Palestinian Hydrology Group

22/03/1433

People's Resilience in Arid and Conflict Areas in the face of Foreseen Global & Climate Changes in the occupied Palestinian territory

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What is Resilience?

- **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 (IPCC 2008).
- The capacity to cope with change and rebuild when necessary.

Main Factors Influencing Resilience in Palestine

1. Natural

   Climate Change – Drought -Water scarcity

2. Political

   Occupation and Control of Natural Resources

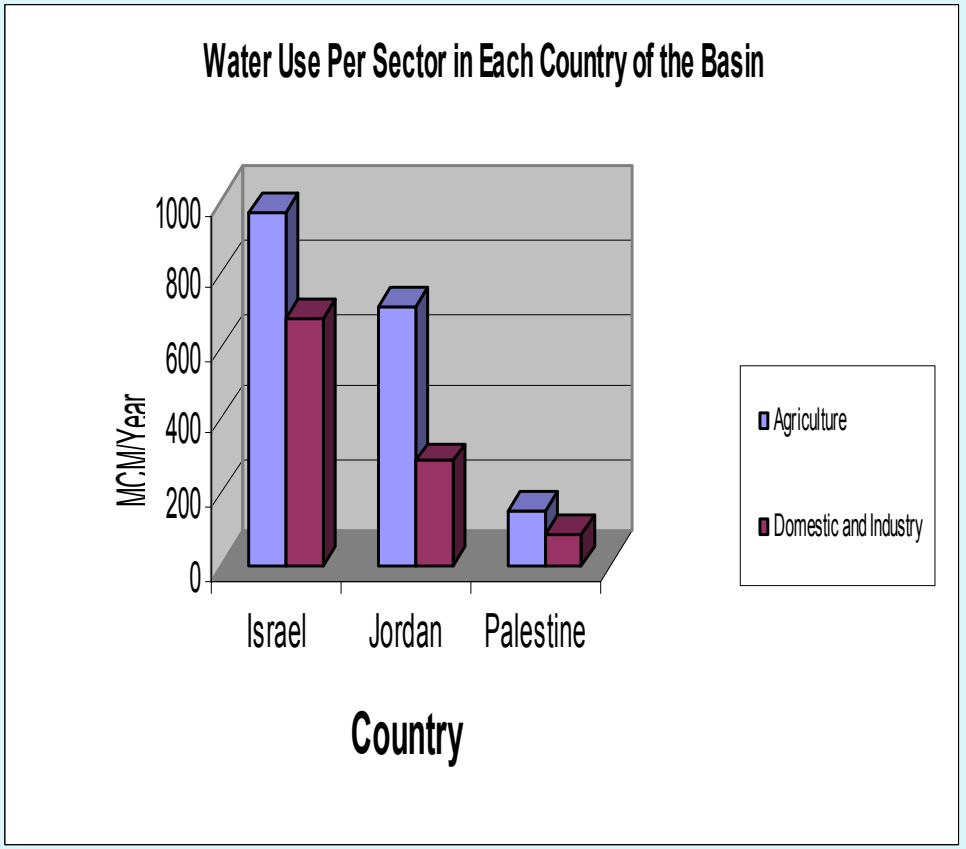
→

- Increased gap between supply and demand
- Increased pressure on the ecosystem, water and environmental pollution
- Degradation of the quality of land
- Sea Water Intrusion in coastal areas
- Unequal resource allocation
- Overall resilience is deteriorated

