		Cham 6	1675.0
		Cham 4	1625.0
		Abo Ghraib 3	1500.0
		Adnanya	1750.0
	Demons. mean		1897.5
	Control	Tel Affer3	2915.0
		Cham 6	1650.0
		Cham 4	1650.0
		Abo Ghraib 3	1500.0
Adnanya		2500.0	
Control mean		2043	

**Table (8) Results of Durum wheat in SI location**

Locations	Treatments	Cv.s	Trait
			Grains yield (kg/hectare)
Rabeea	Demons	Om rabia5	1930.5
		Cham - 3	1564.0
		Cham - 1	1331.5
		Karonia	1808.5
	Demons mean		1658.62
	Control	Om rabia5	970.00
		Cham - 3	1450.0
		Cham - 1	1450.0
		Karonia	1087.5
	Control mean		1239.38
Hummaidat	Demons	Om rabia5	1290.8
		Cham - 3	1170.4
		Cham - 1	782.80
		Karonia	1154.80
	Demons mean		1099.70
	Control	Om rabia5	918.40
		Cham - 3	864.00
		Cham - 1	499.20
		Karonia	831.20
	Control mean		778.20
Nimrud	Demons	Om rabia5	2200.0
		Cham - 3	2968.0
		Cham - 1	1800.0
		Karonia	1440.0
	Control mean		2102.00
	Control	Om rabia5	2200.0
		Cham - 3	2965.6
		Cham - 1	1840.0
		Karonia	1736.0
	Control mean		2185.40

# The field observations

- **Problem:** Large soil clay mass caused by using chisel plow. And there is another problem, which is the rise in fuel price.



- **Solution:**

- The first problem can be solved by using a new chisel with additional operation of disc to smooth the soil
- The second problem can be solved by a new system reducing fuel consumption, so ZT system suggested by the Project

# The Achievements

- Adoption of some wheat and barley cultivars
- Chisel plow was successful in most locations
- Fertilizer use efficiency increased through soil analysis
- Quality seeds were needed so the procurement of DARBAS seed cleaners was made
- The training of the staff and farmers in different subjects have been successfully completed
- Survey on insects and diseases in the field of the project to make better control
- Adoption of forage mixture under moderate rainfall zone needed mechanical harvesting to be developed instead of grazing for the sustainability

# On-farm Trials/Demonstrations

## Project activities 2006/2007

Tell abta



Al-Namrood



# Low Rainfall Areas (< 200 mm)

- Locations: Al-Hatra, Tell Abta, Mahalabia
- Tillage+sowing: ZT, Chisel, Disc plough (check)
- Barley: Zanbaka, local black barley



# Medium Rainfall Areas (200-400 mm)

- Locations: Tel-Keif, Basheeka, Hamdaniah
- Tillage+sowing: ZT, Chisel, Disc plough (check)
- Durum wheat: Cham-5, Karonia, Om Rabia
- Bread wheat: Cham-6, Tellaffer-3, Abo Ghraib
- Barley: Rihan-3, Jazzera-1



# High Rainfall Areas (> 400 mm)

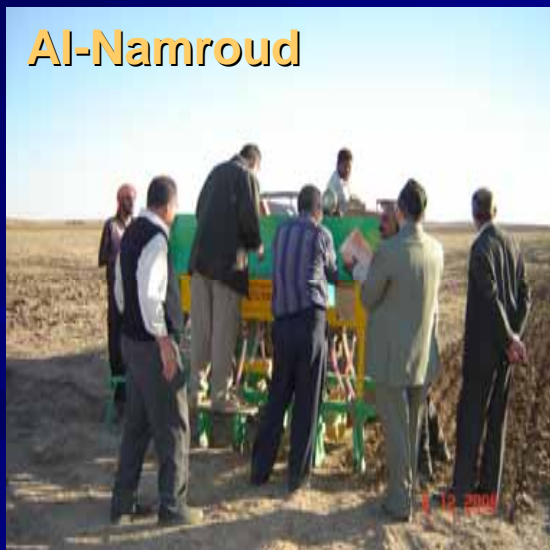
- Locations: Al-Koush, Al-Sheikhan, Rabiah
- Tillage+sowing: ZT, Chisel, Disc plough (check)
- Durum wheat: Cham-3, Karonia
- Bread wheat: Abo Ghraib, Cham-4, Cham-6



# Supplementary Irrigation sites

- Locations: Hamidat-LRA, Al-Namroud-MRA, Rabiah-HRA
- Tillage+sowing: ZT, Chisel, Disc plough (check)
- Durum wheat: Cham-3, Om Rabia
- Bread wheat: Adnania, Tell Affer-3

