



CRP1.1 - DS
CGIAR Research Program
ON DRYLAND SYSTEMS

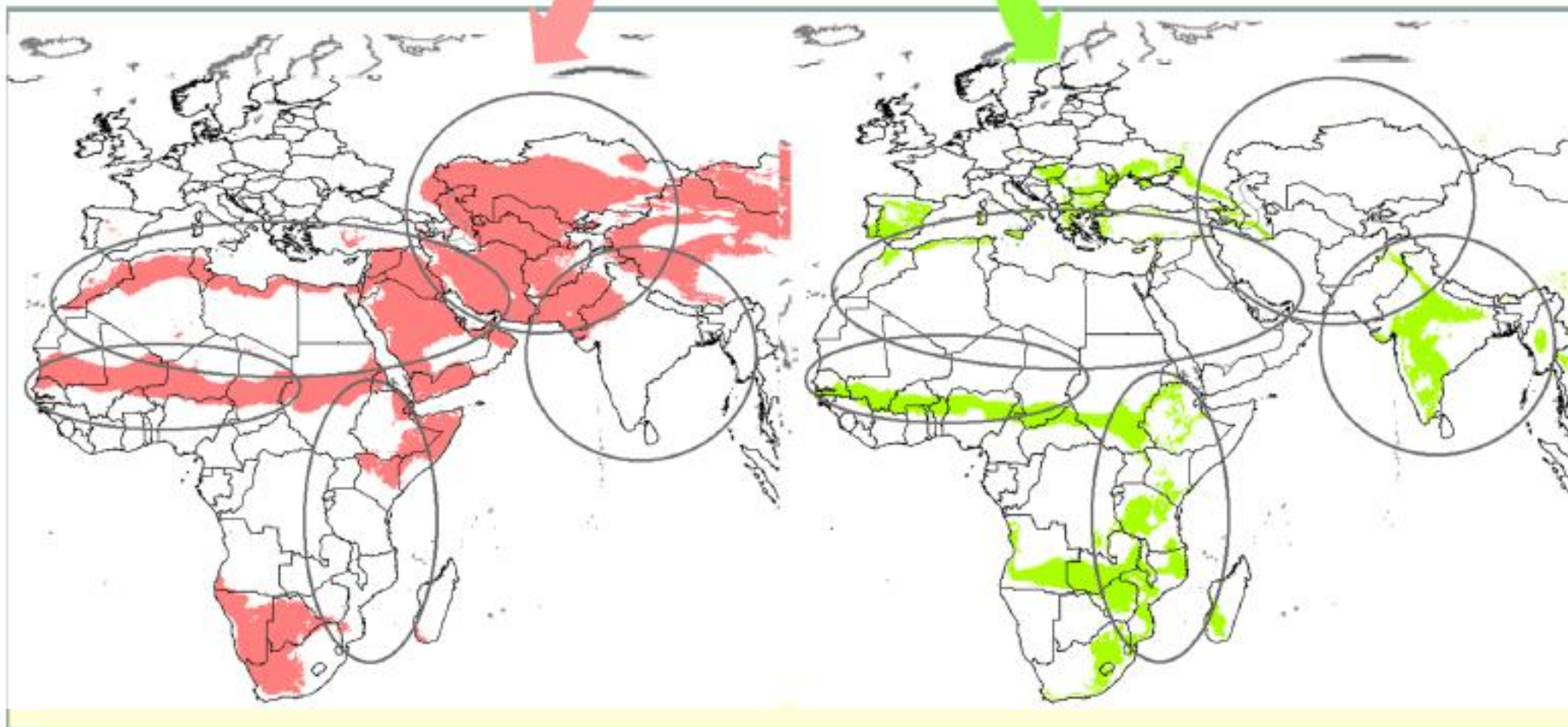
Sidi Bouzid site



Regional focus on vulnerability mitigation vs. Sustainable Intensification