1. Political Causes
Occupation and Control of Resources

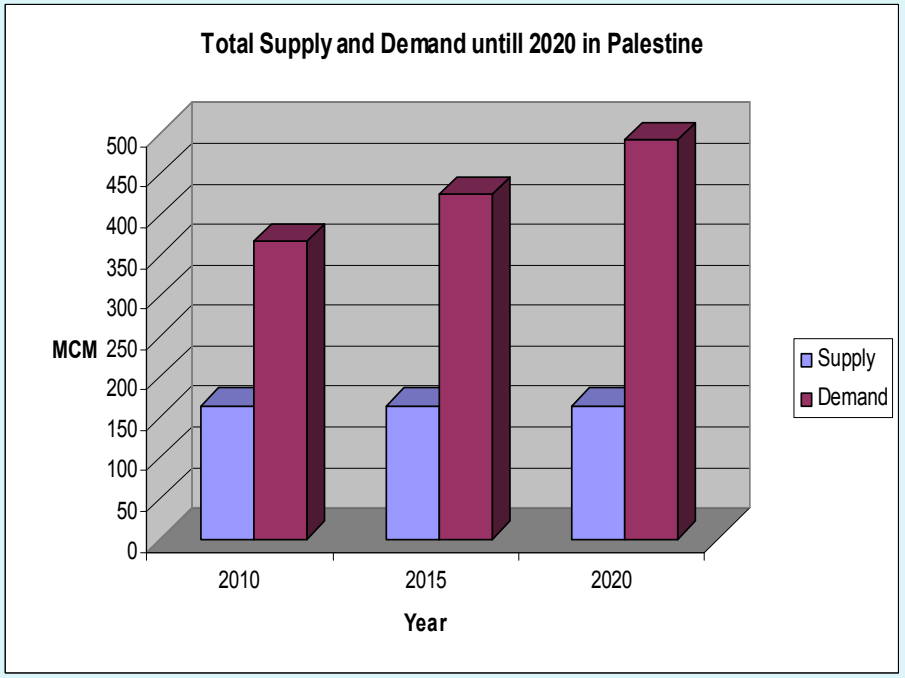
Unequal Water Allocation and Use within the Region

- Total Available renewable Water Resources in Jordan, Israel and Palestine is 2.8 BCM
- Palestinians are allocated almost 8.2% of the total available water resources in the Basin while Israel is using 57.1%.
- The amount allocated to Palestinians does not reflect the actual needs.



Water Supply is much less than Demand in the West Bank

- Supply remains constant while demand will reach 500 MCM in 10 years time



- **No final Agreement on Water. It is – Left to so called final status negotiation.**
- **Restricting water abstraction and development – Maintaining unequal statuesque.**
- **No proper investment in infrastructure**

- **Drilling hundreds of wells outside the green line and tens in the West Bank capture its water for their use**