Al-Namroud



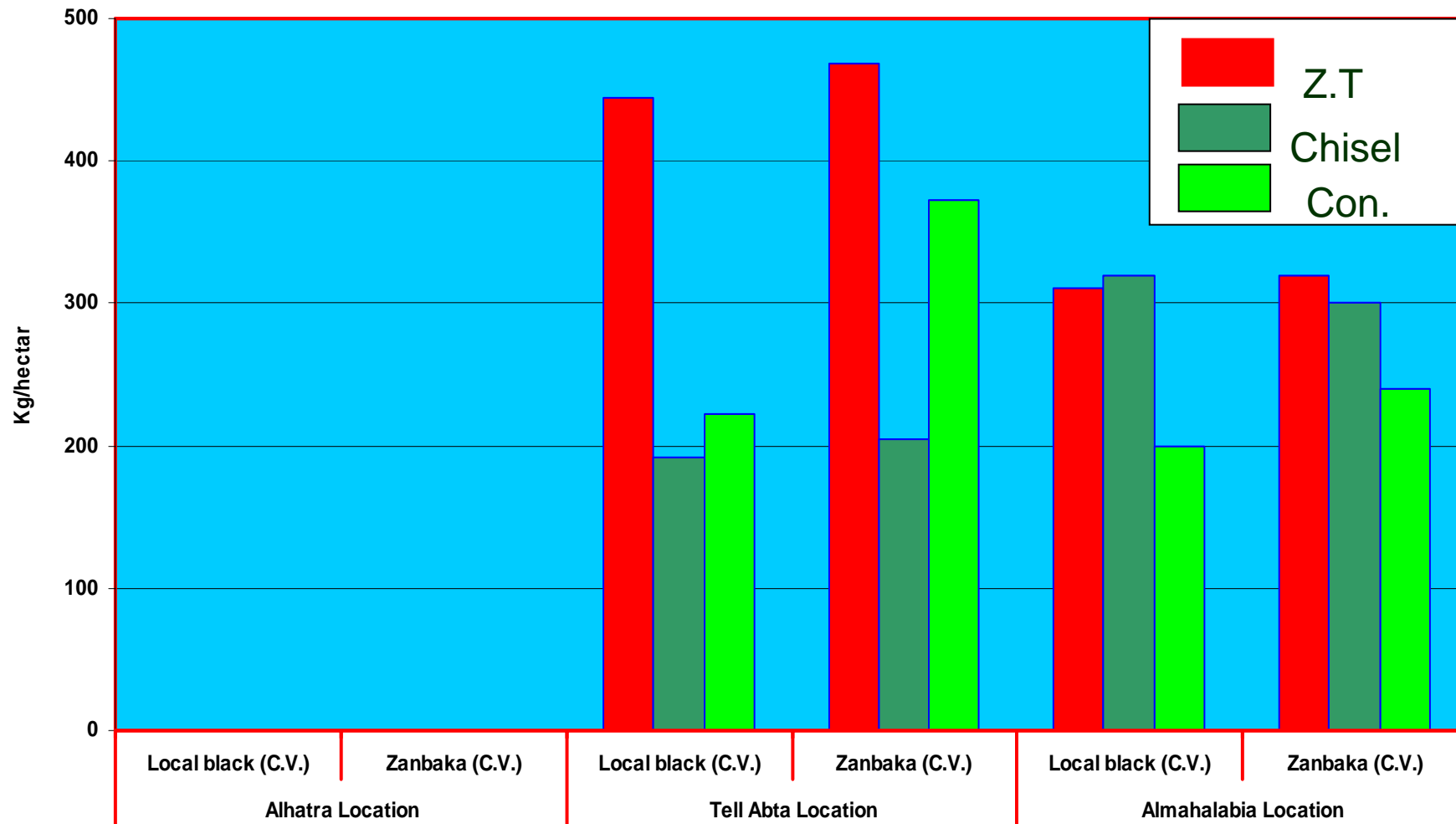
Hamidat



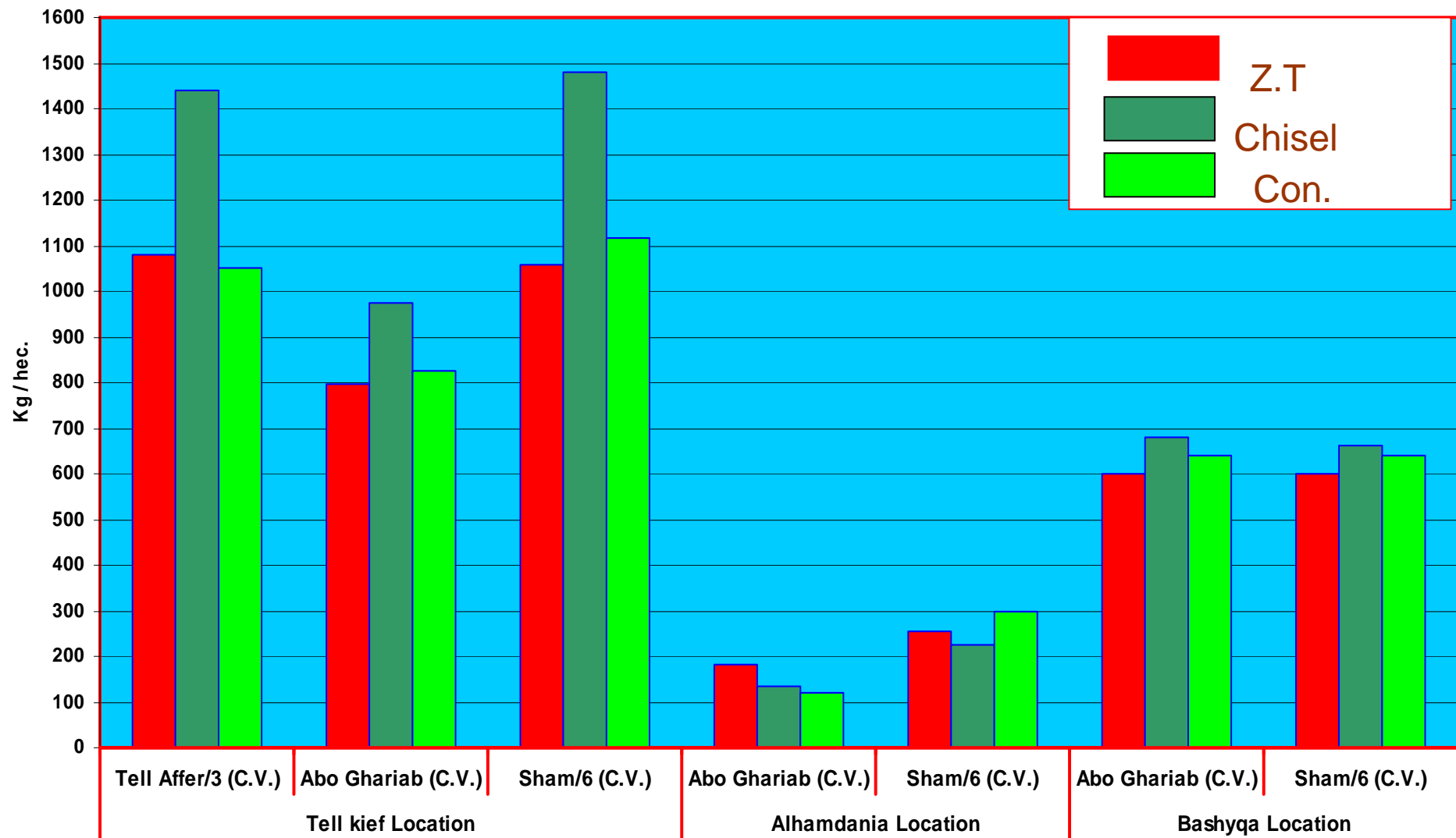
Rabia



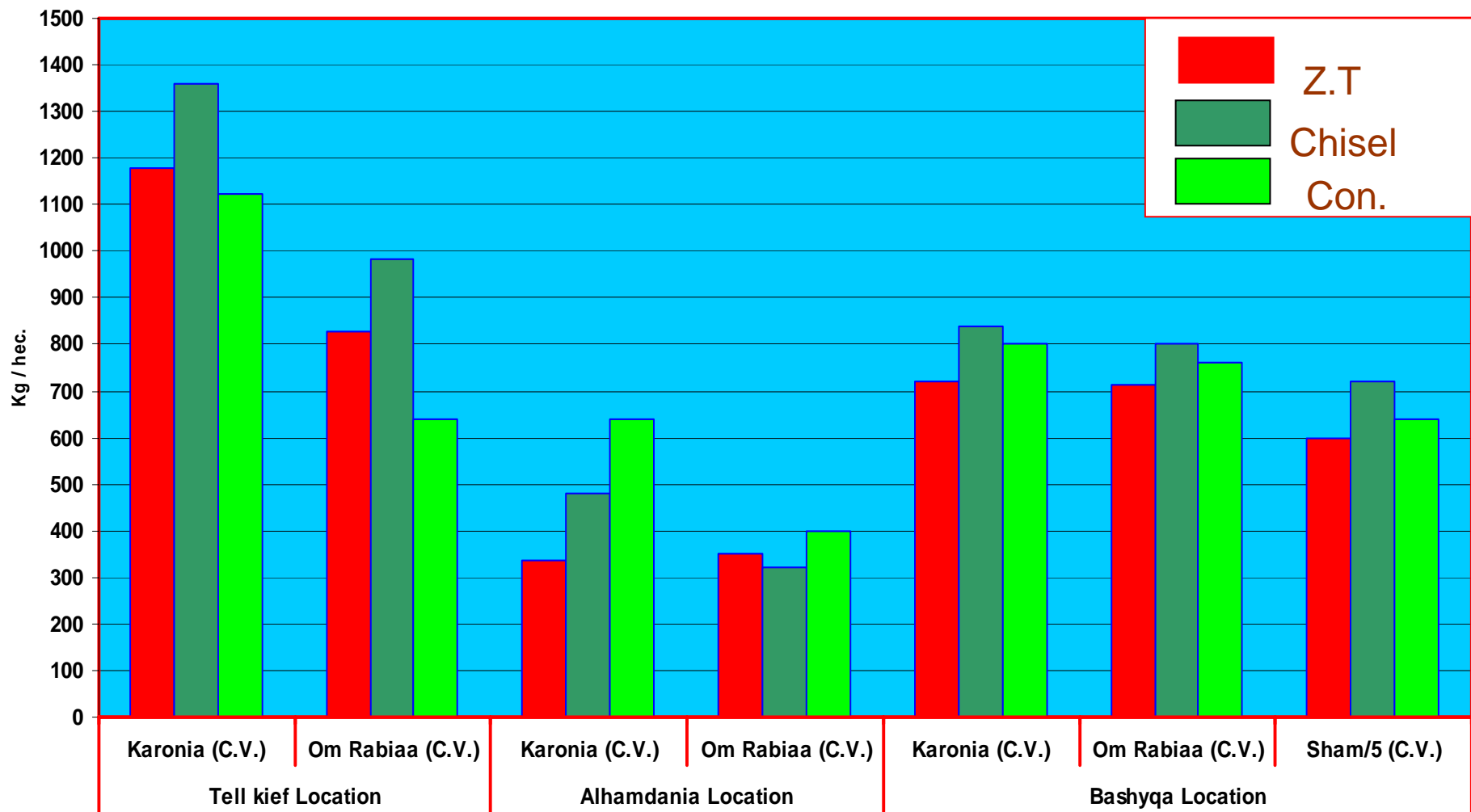