Focus on
mitigating
vulnerability

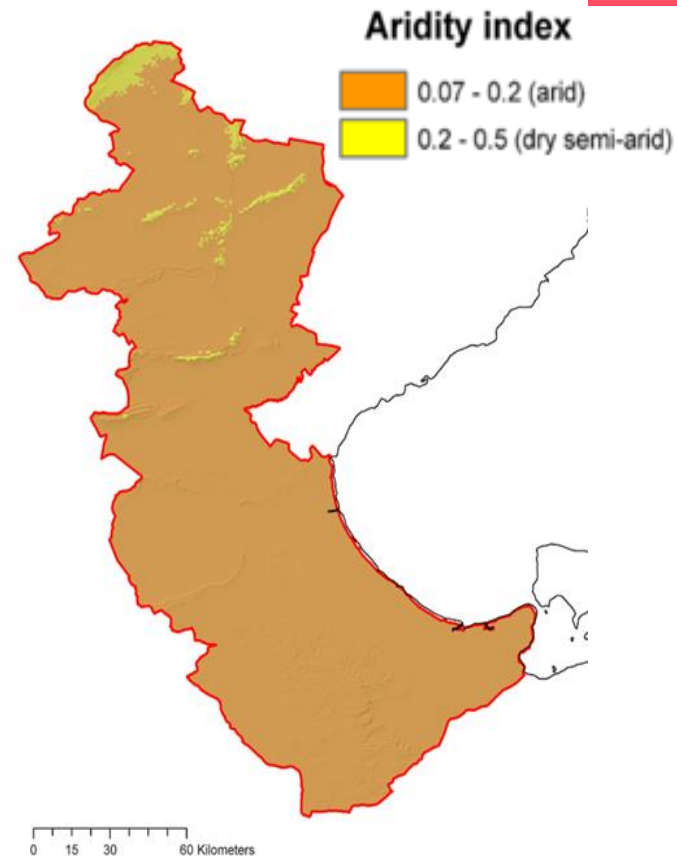
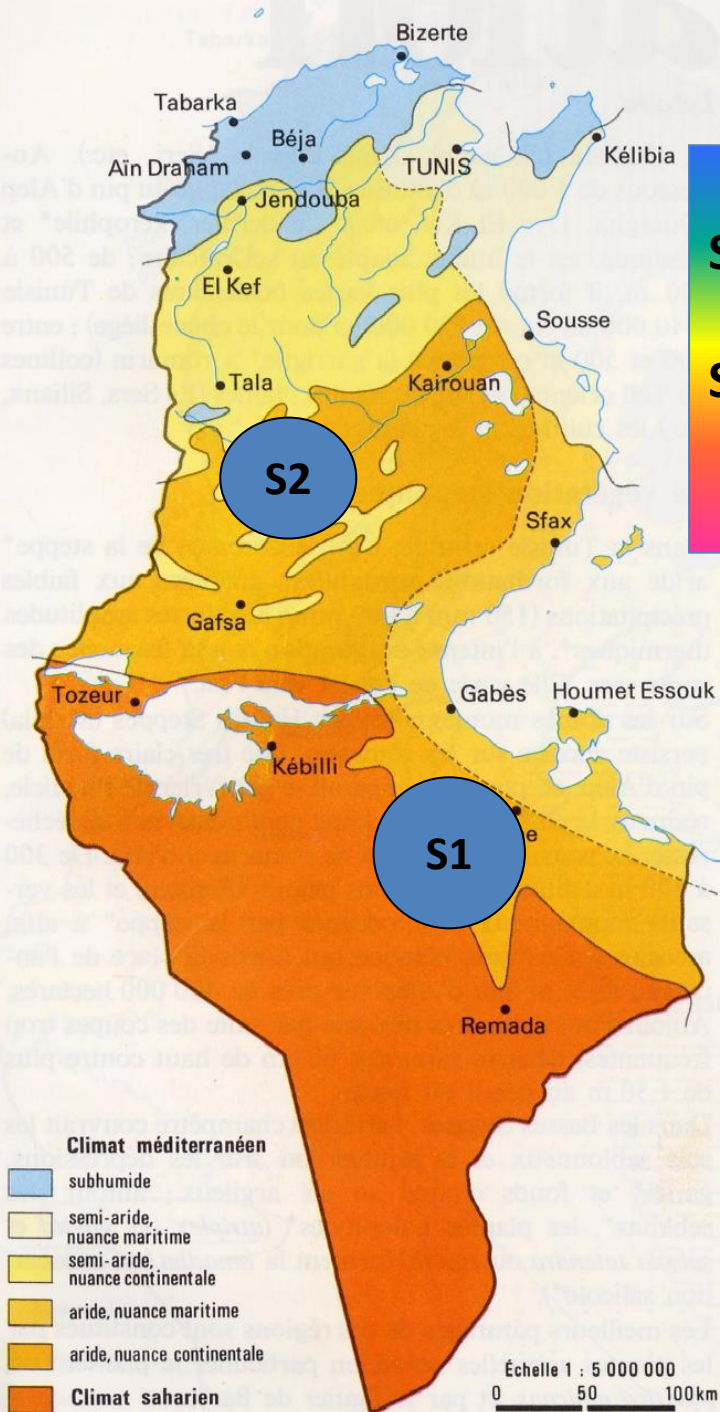
Focus on
sustainable
intensification