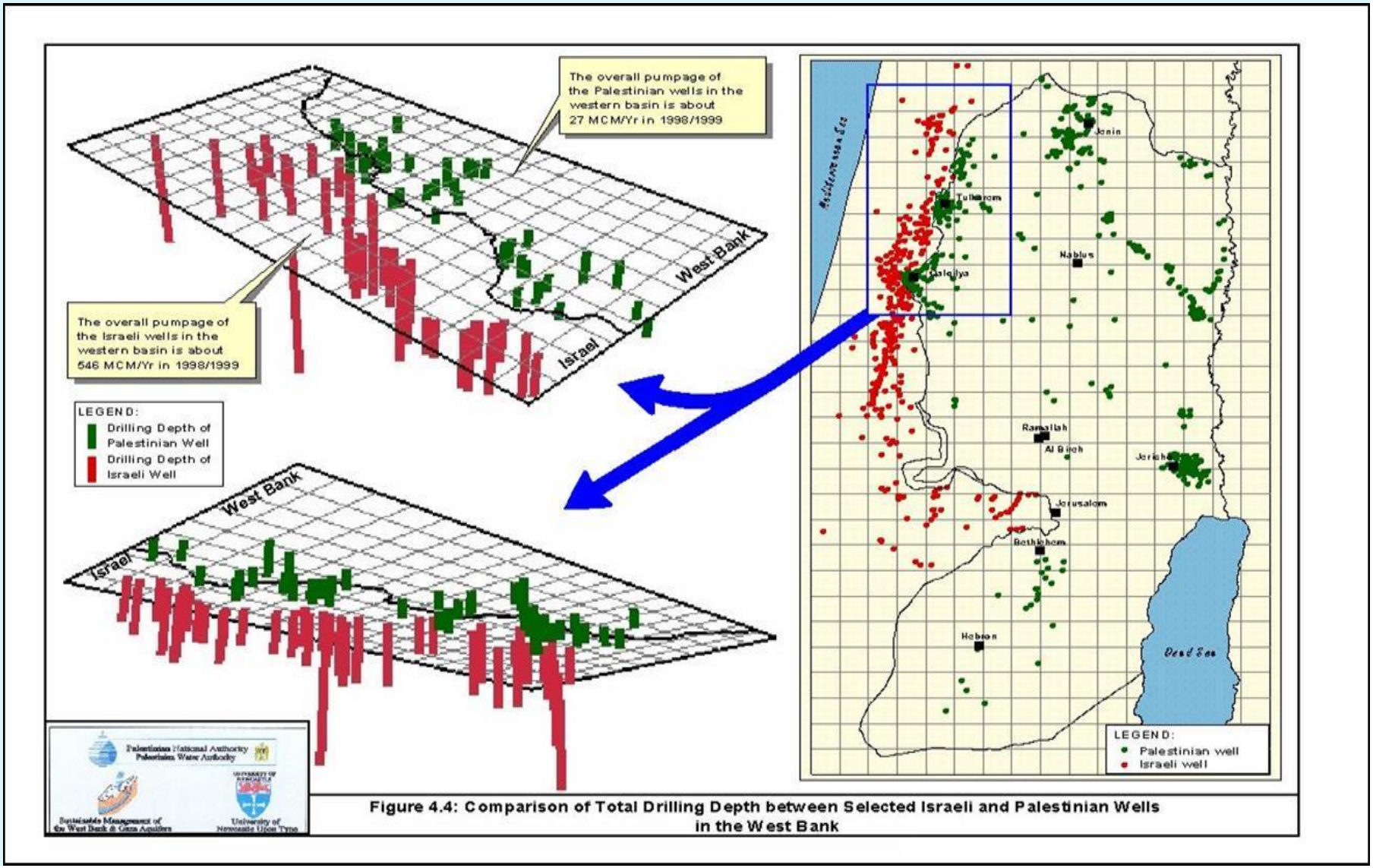


Figure 4.4: Comparison of Total Drilling Depth between Selected Israeli and Palestinian Wells in the West Bank