# Results



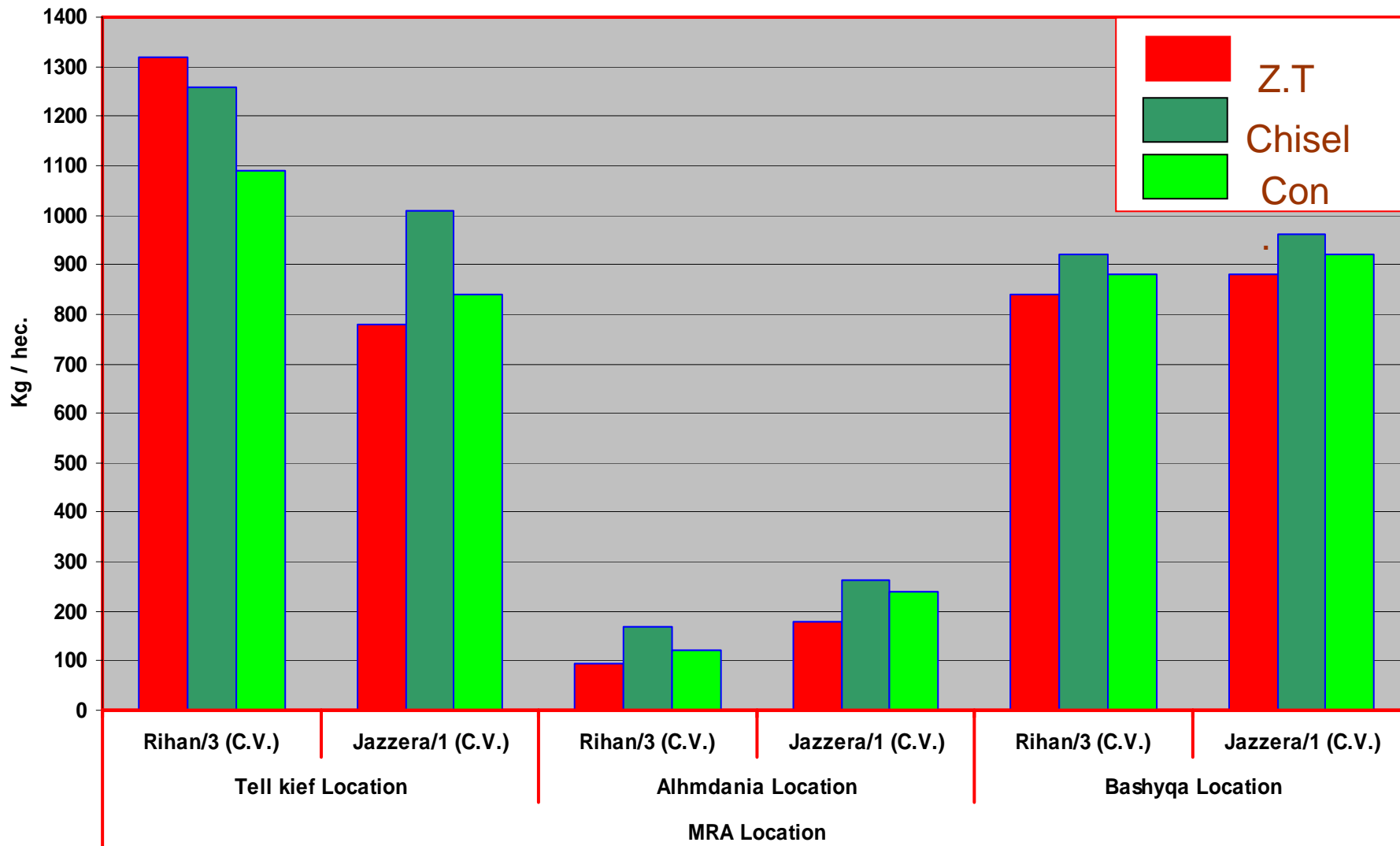
**Fig(1)**  
**Effect of planting methods on grains yields (Kg/hectar) of Barley in LRA lacion**