Study sites in Tunisia

S2 (Centre): Zoghmar/Sidi Bouzid (semi arid)

S1 (South) : Béni Khédache/Medenine (arid)



MAIN OBJECTIVES

- Improving agriculture sustainability in dryland areas by:
 - Integration of agricultural activities.
 - Coping with climatic change variations
 - Increasing resilient of dryland agroecosystems
 - Research innovations in dryland agricultural systems
- Food security improvement
- Dryland systems livelihoods

Steps made

1. Kick off meeting: **October**, 2013
2. Launching IP in Zoghmar: December, 2013.
3. Activities' implementation in Zoghmar in 2013
4. Workplan 2014

1. kick-off meeting:

- NARS + ICARDA (activity leaders) + other partners (ex. FAO, CIRAD), NGO
- Agree on implementation locations
- Develop detailed workplan and research teams
- Agree on budget allocation (ICARDA and NARS)

Outputs of the kick-off meeting

Ouput 1. Project target region



inhabitants	5000
Agricultural area	2914 ha
Cereals	56%
Pasture	33%
Fruit trees	17%
Irrigated area	4%

CRP1.1 MAJOR ACTIVITIES

- 1. CONSERVATION AGRICULTURE**
- 2. SMALL RUMINANTS PRODUCTIVITY**
- 3. WATER & LAND PRODUCTIVITY IN IRRIGATED SYSTEMS**
- 4. POLICIES ON NATURAL RESOURCES**
- 5. SYSTEM vulnerability**
- 6. BIO-ECONOMIC FARM MODELS**
- 7. GENDER IN DRYLANDS**
- 8. MANAGING AGRO-PASTORAL RANGELANDS**
- 9. INNOVATION PLATFORMS & SCENARIOS**
- 10. HIGH-VALUE CHAIN CLUSTERS**
- 11. IN-SITU BIODIVERSITY**
- 12. WATER HARVESTING & SOIL CONSERVATION**

OUTPUT 2.

Activity	Actions	NARS Leader	ICARDA Leader	Team involved	Institutes
1. CONSERVATION AGRICULTURE	3	Cheikh	Ben Salem	Jadlaoui,,Anna bi, Benyoussef, Abidi,	INGC, INRAT
2. SMALL RUMIN. Productivity	7	Bedhiaf	Rekik	Abidi, Gharbi BenYoussef , Zoghlami,	INRAT, EMVT
3. WATER & LAND PRODUCTIVITY in Irrig Syst	4	Hachicha	Boufaroua	Cheikh,Annabi, Bousselmi, Borji, Hachicha	INRAT, INGREF, CRRA SB
4. POLICIES ON NR	1	Daly	Telleria		INRAT
5. SYSTEM vulnerab	1	Daly	Mazid	Mariem, Zied	INRAT
6. BIO-ECONOMIC FARM MODELS	1	Frija	Yigezu		ESA Mograne