Water in Gaza

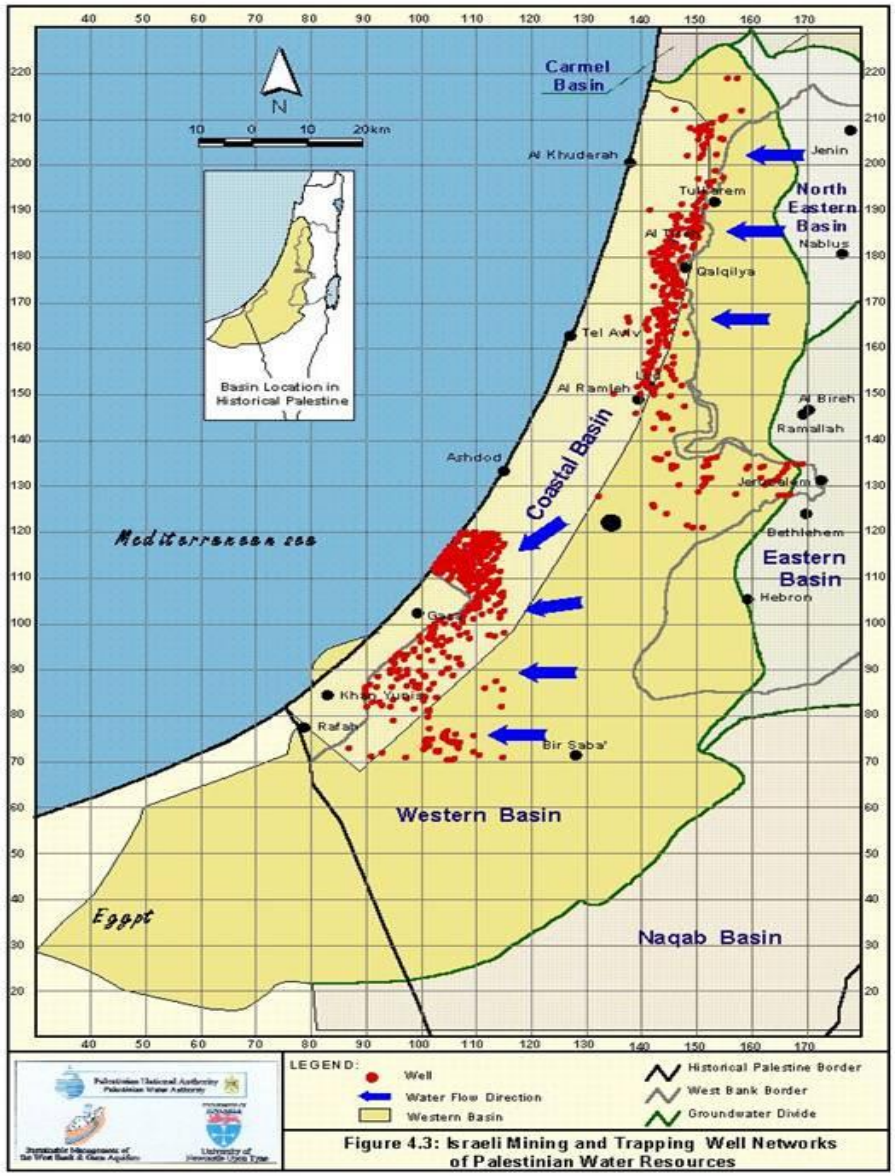
