

Social, Ecological and Agricultural Resilience in the face of climate change in the Mediterranean Region (SEARCH) Toolkit and Resilience Framework

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12 May 2015



I. Toolkit

- **Aim of the Toolkit**

- To provide guidance and recommendations on how to develop climate change resilient strategies and plans at national, sub-national and local levels.

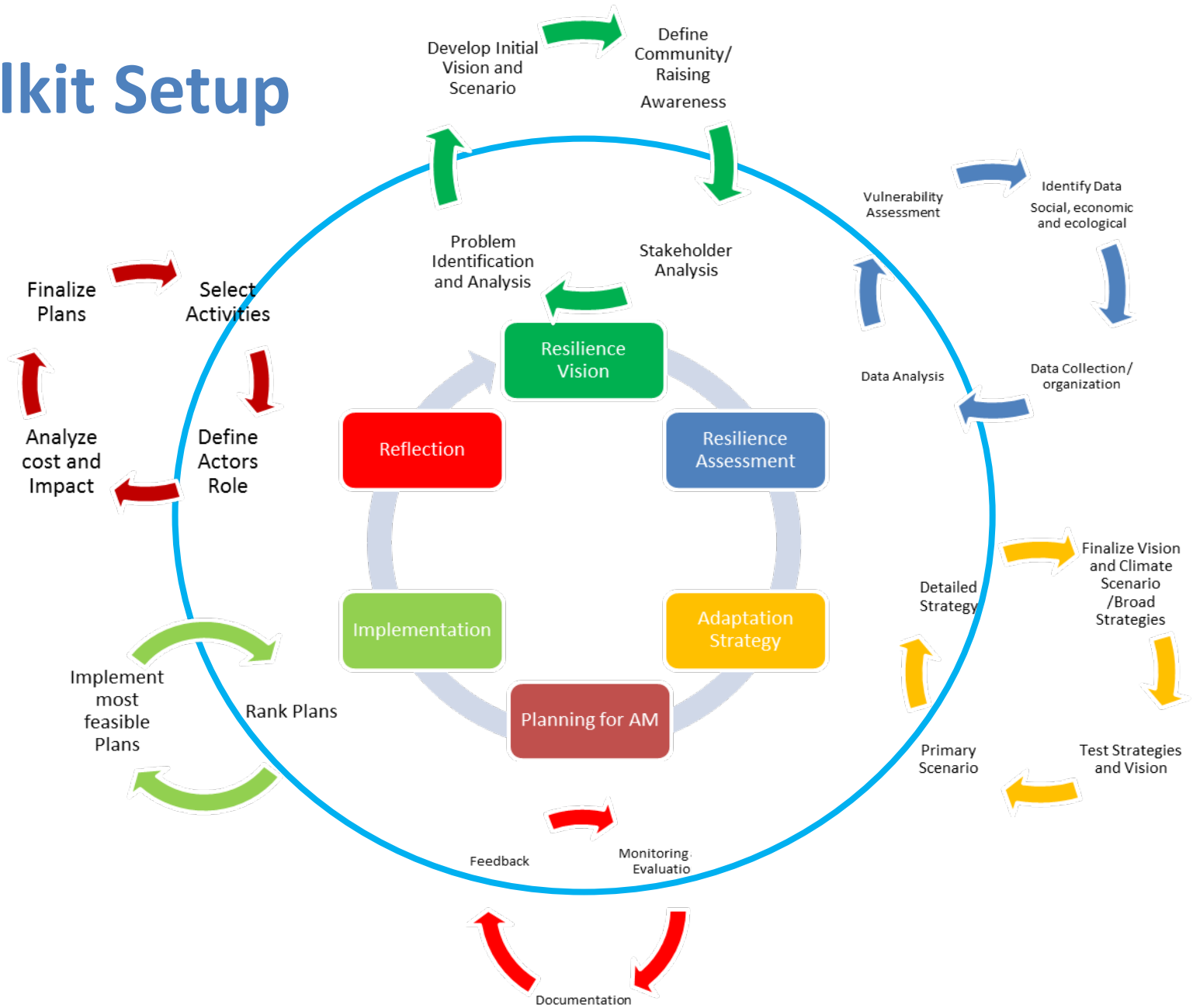
Use of the Toolkit

- Stakeholder analysis
- Identify problems
- Assess vulnerabilities and resilience of social and ecological systems,
- Prioritize adaptation options and develop climate resilient plans,
- Provide a solid knowledge base for decision making,
- Link theory with practice, research with application.

The Added Value of the Toolkit

- It provides practical tools for guiding various practitioners, planners and decision makers in **integrating climate change risks** in the strategies and plans at National, local and also at watershed levels.
- It clearly demonstrates the **flows of activities** under each practical step and shows how these **different steps are interlinked** to deliver integrated and more resilient climate change adaptation plans.