Activity	Action	NARS Leader	ICARDA Leader	Team involved	Institutes
7. GENDER DRYLAND					INRAT, FAO
8. MANAGING AGRO- PASTORAL RANGE	3	Benyoussef	Louahichi	Aziza & others	INRAT, INCR
9. INNOVATION PLATFORMS & SC	1	Daly & Bedhiaf	Aw-Hassan	all	INRAT
10. HIGH-VALUE CH. C	1	Daly	Aw-Hassan	Mariam ,Zied	INRAT
11. IN-SITU BIODIVERSITY	2	Zoghlami	Amri	Zoghlami, Benyoussef	INRAT
12. WATER & SOIL CONSERVATION	1	Hermassi	Ziadat	Hermassi Jabbari Hbaieb & Slimani	INGREF, INAT
TOTAL	25	7	12	18 research	9

Output 3. Budget 2013

- 30% NARS,
- 70% ICARDA: Time for ICARDA scientists, Operational costs for ICARDA, overhead

– Released November 2013

Implementation on the ground:

Progress 2013

Most of the activities have been launched
on the ground:

Staff has been working under pressure

INNOVATION PLATFORM in Zoghmar community in Sidi-Bouzid on December 23, 2013



A total of 190 participants from :

- Small farmers, policy makers
- International partners (FAO, ICARDA),
- National development organizations (CRDA Sidi-Bouzid, INGC, OEP), Extension, Agroprocessors
- National research institutions (INRAT, EMVT, CRRA Sidi-Bouzid),
- NGO's and local media attended the meeting.



Stakeholders shared their experiences in working groups



To identify the main constraints of smallholder farmers in Zoghmar community.

Opportunity:

- To identify institutional support to the program.
- to adjust activities



Preliminary Achievements

(October-December, 2013)

Activity 1- CONSERVATION AGRICULTURE (CA)

Action 1.1 Bed planting systems

Bed planting system

Vs

conventional

- Furrow irrigation
- Zero-till seeders

– D.Wheat-Om Lâadham

- Increased adoption
- More resilient livelihoods in marginal dry areas

Activity 1- CONSERVATION AGRICULTURE (CA)

Action 1. 2. Alley cropping under CA vs alley cropping in ConvA system

Conservation agriculture

- barley (1ha)
- rainfed vetch (0.5 ha)
- Mixture barley/vetch (0.5 ha)

Conventional agriculture

- barley (3ha)
- rainfed vetch (0.5 ha)
- Mixture barley/vetch (0.5 ha)