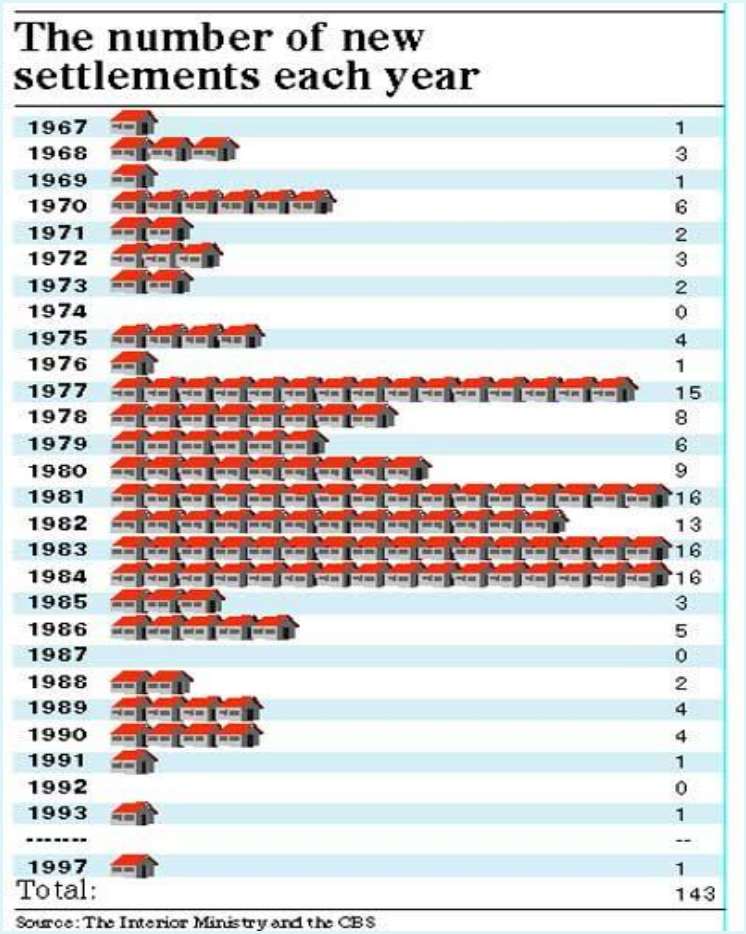
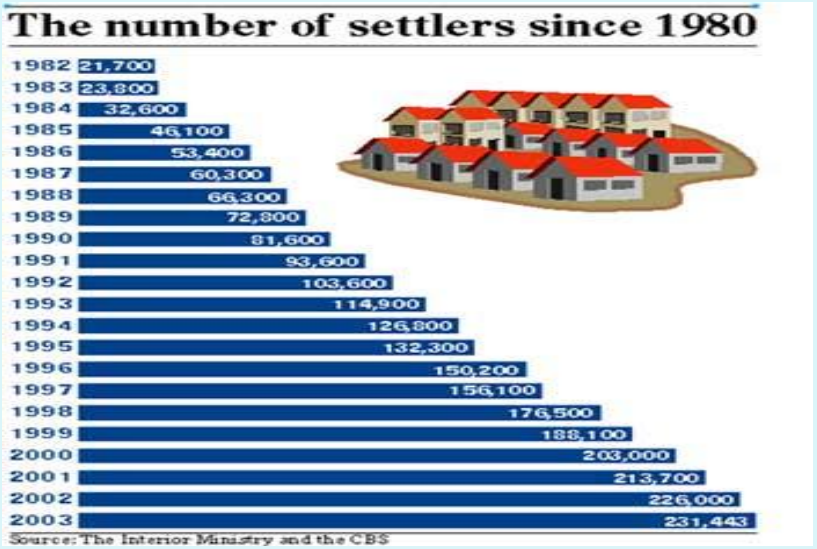