Toolkit Setup



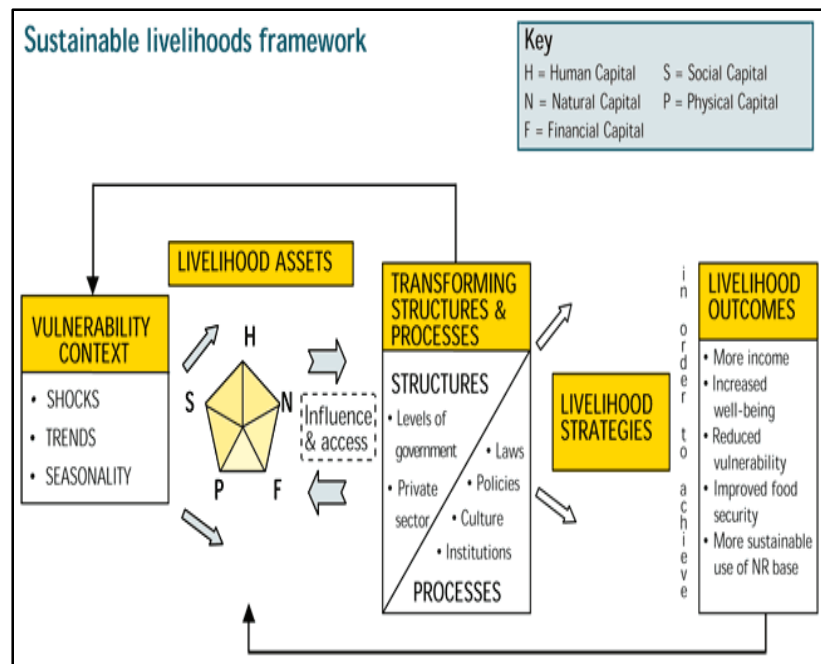
Toolkit Structure

	Toolkit Structure		
	PPC Step		Used Tools / Methods
STEP 1	Developing Initial Vision and Understanding the System	→	1. Situation analysis - RIDA 2. RAAKS and PRA 3. Problem Tree
STEP 2	Vulnerability Assessment	→	1. CRISTAL 2. CVCA 3. Ecological Vulnerability 4. Sustainable Livelihood Approach 5. Vulnerability Mapping
STEP 3	Adaptation Strategy Development	→	1. Analysis and Refinement of Vision and Scenario workshop 2. Scenario Building workshop 3. Finalization of Detailed Strategy (worksho)
STEP 4	Planning	→	1. Planning Workshop. 2. Prioritization and Ranking. 3. Action Plans Development
STEP 5	Implementation	→	1. Pilot and Demonstration Projects. 2. Accountability and Rights Analysis
STEP 6	Reflection	→	1. Multilevel, multi stakeholder Platform Creation. 2. Process Documentation 3. Information and Knowledge management including communication. 4. M&E and feed back

STEP2 - Vulnerability Assessment Tools

Community-based Risk Screening – Adaptation and Livelihoods (CRISTAL) Tool Sustainable Livelihood Tool

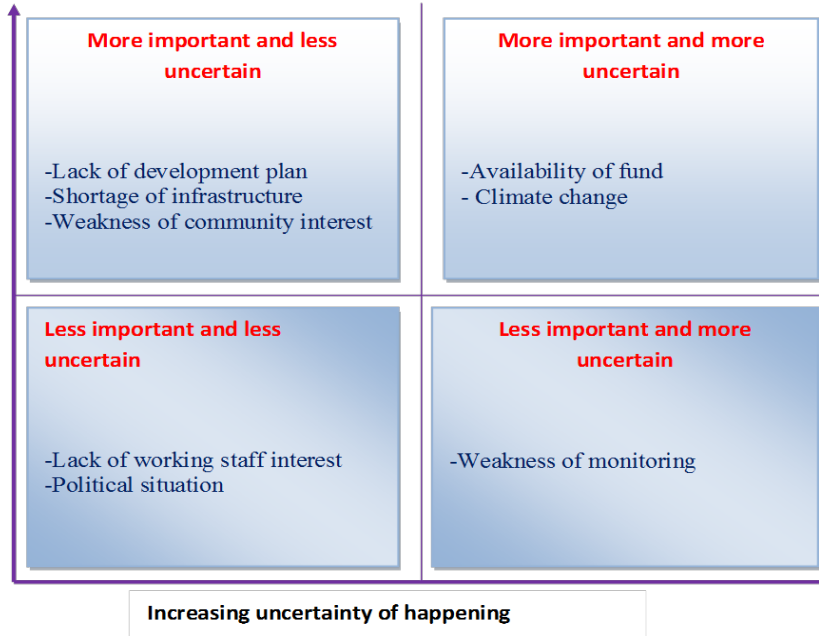
Affected area/ sector	Event(hazard s)	Vulnerability Assessment of the watershed			
		Exposure	Degree of Sensitivity of the System	Degree of the adaptive capacity	Vulnerability of the area
Downstream area	Flood	High-As runoff accumulates in the downstream area.	High-The downstream area is very sensitive to flood.	Low- only upgrade the system partially, and they are costly.	High
Water sources	Drought	High-Groundwater is directly affected by the amount of precipitation.	High-Summer water needs already greater than production	Medium- There is an ability to regulate groundwater exploitation	High
Plantation area and infrastructure	Frost wave	Medium-causing severe impacts on the area.	Medium-change from year to year.	Low-Negative impacts mostly limited to some crops.	Medium
	Wind storm	Medium-mostly cause damage of crops, and infrastructure	Medium- it is considered costly for some people.	Medium-	Medium