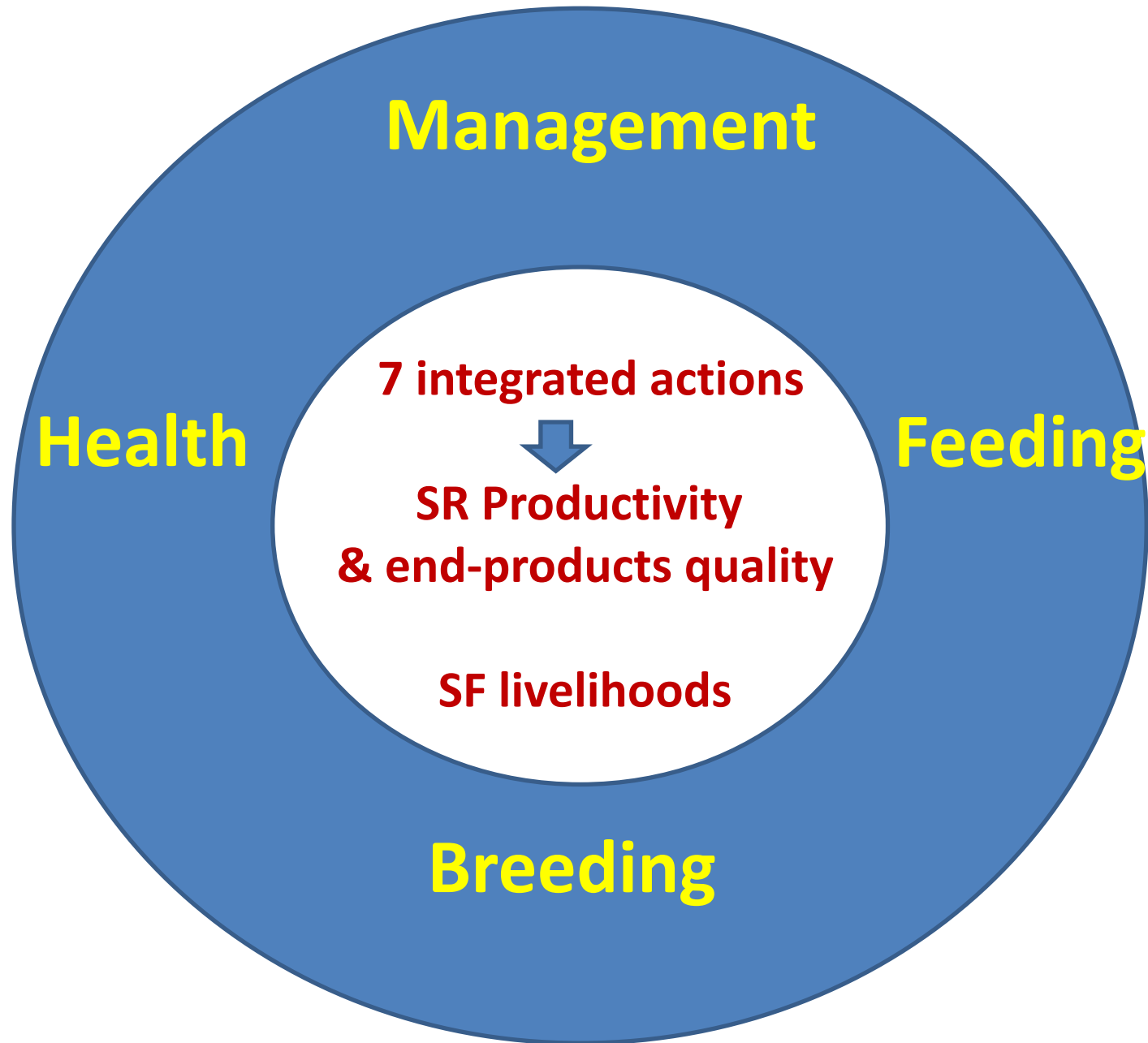
- Compare CA and conventional tillage on crop, land, soil.
- Increase awareness & knowledge of CA and alley cropping systems in low rainfall areas



Conservatio agriculture	National counterp	ICARDA counter	Brief description of the work to be done (<i>on-station or on-farm</i>)	Expected results 2014
Action 1.1. Conservation agriculture vs. conventional agriculture in SidiBouزيد	<p>Action leader: Hatem Cheikh M'hamed</p> <p>Action team: Mohamed Jadlaoui, Mohamed Annabi, Salah Ben youssef</p>	Hichem Ben Salem & HarunCicek	<p><i>Bed planting :</i></p> <ul style="list-style-type: none"> - Comparison between bed-planting system and conventional tillage system on crop yield, land, soil, water. <p><i>Zero tillage planting :</i></p> <ul style="list-style-type: none"> - Comparison between zero tillage and conventional tillage (2 ha of barley and D. wheat trials' installed on December 2013) on WUE, water storage and yield crops. - Implementation of 20 ha under CA system (November 2014) in 10 farms. - Organization of field days on ZT-seeders. - A field day on machinery issue under CA. - One field day on crops management under CA system. - Production of a leaflet on CA technology. 	<ul style="list-style-type: none"> - A zero-tillage seeder system for bed planting under CA conditions developed - CA technical package fine-tuned and promoted