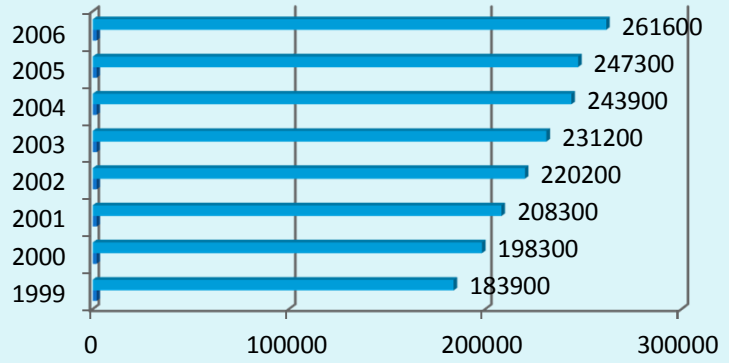
Figure 4.3: Israeli Mining and Trapping Well Networks of Palestinian Water Resources

- **More land confiscation for building Israeli Settlements**

"The Occupying Power shall not deport or transfer parts of its own civilian population into the territory it occupies". (GC IV, art. 49)

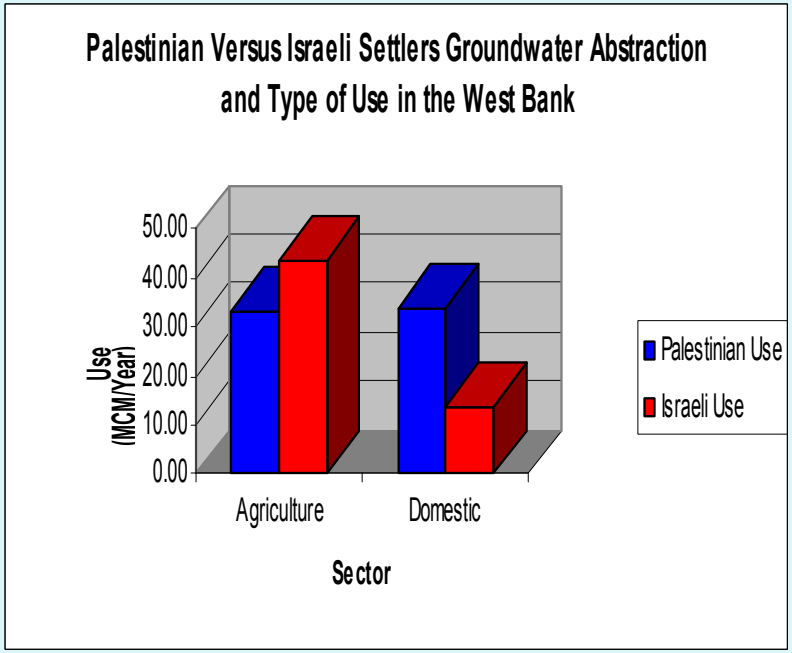




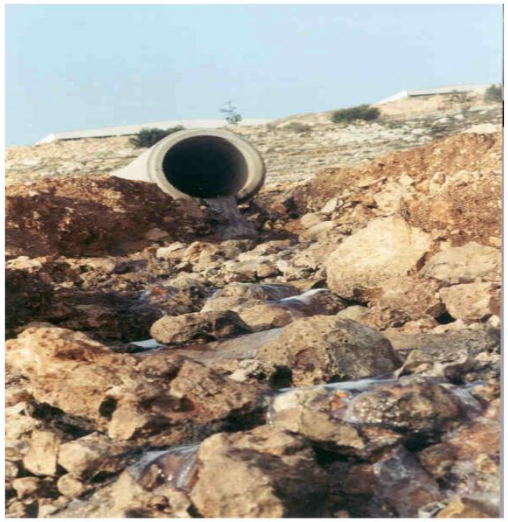


Palestinian Versus Settlers Water Use

- Total water use in the Settlements is 75 MCM / Year of which 44 MCM pumped from wells in the West Bank
- Total Daily Per capita water use for Settlers is 780 l/c/d
- Total Daily Per capita water use for Settlers from water sources of the West Bank is 461 l/c/d
- Total Daily per capita water use of each Palestinian in the West Bank is nearly 192 l/c/d
- This means that each settler uses 4 times more than each Palestinian