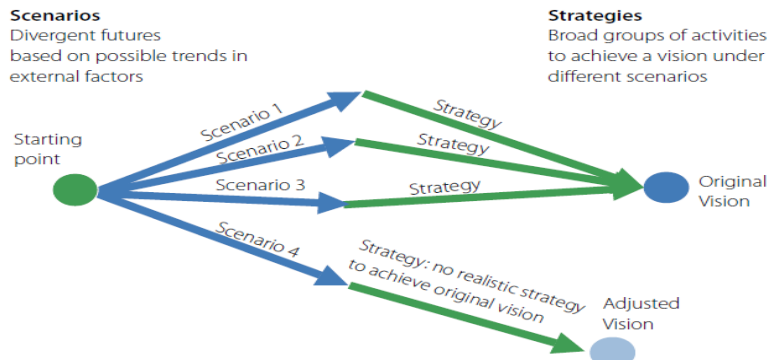
	High °C and low p		
Livelihood Assets	Andaket	Karmchbaat	Qoubyat
Human Capital			
Education Level	High	Medium	High
Poverty Level	Low	High	Low
Natural Capital			
Dependency on Agriculture	Low	High	Low
Dependency on Water Resources	High	High	High
Physical Capital			
Ownership of Land	Yes	Yes	Yes
Social Capital			
Membership in Local Societies	High	Medium	High
Financial Capital			
Dependency on Employment Salary	High	Medium	High

STEP3 - Adaptation Strategy Development Tools

Analysis and Refinement of Vision and Scenarios



Scenario Building



Finalisation of Detailed Strategy

Activities	Scenarios		
	S1	S2	S3
Mobilizing community resources to adapt to climate change	√		√
Involving private sector in the activities to adapt to climate change.	√		√
Establishing partnerships with donors in order to fund projects that strengthen farmers to adapt to climate change.	√		√
Projects to manage solid and liquid wastes in all villages of the district.		√	√
Producing bio fertilizers using agricultural wastes.	√		√
Follow the Crop rotation (which organizes the process of cultivating)	√	√	√
Provision of crop varieties adapt to the effects of climate change (high temperature and water shortage).	√	√	√
Preventing encroachment on agricultural land.	√	√	√
Laser leveling	√	√	√

STEP4 - Planning Tools

Ranking

Sustainable Technical interventions	Implementation tools	Relevant Stakeholder
Connect houses to the sewage network to prevent pollution of the ground water	Waste water management project	Ministry of Water and Irrigation, Water Authority
Monitoring system for the wells that are used by factories, farms, and quarries	Monitoring Program for industrial and agricultural water	(MOWI), Water Authority, Ministry of Environment (MOEnv), Ministry of health (MOH)
Grey water reuse (mainly kitchen)	Supported and funded project	MOEnv, MOH, JOHUD, Royal Scientific Society (RSS)
Rehabilitation of the Local springs	Springs development	Ministry of Agriculture, Ministry of Water and Irrigation, Ministry of Interior
Rain water harvesting	Cisterns reservoir	WA, CBOs through revolving funds' system, MoA, (ACC)
Introducing food processing and an appropriate marketing system	Community Revolving funds	CBOs, Donors

Weight		1	2	3	
Criteria		Rating Scale	Project1	Project 2	Project 3
Social	Job creation	1			
	Health impact				
Economical	Expected Revenue	2			
	Cost				
Environmental	Pollution	3			
	Preserving	4			
Technical	Technology	5			

Prioritization Matrix

Project	Need of local communities	Constraints	Budget estimate (USD)	Source of financing	Priority
Rehabilitation of old water tanks and installation	High	Availability of funds from municipal contribution Unstable security situation in the overall region	28,000	SEARCH	1
Promote alternative income generating activities to	Medium	Limited awareness and knowledge of the locals Unstable security situation in the overall	20,000	Fundraising	2
Develop a rotational grazing program for Aydamoun and Qobayat forests	Medium	Persistence of ingrained (ancestral) unsustainable overgrazing	35,000	Fundraising	3
Develop and implement a forest management plan for Aydamoun and Qobayat to control	Low	Ingrained unsustainable overgrazing habits Landownership concern Lack of technical forestry experts specialized in	25,000	Fundraising	4