Conservation agriculture	National counterparts	ICARDA counterparts	Brief description of the work to be done (<i>on-station or on-farm</i>)	Expected results 2014
Action 1.2. Alley cropping under CA vs. alley cropping under conventional system	Action leader: Salah Ben Youssef Action team: S.Abidi, M.Annabi, H.Cheick M'hamed,	Hichem Ben Salem , Harun Cicek Mounir Louhaichi, Mariana Yazbek	<p><i>Alley cropping system: Barley and barley-vetch mix cropping between cactus lines.</i></p> <ul style="list-style-type: none"> - 6 ha of an alley cropping systems (of which 3 ha are under zero-tillage system). - Evaluation of Alley cropping, in context of conservation agriculture (yields components, WUE, water storage in soil, feed quality). - Monitoring of in situ biodiversity encountered between cactus lines and in buffer zones (not cultivated) <i>see Action in situ agrobiodiversity.</i> <p><i>One leaflet on alley cropping and forage use of cactus.</i></p>	Technical Environmental and Economic benefits of alley cropping System evaluated

Activity 2- Small ruminant productivity



Activity 2- Small ruminant productivity

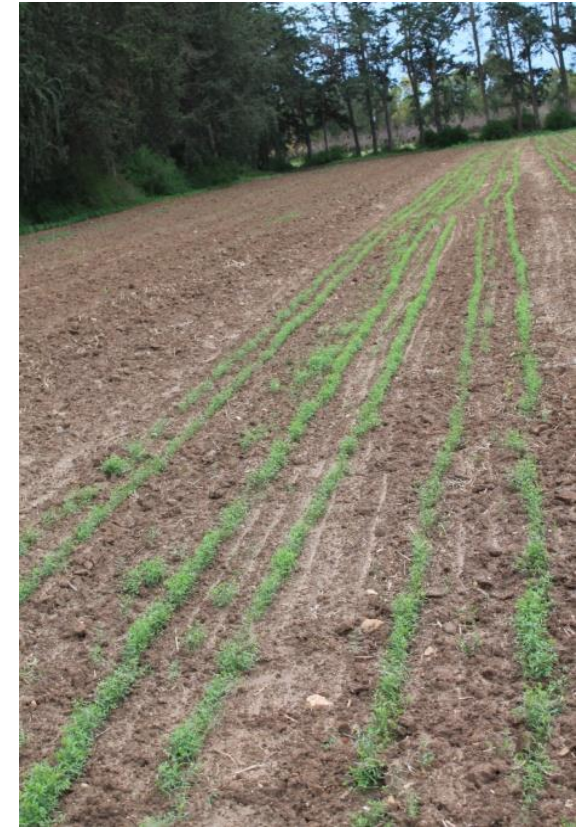
Action 2.1. Evaluation of underutilized dryland forage legumes for animal feeding and soil improvement



Vicia narbonensis



Lathyrus sativus



Vicia sativa

- Seed multiplication of drought tolerant forage legumes,
- sown later in alley cropping & under CA

Activity 2. SMALL RUMINANTS PRODUCTIVITY	INRAT counterparts	ICARDA counterpart	Planned subactions	Expected results from 2014
Action 2.1. Evaluation of underutilized dryland forage legumes for animal feeding and soil improvement (Testing mixtures and monocultures of forage legumes and cereals)	Benyoussef, Zoghlami, Abidi, Annabi	Serkan, Wamatu	-Seed multiplication of drought tolerant forage legumes (<i>Lathyrus sativus</i> , <i>L. cicera</i> , <i>Vicia narbonensis</i> , <i>V. sativa</i> , <i>Trigonella foenum-graecum</i>). - Comparison of different mixtures including forage and pasture legumes with barley (commercial variety) compared to their pure stands	-Evaluation of agronomic and nutritional potentials of the multiplied drought tolerant forage legumes. - First seed quantity of the multiplied drought tolerant forage legumes collected.
Action 2.2. Management of dual purpose barley and evaluation of the feeding value of regrown material following spring grazing	Benyoussef, Abidi	Wamatu, Serkan	-Comparaison of Seven barley genotypes: « 5 of which originated from ICARDA (Furat 1, Furat 2, Nawair, Rihane3 and Zambaka) and 2 from Tunisia (Lemsi and Ardhaoui) » for their dual purpose aptitude (forage + grain).	-Evaluation of agronomic traits, nutritive value and biomass production of different barley varieties tested for their dual purpose aptitude (forage + grain). -Basic management guidelines for dual purpose barley