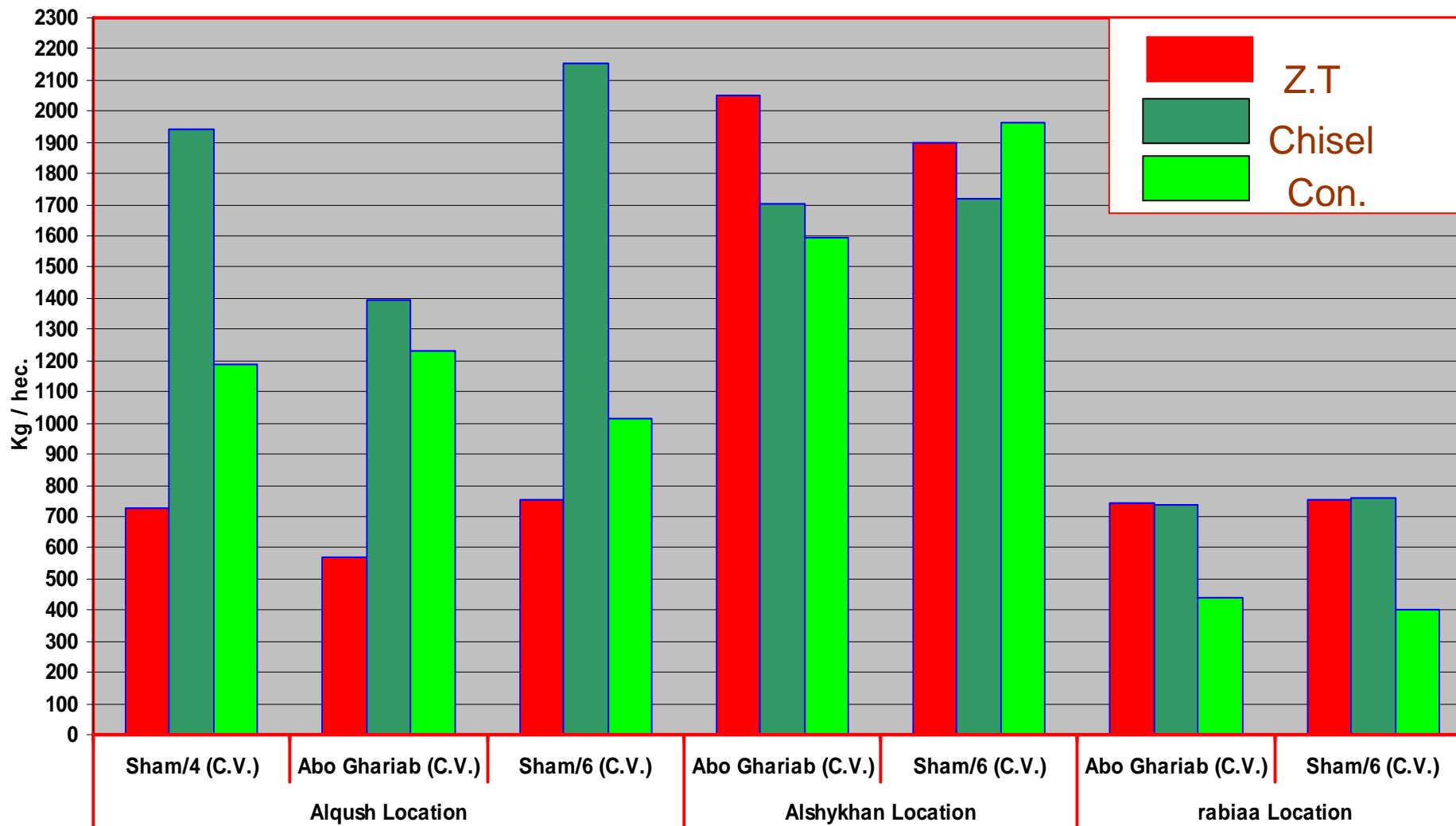
**Fig(2)**  
**Effect of planting methods on grains yields (Kg/hectar) of bread wheat in MRA location**



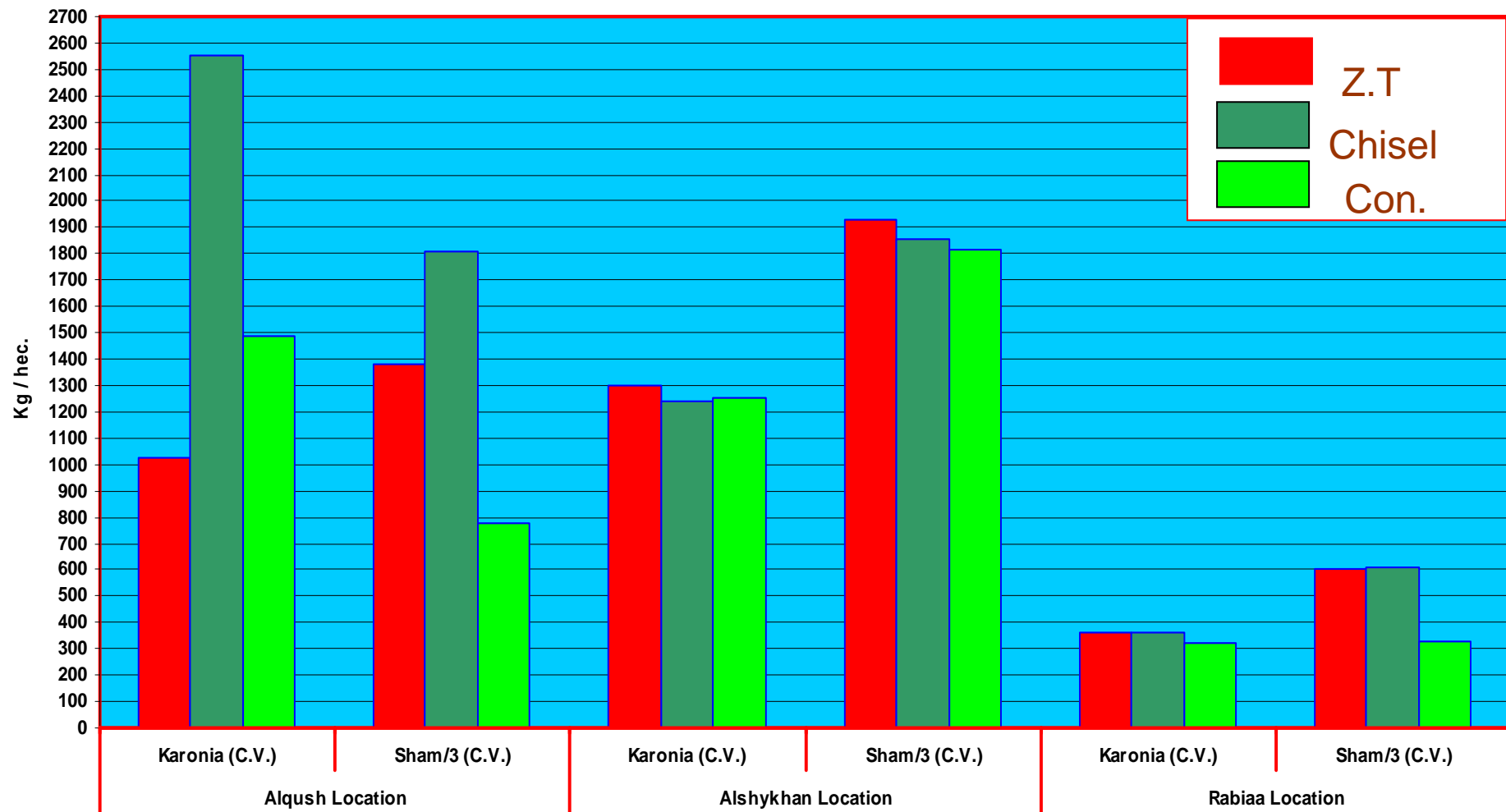
**Fig(3)**  
**Effect of planting methods on grains yields (Kg/hectar) of Durum wheat in MRA location**