STEP5 - Implementation Tools

Accountability and rights analysis

Pilot and Demonstration Projects

<u>Pre-Conditions for Success or Failure of accountability</u>	<u>Ok</u>	<u>Mid</u>	<u>Slight</u>	<u>Low</u>
Awareness/Capacities & knowledge	Local community has capacity & skills to adapt to climate change	People are aware of problem & have the ability to rank priorities	Local community is aware of the available resources with capacities to identify problems	Local community is aware and have knowledge of their natural situation
Benefits	considering the needs of various social groups	Understanding the different interest & rights of various social groups	Address rights and interest of others in the community	Identify individual interest regarding natural resources
Access Rights and Control	Group accountability to government authorities for respecting their rights	Local community accountability towards respect for the right of different social groups	Rights and roles of different community groups are addressed	Dominant groups have access according to rights
Group process	Organized groups have the ability and capacity to claim benefits	Consider social diversity within organized groups	Identify various social group in forming organized groups	Organized group include dominant sector only



STEP6 - Reflection Tools

- **Multi-level, multi-stakeholder platform creation**
- **Process documentation**
- **Information and knowledge management including communications**
- **M&E and Feedback**

II. SEARCH Resilience Framework

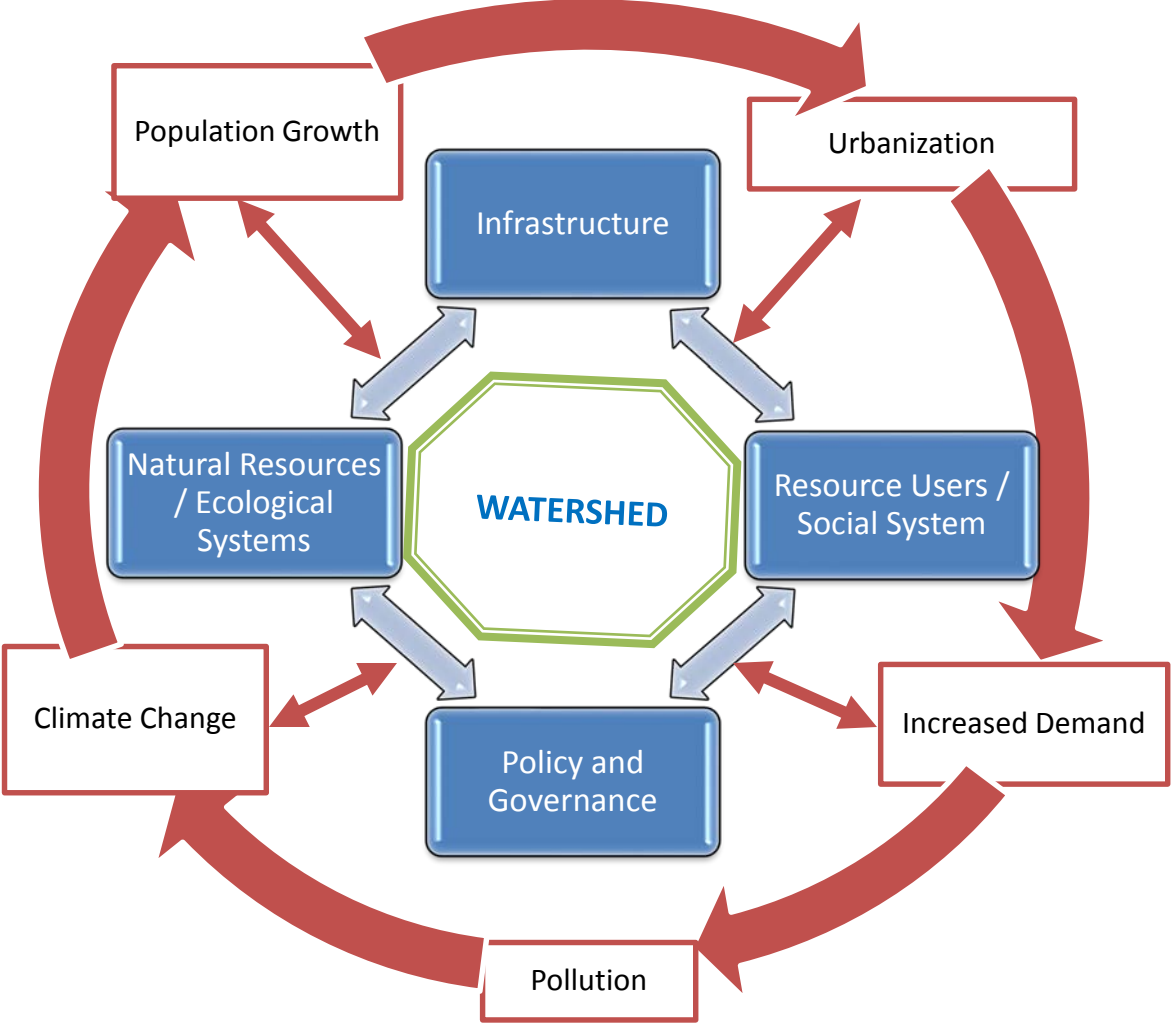
Defining Resilience

SEARCH

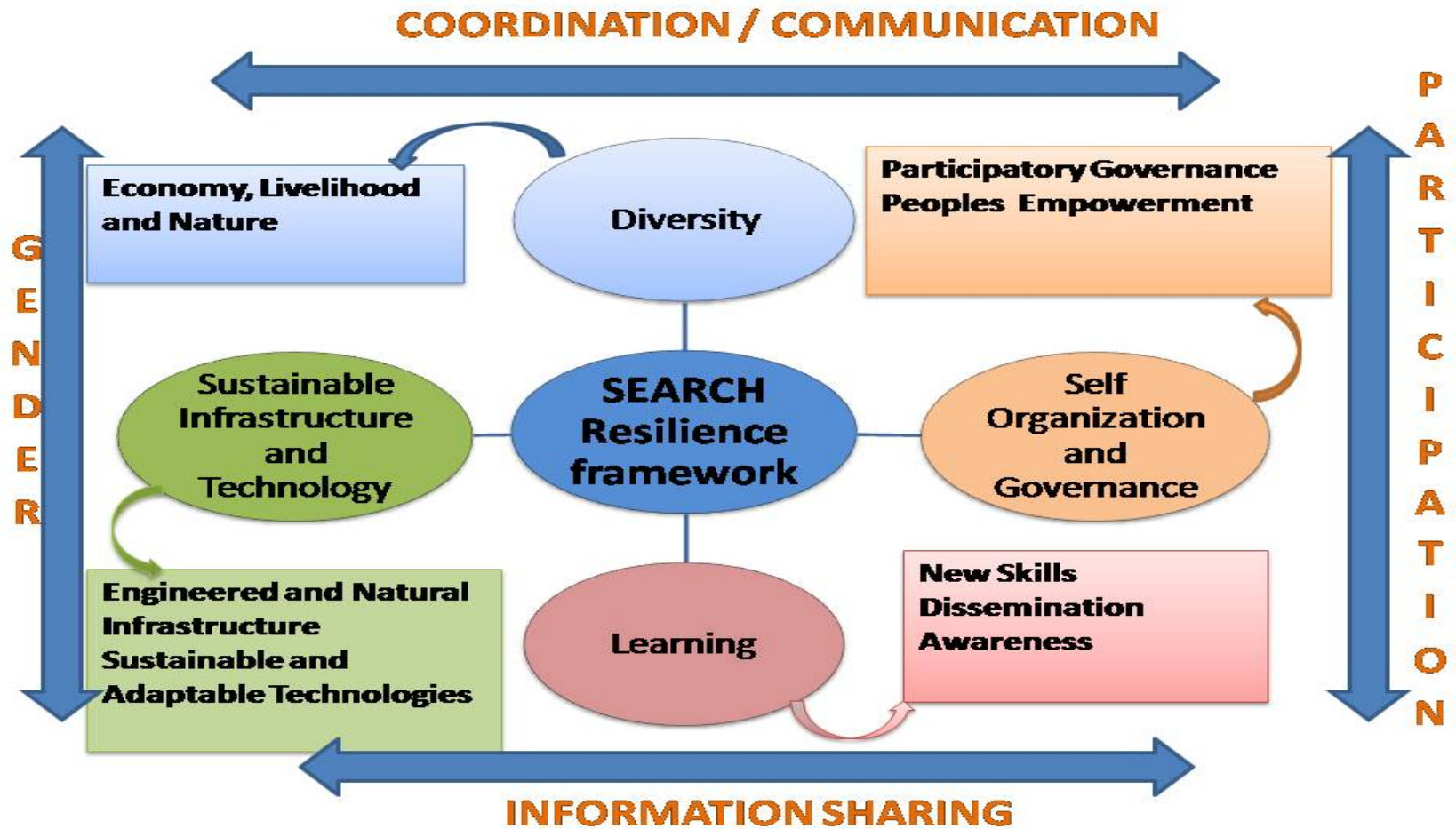
“A watershed system’s capacity to absorb, manage, and adapt to social and health, agricultural, and ecological changes (or stressors) while still maintaining its essential structure, feedbacks, and functionality.”