<p>Action 2.3. Update a feeding survey and highlight the factors for Nutri. deficiencies.</p> 	<p>Abidi, Benyoussef</p> 	<p>Ben Salem, Wamatu</p>	<ul style="list-style-type: none"> - Sampling of feeds, water, blood, milk, meat ,wool, soil. - identifying feed calendar - identifying the major factors for nutrient deficiencies. 	<ul style="list-style-type: none"> - farmers feeding calendar identified - Nutritive value of feed - physical chemical characteristics of livestock Watering. - Compiling data base for further studies on water footprint modeling. - Farmers’ perception of feeding strategies (FEAST tool).
<p>Action 2.4. Identifying crossing practices and their impact on productivity.</p>	<p>Bedhiah</p> 	<p>Barbara, Rekik</p>	<ul style="list-style-type: none"> -Survey identifying smallholders’ crossing practices with relation to fattening and monitoring of fattening units. -Species/breed diversity with relation to breeding practices and the prevailing environment (production system) - GPS coordinates across the 	<ul style="list-style-type: none"> -Fattening practices identified -Breeding practices identified -lamb markets identified -Mapping of SR (spacial distribution of small ruminants across the target site 

Action 2.5. Study of quality end-products and health status of animal genetic resources	Bedhiaf, Gharbi, Abidi, Zoghلامي, Benyoussef	Rekik, Wamatu	<ul style="list-style-type: none"> -Evaluation of the effects of MAP on the quality attributes of the end-products. - Evaluation of the effects of selected MAP on the health of small ruminants. - control of main animal diseases and estimation of toxoplasmosis prevalence and gastrointestinal helminthes infection dynamics. 	<ul style="list-style-type: none"> - Local plants collected, -their effects on end-products' quality studied, -their anthelmintic activity tested, - Toxoplasma gondii protozoan (as an abortive infection) studied. - A programme gastrointestinal control established.
Action 2.6. Optimization of feeding, culling and selection practices for SR to improve their productivity.	Bedhiaf, Abidi, Gharbi, Benyoussef,	Ben Salem, Rekik	<ul style="list-style-type: none"> -Establishment of practical guidelines in feeding, culling and selection for small ruminants. - Plantation of cactus varieties - Conception cactus feed block unit. -Barbarine sheep breed fair. 	<ul style="list-style-type: none"> -Livestock management guidelines under low input production systems developed. - Construction of a feed block unit
Action 2.7. Characterization of small ruminant & identification of markers related to economic traits	Bedhiaf, Gharbi	Barbara Mwacharo	<ul style="list-style-type: none"> -Animal genetic resources management and implications for a breeding program. -identification of specific markers of fat tailed sheep linked to quality end products and disease resistance. 	<ul style="list-style-type: none"> -formation of farmers breeding group -implementation of ram nucleus program -identification of resistant animals to disease

Activity 3- Water and land productivity in irrigated systems

Action 3.1. Crop production with supplemental irrigation system to improve WUE

Rainfed system	Supplemental irrigation system
<ul style="list-style-type: none">- barley (2 ha)- vetch (0.5 ha)- Durum wheat (0.5 ha)- Alfalfa (0.25 ha) sown march	<ul style="list-style-type: none">- barley (1 ha) (aspersion,- vetch (0.25 ha) (aspersion,- Durum wheat (1 ha)- Alfalfa (0.5 ha) sown in march