**Fig(4)**  
**Effect of planting methods on grains yields (Kg/hectar) of Barley in MRA location**



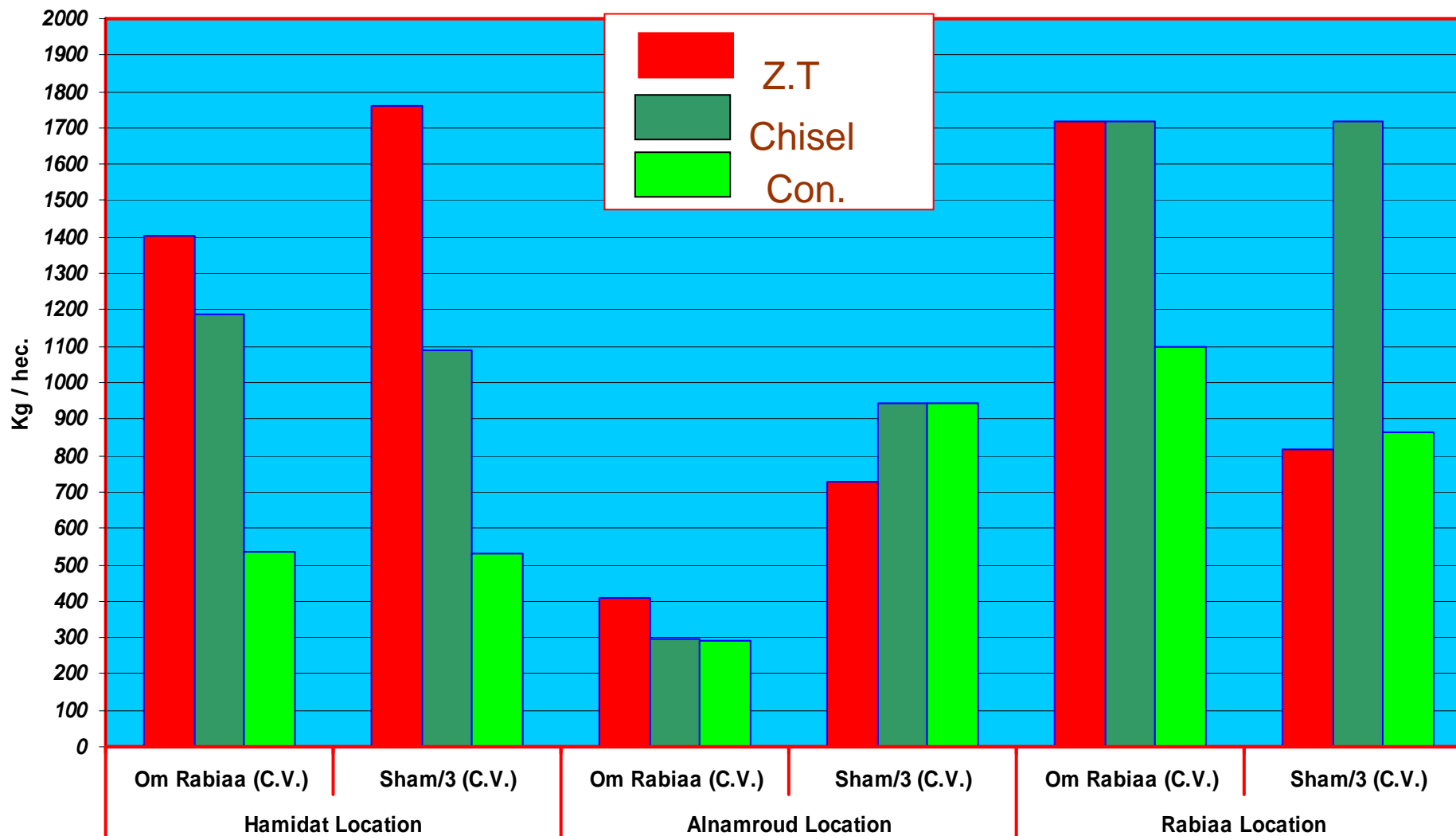
**Fig(5)**  
**Effect of planting methods on grains yields(Kg / hectar) of bread wheat in HRA lacion**



**Fig(6)**  
**Effect of planting methods on grains yields (Kg / hectare) of durum wheat in HRA location**



**Fig(7)**  
**Effect of planting methods on grains yields (Kg/hec.) of bread wheat in SI location**



**Fig (8)**  
**Effect of planting methods on grains yields (Kg/hectar) of durum wheat in SI location**

## The highest significant value of crops yield and yield traits under different management (ZT vs. Chisel vs. Conventional tillage)

Traits \ Crops in Locations	SI Durum Wheat	HRA Durum Wheat	MRA Durum Wheat	SI Bread Wheat	HRA Bread Wheat	MRA Bread Wheat	MRA Barley	LRA Barley
Grains yield (gm/m <sup>2</sup> )	Z. T.	Chisel	Chisel	Z. T.	Chisel	Chisel	Chisel	Z. T.
No .Spikes /m <sup>2</sup>	Chisel	Chisel	Chisel	Z. T.	Chisel	Chisel	Chisel	Z. T.
Weight of 1000 grains (gm)	Z. T.	Chisel	Con.	All	Z. T.	Z. T.	Chisel	All
No . grains/ spike	Z. T.	Chisel	Z. T. + Chisel	Z. T. + Chisel	Z. T. + Chisel	Z. T.	All	Chisel
Straw biomass (gm/m <sup>2</sup> )	Chisel	Chisel	Chisel	Z. T.	Chisel	Chisel	Chisel	All
Plant height (cm)	Z. T.	Chisel	Chisel	Z. T.	Chisel	Z. T.	Z. T.	Z. T.
Specific weight (kg/ hectoliter)	Con.	Chisel	All	Z. T.	Chisel	All	Z. T.	Z. T. + Chisel

Traits	Chisel rep.	Z. T. rep.	Con. rep.
Grains yield (gm/m <sup>2</sup> )	5	3	-
No .Spikes /m <sup>2</sup>	6	2	-
Weight of 1000 grains (gm)	4	5	3
No . grains/ spike	6	6	1
Straw biomass (gm/m <sup>2</sup> )	7	2	1
Plant height (cm)	3	5	-
Specific weight (kg/ hectoliter)	5	5	3
<b>Total</b>	<b>36</b>	<b>28</b>	<b>8</b>

# Performance of genotypes

■ Source: ICARDA

■ Crops:

- Barley
- Durum wheat
- Bread wheat

# Performance Evaluations of Barley cultivars (Bartella location, MRA)

Crops	Cultivars	Traits						
		Plant height(cm)	No. Spike/ m <sup>2</sup>	Straw biomass (gm/m <sup>2</sup> )	No. grains/ Spike	Weight 1000 grains (gm)	Grains yield (gm/m <sup>2</sup> )	Grains yield (kg/100m <sup>2</sup> )
Barley	Alanda / 1	50.16	39.33	16.18	15.53	25.6	26.08	6.00
	Alanda hamra	54.83	46.66	17.98	28.96	33.2	26.98	6.50
	Alanda zafraa	53.23	40.00	17.43	16.13	22.8	25.15	5.50
	Zanbaka	62.83	62.33	26.66	37.80	27.4	35.56	9.00
	Zanbaka SLB 81	60.50	60.00	22.98	29.50	32.2	27.86	7.10
	Zanbaka SLB 74	60.23	60.95	25.08	34.06	27.6	31.70	8.70
	Rihan/3	53.96	55.33	19.25	33.50	26.8	31.33	8.20
	Rihan 03/ Lignee	55.30	49.66	18.08	29.33	23.6	26.51	6.30
	Yazan	49.36	43.33	15.76	17.50	24.8	25.66	5.50
	Momtaz	60.26	41.00	16.96	15.80	25.2	24.08	5.30

# Performance Evaluations of Wheat cultivars (Bartella location, MRA)

Crops	Cultivars	Traits							
		Plant height(cm)	No. Spike/ m <sup>2</sup>	Straw biomass (gm/m <sup>2</sup> )	No. grains/ Spike	Weight 1000 grains (gm)	Grains yield (gm/m <sup>2</sup> )	Grains yield (kg/100m <sup>2</sup> )	
Bread wheat	Abouzc/9	64.00	33.00	20.65	28.03	22.2	25.40	7.00	
	Hamma	39.56	14.33	7.00	16.16	22.4	9.56	1.40	
	Anji / 2	49.96	15.66	14.40	23.33	22.6	15.05	2.30	
	Dajaj / 5	43.63	19.00	10.71	20.96	22.0	14.48	2.10	
	Babaga / 3	49.90	21.66	13.11	23.66	22.6	17.15	3.80	
	Qimma / 6	39.40	13.00	9.31	15.53	22.0	10.23	2.00	
Durum Wheat	Sham / 5	62.40	20.33	11.78	24.43	22.2	15.00	3.00	
	ICASIR / 2	52.10	16.00	8.25	20.40	24.6	12.52	2.10	
	Bultagy / 1	56.46	19.00	11.00	17.90	24.0	12.48	2.25	
	Bultagy / 2	65.36	35.00	17.60	24.76	22.2	20.01	4.50	
	Younes / 1	59.20	26.00	12.58	21.56	21.4	18.53	3.70	
	Ammar / 3	56.86	17.00	9.21	25.46	22.0	15.70	3.25	
	Ammar / 1	50.96	25.33	10.08	20.56	25.0	13.90	3.00	
	Ammar / 6	59.36	24.00	10.68	21.06	23.8	13.50	2.60	
	Lahancan	-	-	-	-	-	-	-	-
	Fadda / 98	59.93	22.00	14.15	22.10	22.8	14.95	2.70	
	Azeghar / 2	50.96	15.00	8.41	24.10	24.0	12.83	2.50	

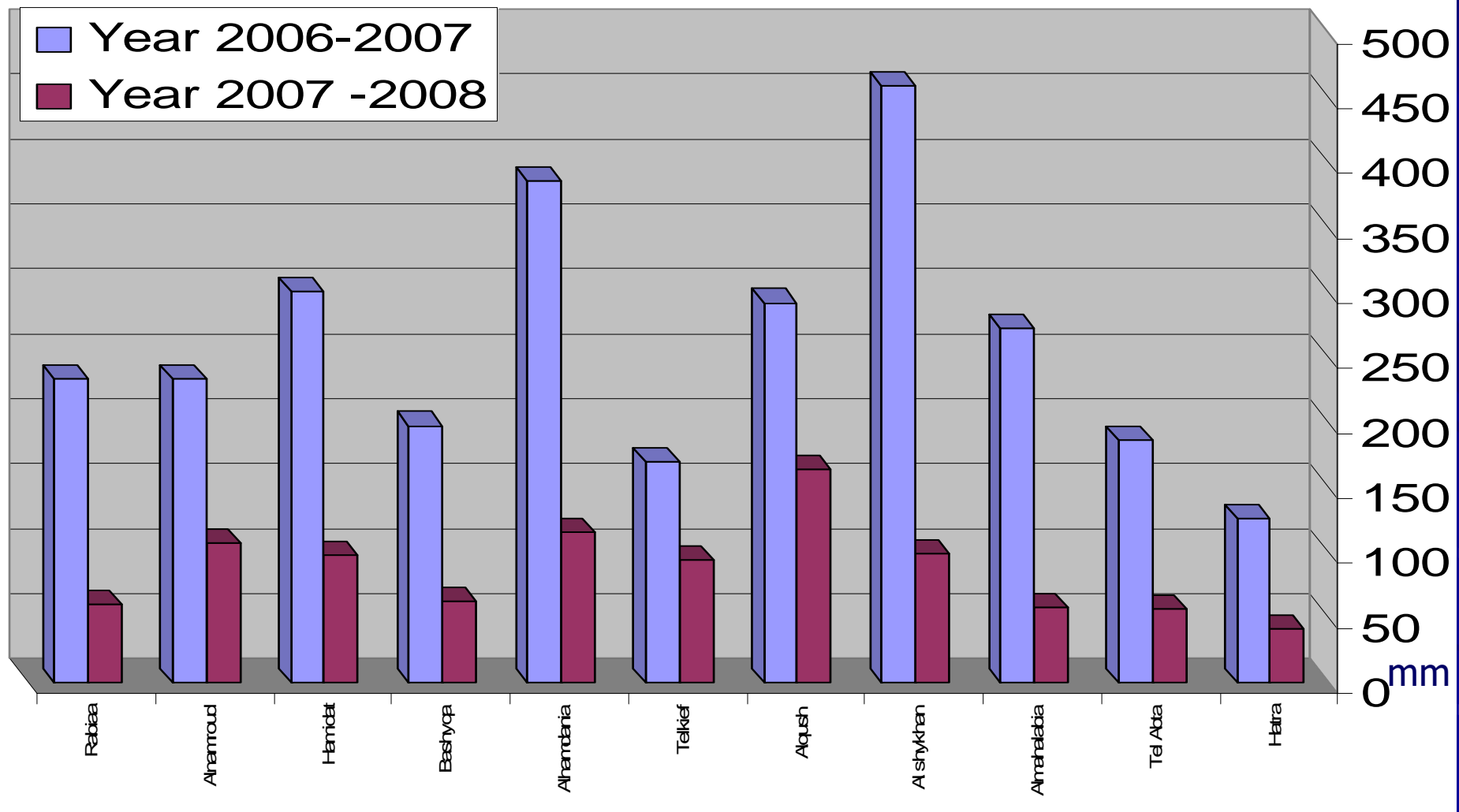
# Project activities 2007/2008

## Research:

- 3 sets of barley provided by ICARDA for LRA were planted by Research group in Rasheedya.
- 3 sets of barley provided by ICARDA for MRA barley were planted by Mosul University