- **IPCC 2008**

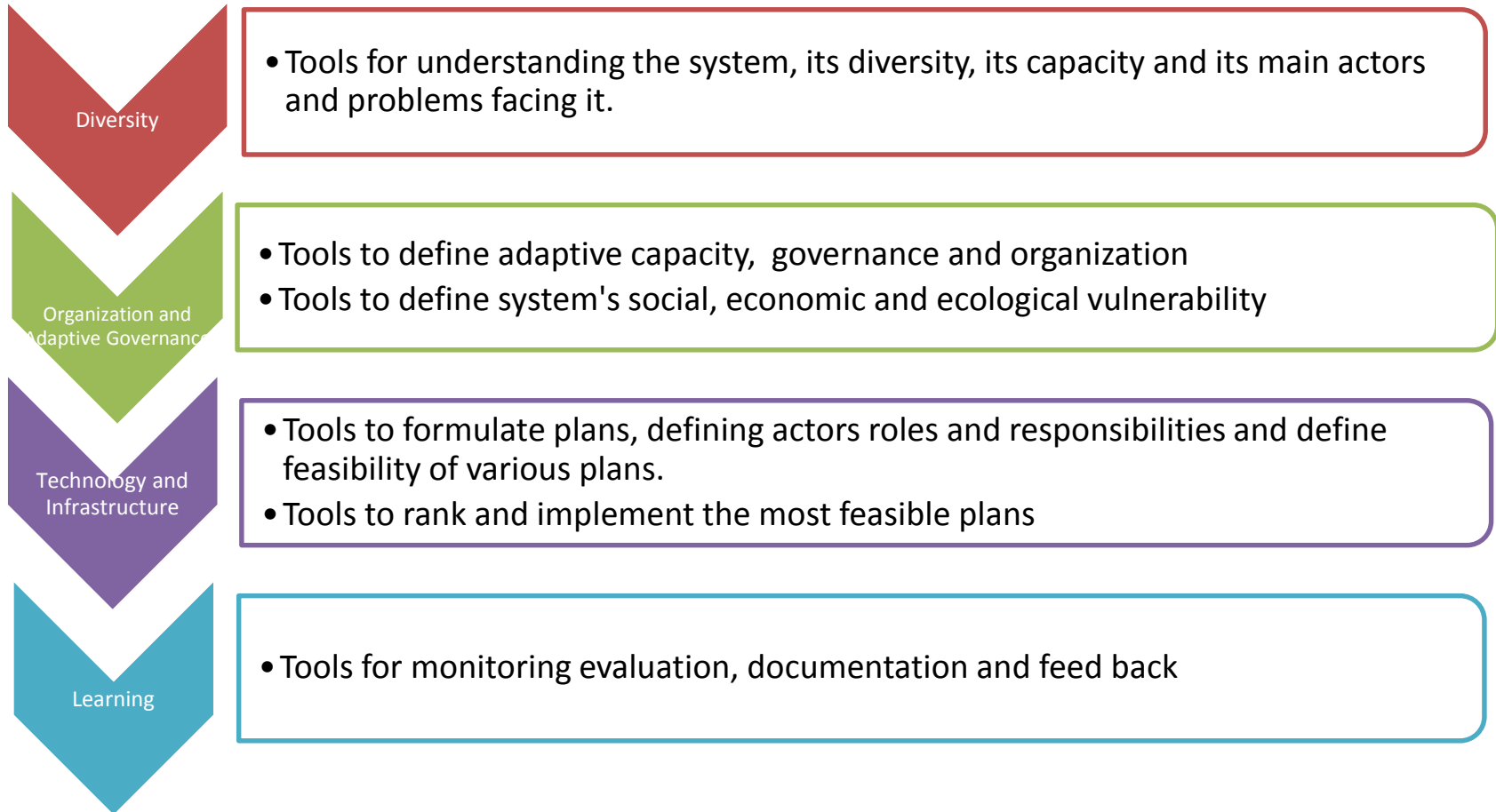
"The ability of social and ecological system to absorb disturbances while maintaining the same basic structure and functioning. The capacity for self – organization and the capacity to adapt to stress and change".



Resilience Framework



Linking Toolkit with Resilience Framework



Resilience Assessment

- methodology is based on qualitative multi-attribute modelling supported by the DEXi software.
- final goal for the designed tool is to help monitoring and assessment of resilience by identifying and characterizing positive change (the shift) when this occurs.
- The proposed framework also seems to allow for both consistency and flexibility

Model Structure

- Define Criteria to measure resilience –
 - 14 attributes representing the weakness of the system (used to assess vulnerability in the project sites and for different sectors)
 - 16 attributes related to adaptive capacity and the strength of the system properties were selected.
- All attributes used are qualitative and can take discrete and symbolic values represented by words. In our model, we used a maximum five-grade value scale ("very high", "high", "medium", "low", "very low")
- **Decision attributes** is aggregated from basic attributes (terminal nodes) towards the output (root node)