- Compare water and land productivities in the 2 systems
 - Quantify the water productivity supported by irrigation management support system



- Develop and disseminate irrigation and fertility package utilizing fresh and marginal (graywater) quality waters to improve land and water productivities



Activity 4. POLICIES ON NATURAL RESOURCES

- Policies to be studied are going to be identified based on demand-driven approach.
 - Analysis (impact) and formulation of seed policies (wheat, barley);
 - Analysis (impact) and formulation of water and groundwater policies (systems);
 - Specific policy is the study of subsidy on cactus and wheat production.
 - Impact of the subsidies on land-use (livestock and cropping) on animal feeding, farming systems, and household income.

Activity 5. System Vulnerability

Action 5.1. Establishing Baseline survey

- 200 surveys realized in WLI project
 - to identify the constraints of production
 - to determine vulnerability cases
 - Production systems (both crop and livestock) characterized
 - Feed and water resources identified and quantified



Activity 6. Bioeconomic models

- **NARS leader moved to ICARDA**

Activity 7. Gender Issues (FAO)

Activity 8. Managing agropastoral rangeland

Action 8.1. Assessing the performance of major pasture species

- **Medic and Vicia** species multiplication trial was implemented at Chebika OEP station in November 2013.
- Seeds were provided by INRAT

Species	Accession/variety	Origin
<i>Medicago Littoralis</i>	41	local
	273	
	173	
	-	Unknown
<i>Medicago polymorpha</i>	327	Local
	114	
<i>Vicia sativa amphicarpa</i>	139	
<i>Vicia sp.</i>	103	
	32	
<i>Vicia sativa</i>	INRAT303	Local/commercial cultivar
	Mghila	
	VS8	ICARDA
	VS15	
<i>Vicia narbonensis</i>	VN9	
	VN1	local
<i>Lathyrus cicera</i>	156	
<i>Lathyrus sativus</i>	-	



Activity 10. HIGH-VALUE CHAIN CLUSTERS

- Preliminary selection of promising high value products.

2014 planning

- Through investigations on the selected products,
- Clustering of products.

Cluster Innovation / Value Chain Analysis (Integrated sheep/cactus products

Aim : to improve the livelihoods of farmers and “SidiBouزيد Sheep” supply chain in Sidi-Bouزيد region, by improving marketing efficiency, postharvest management, and value addition.

Specific objectives of this activity in 2014 will be:

Objective 1: To map social, economic and physical components of Sheep supply chains.

Objective 2: To develop locally appropriate postharvest handling and processing options.

Objective 3: To facilitate the development of stakeholder-driven strategies.

Activity 11. In-situ Biodiversity

Action 11.1. Assessment and monitoring of crop wild relative species diversity and their threats, including the use of GIS/RS tools.

- A rich diversity of forage and pasture legumes was observed in Zoghmar and Bouhedma park
- Seed collection



Tetragonolobus

Astragalus armatus

Activity 12. WATER HARVESTING & SOIL CONSERVATION

Olive trees irrigated from lake



Rock belt for the lake



Work plan 2014

Small ruminant productivity

WoP 2014 for remaining activities (in progress)

1. CONSERVATION AGRICULTURE (priority1)
2. **SMALL RUMINANTS PRODUCTIVITY(priority1)**
3. WATER & LAND PRODUCTIVITY IN IRRIGATED SYSTEMS (priority 2)
4. POLICIES ON NATURAL RESOURCES (priority 1)
5. SYSTEM vulnerability (priority 2)
6. BIO-ECONOMIC FARM MODELS (priority 2)
7. GENDER IN DRYLANDS (priority 1)
8. MANAGING AGRO-PASTORAL RANGELANDS (priority 1)
9. INNOVATION PLATFORMS & SCENARIOS (priority 1)
10. HIGH-VALUE CHAIN CLUSTERS (priority 2)
11. IN-SITU BIODIVERSITY (priority 3)
12. WATER HARVESTING & SOIL CONSERVATION (priority 2)

Thank you