# On-farm trials/demonstrations



**Seasonal Rainfall (mm) until 6 April for two years**

# Features of the 2007/08 season

- Until 15 Jan-2008, no rain at all associated with frost (Wheat could not be sown)
- Thus, most of trials have not been planted to save the seed at least
- However, following plantings were made as the ZT seeder and Chisel were available:
  - Barley in LRA (Tell Abta, Hatra)
  - Wheat under SI (Namroud, Rabia)
  - Wheat in HRA (Rabia)
- Wheat cultivars (11) provided by ICARDA were planted under SI (Al- Namroud) for performance evaluation and seed production for the next season

# Location : Al-Namroud SI

ICASYR - 2 Durum Wheat

منطقة  
أيكاسير  
«2» فشة

2008/04/02

Baltagy - 3 Durum Wheat

منطقة  
بالتاجي «3»  
فشة

2008/04/02

AZEGHAR - 2 Durum Wheat

منطقة  
أزهجار «2»  
فشة

2008/04/02

Qimma - 6 Bread Wheat

منطقة  
قمة ناعمة  
«6»

2008/04/02

Younes-1 Durum Wheat

منطقة  
يونس «1»  
فشة

2008/04/02

Baltagy - 2 Durum Wheat

منطقة  
بالتاجي «2»  
فشة

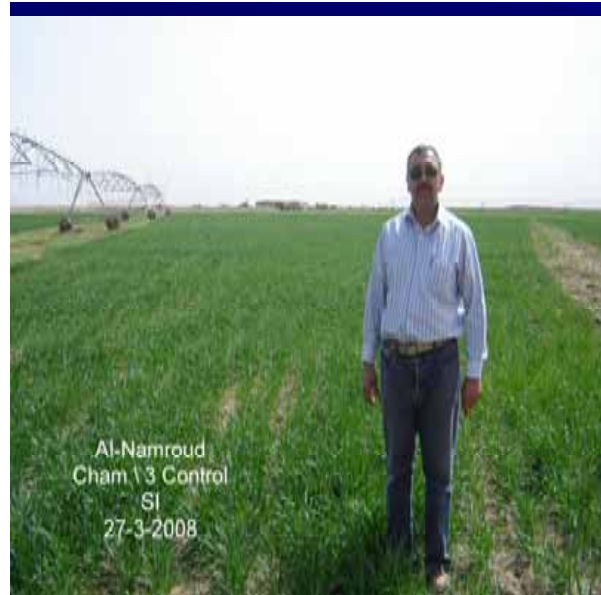
2008/04/02

## First : Supplementary Irrigated region :

Location : Hamidat				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Om Rabiaa/5	4	3	(Z. T-Chisel -Control)
	Cham/3	4	3	(Z. T-Chisel -Control)
Bread Wheat	Adnaniya	4	3	(Z. T-Chisel -Control)
	Tell affer/3	4	3	(Z. T-Chisel -Control)

Location : Al-Namroud				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Om Rabiaa/5	4	4	(Z. T-Chisel -Control)
	Cham/3	4	3	(Z. T-Chisel -Control)
Bread Wheat	Adnaniya	4	3	(Z. T-Chisel -Control)
	Tell affer/3	4	3	(Z. T-Chisel -Control)

Location : Rabeaa				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Om Rabiaa/5	4	3	(Z. T-Chisel -Control)
	Cham/3	4	3	(Z. T-Chisel -Control)
Bread Wheat	Adnaniya	4	3	(Z. T-Chisel -Control)
	Tell affer/3	4	3	(Z. T-Chisel -Control)



**Second : HRA (Alqush , Al shykhan, Rabiaa) :**

<b>Location : Alqush</b>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Sham /3	4	3	(Z. T-Chisel -Control)
	Karonia / local	4	3	(Z. T-Chisel -Control)
	Ecacier / 2	100m <sup>2</sup>	1	supplied with 1.400 kg for cultivating 100m <sup>2</sup>
Bread Wheat	Abo Gharaib /3	4	3	(Z. T-Chisel -Control)
	Sham /6	4	4	(Z. T-Chisel -Control)
	Dejag /5	100m <sup>2</sup>	1	supplied with 1.200 kg for cultivating 100m <sup>2</sup>
	Inge /4	100m <sup>2</sup>	1	supplied with 1.200 kg for cultivating 100m <sup>2</sup>
Chickpea (Winter)	IPA 510	2	3	(Z. T-Chisel -Control)
	Ghab /4	2	3	(Z. T-Chisel -Control)
	Local	100m <sup>2</sup>	1	
Chickpea (Spring)	IPA 510	2	3	(Z. T-Chisel -Control)
	Ghab /4	2	3	(Z. T-Chisel -Control)
	Local	100m <sup>2</sup>	1	
Chickpea (Winter)	IPA 510	2	1	3 additional farmers would be given one variety each 2 donums. Each farmer = 60 Kg seed
	Ghab /4	2	1	
	Flip 97-706	2	1	
	Gokche	100m <sup>2</sup>	1	One farmer was chosen to cultivate this variety. The strip area is 100m <sup>2</sup> under the supervision of the program. The yield will be returned to the program.
Chickpea (Spring)	IPA 510	2	1	4 additional farmers would be given one variety each 2 donums. Each farmer = 60 Kg seed
	Ghab /4	2	1	
	Flip 97-706	2	1	
	Gokche	2	1	
	Gokche	100m <sup>2</sup>	1	One farmer was chosen to cultivate this variety. The strip area is 100m <sup>2</sup> under the supervision of the program. The yield will be returned to the program.

<b>Location : Al shykhan</b>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Sham / 3	4	3	(Z.T-Chisel -Control)
	Karonia / local	4	3	(Z.T-Chisel -Control)
Bread Wheat	Abo Gharaib /3	4	3	(Z.T-Chisel -Control)
	Sham /6	4	3	(Z.T-Chisel -Control)
Faba bean	Akwadilji	2	2	(Chisel -Control)
	ILB	2	2	(Chisel -Control)
	Local	100m <sup>2</sup>	1	

<b>Location : Rabeaa</b>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Sham /3	4	3	(Z.T-Chisel -Control)
	Karonia / local	4	3	(Z.T-Chisel -Control)
Bread Wheat	Abo Gharaib /3	4	3	(Z.T-Chisel -Control)
	Sham /6	4	3	(Z.T-Chisel -Control)



### Third : MRA (Telkief , Al-Hamdania , Bashyqa):

<b>Location : Telkief</b>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Om Rabiaa/5	4	3	(Z. T-Chisel -Control)
	Karonia / local	4	3	(Z. T-Chisel -Control)
	Fada / 98	100m <sup>2</sup>	1	supplied with 1.400 kg for cultivating 100m <sup>2</sup>
Bread Wheat	Abo Gharaib /3	4	3	(Z. T-Chisel -Control)
	Sham /6	4	3	(Z. T-Chisel -Control)
	Babaja / 3	100m <sup>2</sup>	1	supplied with 1.200 kg for cultivating 100m <sup>2</sup>
	Abo Ziek	100m <sup>2</sup>	1	supplied with 1.200 kg for cultivating 100m <sup>2</sup>
Barley	Rihan / 3	4	3	(Z. T-Chisel -Control)
	Jazzera / 1	4	4	(Z. T-Chisel -Control)
	Alnanda / 1	100m <sup>2</sup>	1	supplied with 1.200 kg for cultivating 100m <sup>2</sup>
	Fat / 5	100m <sup>2</sup>	1	supplied with 1.200 kg for cultivating 100m <sup>2</sup>
Forage Legums	IPA /2001	2	1	
	Seil / 587	2	1	