Attribute	Scale
resilience	<i>very high; high; medium; low; very low</i>
diversity	<i>very high; high; medium; low; very low</i>
economic services	<i>very high; high; medium; low; very low</i>
gdp	<i>increase; constant; decrease</i>
income	<i>suffisant; insufficient; zero</i>
health services	<i>developped; available; not available</i>
percentage local budget	<i>high; medium; low</i>
government contribution	<i>high; medium; low</i>
livelihoods	<i>very high; high; medium; low; very low</i>
stability of income	<i>stable; fragile; instable</i>
poverty level	<i>high; medium; low</i>
sources of income	<i>diversified; medium; limited</i>
migration rates	<i>immigration; zero; emigration</i>
natural services	<i>very high; high; medium; low; very low</i>
water resources	<i>abundant; available; scarcity</i>
deforestation/desertification	<i>high; medium; zero</i>
land ownership & quality	<i>equitable-productive; equi-marginal; not equi-productive; not equi-marginal</i>
natural cover	<i>high; medium; low</i>
species	<i>high richness; medium; poor</i>
integrated land use planning	<i>present; absent</i>
capital-innovation	<i>high; medium; low</i>
built capital	<i>high; medium; low</i>
domestic water supply	<i>generalized; partial; absent</i>
wastewater facilities	<i>available; not available</i>
energy services	<i>electricity; petrol; wood</i>
techn. exp. available	<i>high; medium; low</i>
natural capital	<i>high; medium; low</i>
natural infrastructure	<i>high connectivity; medium connectivity; low connectivity</i>
use of local knowledge	<i>high; medium; low</i>
innovation	<i>high; medium; low</i>
self-organisation	<i>high; medium; low; very low</i>
local level	<i>high; medium; low</i>
n & type of CBOs	<i>active; present; absent</i>
facilitation & leadership	<i>active; present; absent</i>
intermediate level	<i>high; medium; low</i>
equity	<i>high; medium; low</i>
legitimacy	<i>high; medium; low</i>
national level	<i>high; medium; low</i>
cross-scale institutions	<i>active; present; absent</i>
accountability	<i>high; medium; low</i>
coordination GOs	<i>high; medium; low</i>
learning	<i>very high; high; medium; low; very low</i>
awareness	<i>high; medium; low</i>
support of community education	<i>high; medium; low</i>
learning per se	<i>high; medium; low</i>
learning from crises	<i>high; medium; low</i>
capacity	<i>high; medium; low</i>

Evaluation results

Attribute	Resilience before project	Resilience after project
resilience	very low	low
diversity	very low	medium
economic services	very low	very low
gdp	constant	constant
income	insufficient	insufficient
health services	not available	not available
percentage local budget	low	low
government contribution	low	medium
livelihoods	low	medium
stability of income	fragile	fragile
poverty level	medium	medium
sources of income	limited	medium
migration rates	zero	zero
natural services	high	high
water resources	available	available
deforestation/desertification	medium	medium
land ownership & quality	not equi-productive	not equi-productive
natural cover	medium	medium
species	high richness	high richness
integrated land use planning	absent	present
capital-innovation	low	medium
built capital	low	medium
domestic water supply	absent	partial
wastewater facilities	not available	not available
energy services	electricity	electricity
techn. exp. available	low	medium
natural capital	medium	medium
natural infrastructure	medium connectcivity	medium connectcivity
use of local knowledge	medium	medium
innovation	medium	medium
self-organisation	low	medium
local level	low	high
n & type of CBOs	present	active
facilitation & leadership	absent	present
intermediate level	low	medium
equity	low	medium
legitimacy	medium	medium
national level	medium	medium
cross-scale institutions	present	present
accountability	medium	medium
coordination GOs	medium	medium
learning	low	low
awareness	medium	medium
support of community education	medium	medium
learning per se	low	low
learning from crises	low	low
capacity	low	medium

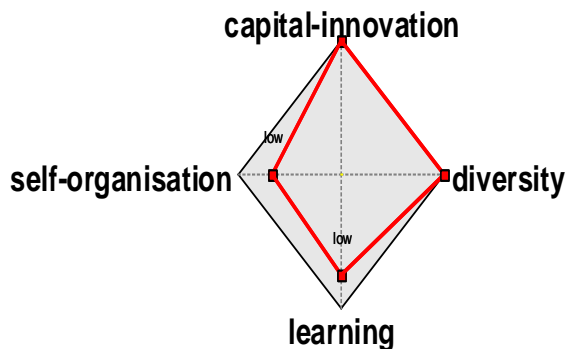
Model Results

- increase of government contribution (through funds of Morocco Green Plan)
- increase of sources of income (improvement of tree fruits and aromatic herbs plantation)
- promotion of integrated land use planning (elaboration of a tool kit to integrate climate change and land use planning in municipal development plans)
- partial improvement of domestic water supply (domestic rainwater harvesting)
- increase of technical experience available (through trainings on aromatic herbs planting and through constructing rainwater harvesting systems)
- shift of number and type of CBOs from present to active (increase of number of CBOs by creation of one association of farmers and two groups of women, empowerment of one agricultural cooperative of women).
- enhancement of cooperation between local organizations (equity)
- empowerment of capacity (training of farmers, introduction of new agricultural practices, publication of several documents as learning tools, exchange of information, facilitation of group processes)

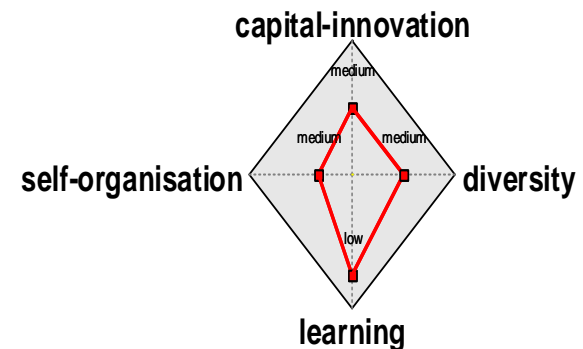
Outcome

- Components of Resilience that have changed were
 - Diversity (from **very low to medium**) mainly because of a slight increase of sources of income of livelihoods,
 - Capital and Innovation (**from low to medium**) due to the introduction of a rainwater harvesting technique and improvement of technical experience available,
 - Self-organisation (**from low to medium**) at local and intermediate levels.
 - **Overall resilience shift has been from "very low" to "low".**

Resilience before project



Resilience after project



Conclusions

- Using the various tools listed in this toolkit will **only provide guidance** for the users to enable them from indentifying the main climate risks and resilience and how they can develop recommendations to integrate such resilience within national plans and strategies.

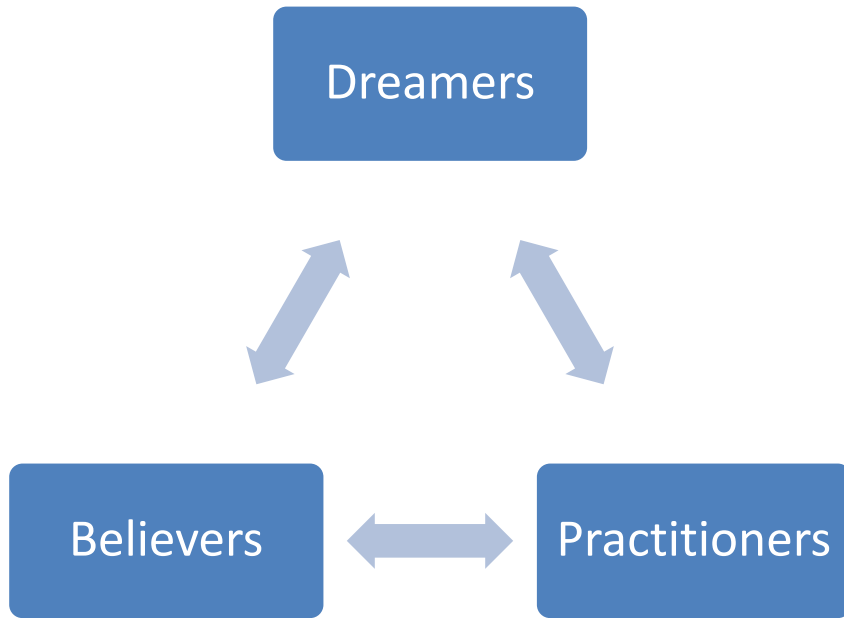
Conclusions

- Resilience, there is a lack of awareness throughout the sector and the general public of the concept and its application.
- To integrate success stories from local level project implementation into more strategic planning instruments at broader scales
- Adaptation based solely on **prioritisation of discrete actions** – for example on infrastructure, institutions, or ecosystems – **may lead to missed opportunities** to build resilience towards a dynamically changing climate, where uncertainty and unknowns are expanding

Conclusions

- Building climate resilience is dependent on how well established the adaptive governance capacity is (**the ability to apply adaptation measures in practice from community to national and basin scale**).
- Ensuring a good adaptive governance capacity requires that local knowledge, access to resources, leadership, mobilisation, and financing are available to strengthen the resilience.

Conclusions



Act sequentially but cumulatively
to make the positive change

- **Dreamers** (or planners, visionaries) are those who can initiate the logic for change - ambassadors for mainstreaming climate change within national strategies.
- **Believers** or the champions of the resilience building process (the Facilitation Team) are those who take on the role of advocating and guiding the process to develop resilient plans
- **Practitioners (Doers)** at the local level are those who will transform theoretical knowledge into practical implementation plans on the ground through testing and piloting and selecting the best plans.

Recommendations

- Involving all relevant stakeholders, including dreamers, believers and practitioners in planning process **from its early stages**.
- Raising awareness about the conditions of vulnerability.
- Identify the Gaps in capacities needed among both believers and practitioners to be identified and addressed early on and to be bridged.

Recommendations

- Empower politicians by providing relevant information to better understand the societal costs of **not working on resilience**
- Create an environment where believers and practitioners are encouraged to experiment with small-scale innovations that make incremental improvements on present practice.
- Ensuring widespread recognition of those championing innovation.
- Create both formal and informal opportunities for practitioners to communicate and share ideas
- Focus on initiatives that bring tangible results at the early stage of planning

THANK YOU