<b>Location : Al-Hamdania</b>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Om Rabiaa/5	4	3	(Z. T-Chisel -Control)
	Karonia / local	4	3	(Z. T-Chisel -Control)
Bread Wheat	Abo Gharaib /3	4	3	(Z. T-Chisel -Control)
	Sham /6	4	3	(Z. T-Chisel -Control)
Barley	Rihan/3	4	3	(Z. T-Chisel -Control)
	Jazzera/1	4	3	(Z. T-Chisel -Control)
Lentil	IPA /98	4	3	(Z. T-Chisel -Control)
	Adlip /3	4	3	(Z. T-Chisel -Control)
	Local	100m <sup>2</sup>	1	

<b>Location: Bashyqa</b>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Durum Wheat	Om Rabiaa/5	4	3	(Z. T-Chisel -Control)
	Karonia / local	4	3	(Z. T-Chisel -Control)
Bread Wheat	Abo Gharaib /3	4	3	(Z. T-Chisel -Control)
	Sham /6	4	3	(Z. T-Chisel -Control)
Barley	Rihan/3	4	3	(Z. T-Chisel -Control)
	Jazzera/1	4	3	(Z. T-Chisel -Control)

## Fourth : LRA (Hatra , Tel Abta , Almahalabia):

Location : Hatra				
Crops	Cultivar	Area -Donum	Treatments	Notes
Barley	Zanbaka	4	2	(Z. T-Control)
	Local Black	4	2	

Location : Tell Abta				
Crops	Cultivar	Area -Donum	Treatments	Notes
Barley	Zanbaka	4	2	(Z. T -Control)
	Local Black	4	2	(Z. T -Control)

Location : <u>Al-Mahalabia</u> <span style="float: right;">⊕</span>				
Crops	Cultivar	Area -Donum	Treatments	Notes
Barley	Zanbaka	4	4	(Z. T-Chisel -Control)
	Local Black	4	4	(Z. T-Chisel -Control)
	IPA / 2001	2	1	



Advantages of the program  
Locally modified Zero Tillage seeder

# Farmers' opinions on Zero Tillage seeders

- The Indian ZT seeder seems unsuitable:
  - Working width is small,
  - Connections and the sowing arms are weak
  - Rigidly connected to the tractor, so easy to be broken

Indian ZT seeder



Modified Rama Seeder to ZT seeder



# Studies on locally modified ZT seeders

- The **RAMA** and the **Jhon Shearer** sowing machines have been successful for more than 15 years
- **Wide working width** (3.6 m)
- **Suitable** for modification to **ZT seeders**
- **Problems** are **manufacturing** of **new blades** for ZT sowing and **their connection to the arms**



# Studies on locally modified ZT seeders

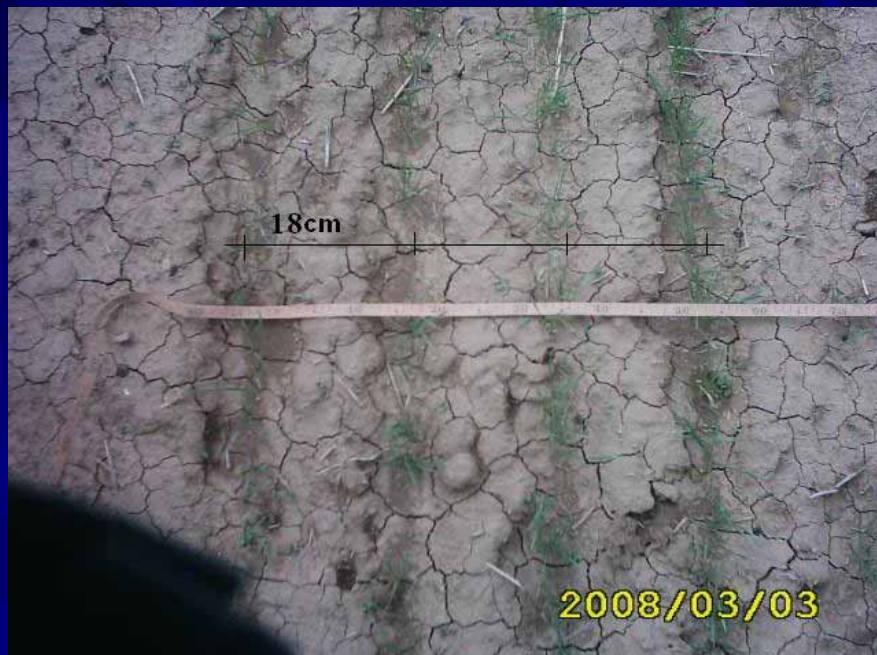
- The Indian ZT seeder was studied by Mosul company for mechanical works
- The four sided polygon steel plate was replicated that hold the blade in the Indian ZT seeder to be easily fixed to the arm in the RAMA seeder
- U-shape part was manufactured to connect the seed hose to the steel plate,
- The cutting edge of the blade was shaped and welded to the steel plate.



# Studies on locally modified ZT seeders

- The modified ZT seeder made good coverage for the seeds, with consistent depth of 8 cm and uniform crop establishment
- The same principles will be applied to other types of sowing machines by local expertise in manufacturing ZT seeders







Rama seeder modified for ZT seeder (1 minute movie)

# Modification of Local Disc Plough to ZT disc seeder

## ■ PhD study of Zakar M. Khudur, Mosul University:

- Investigation of the **defects** of the **standard disc** and the **local disc seeders**, so
- The **local disc seeder** is improved to be more suitable as **ZT seeder**
- The **improved seeder** provided **52% grain yield increase** in wheat compared to **local disc seeder**
- The improved seeder **reduced seed loss** from **32%** of local disc seeder **to 11%**



Disc Seeder (1 minute video)



V. Disc plough (1 minute video)



## Modified ZT disc seeder

**Modified one  
way disc tiller Seeder  
Method of hitching ( trailed )  
Working width ( 3.8 m )  
hopper Capacity ( 570 kg )  
Weight ( 1200 kg Unloaded )  
tractor size (100 hp .)**

**الدبك البدار المحور  
طريقة الشبك ( مسحوب )  
العرض الشغال ( ٣.٨ م )  
سعة الخزان ( ٥٧٠ كغم )  
وزن الالة فارغة ( ١٢٠٠ كغم )  
حجم الساحبة ( ١٠٠ حصان )**



Local disc seeder (1 minute movie)



Local disc plough (1 minute movie)



## Modified ZT disc seeder

**Modified one  
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Method of hitching ( trailed )  
Working width ( 3.8 m )  
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**Thank You...**