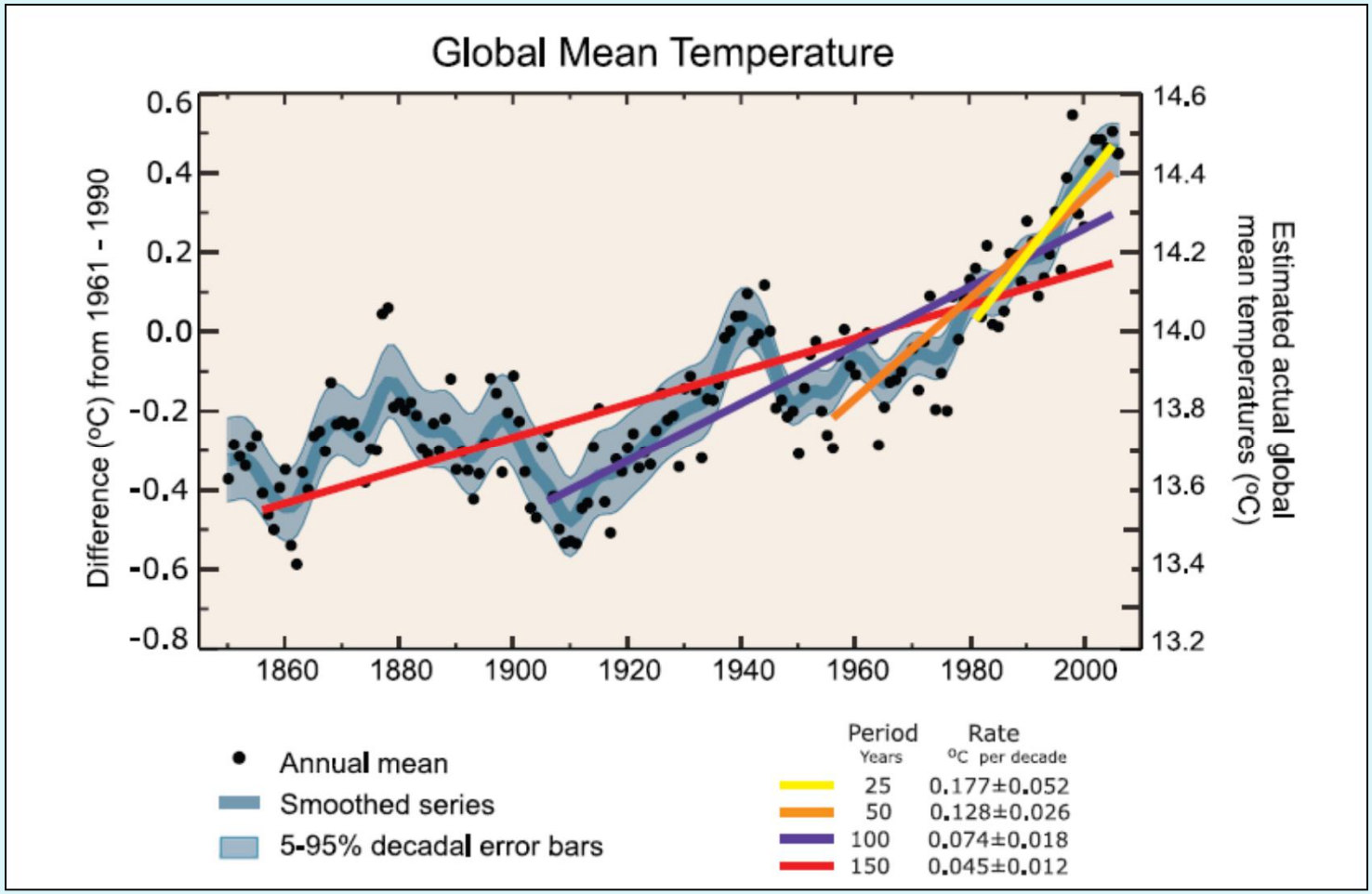


Pollution: Increasing Pressure



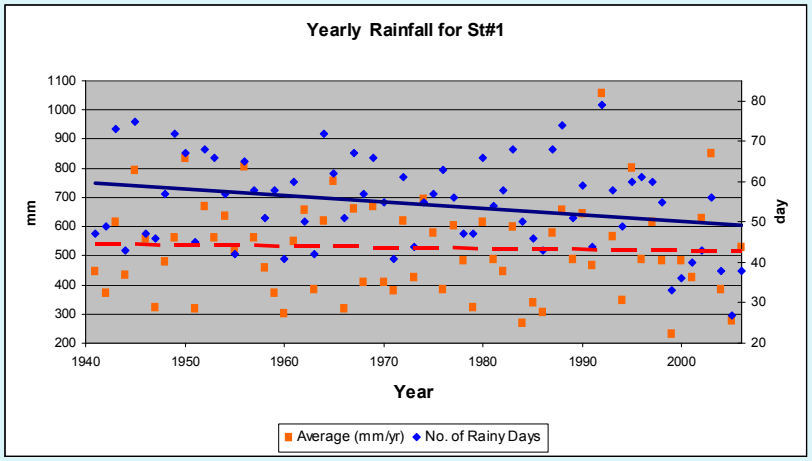
2. Natural Causes
Climate Change

Global Temperature Trend Analysis

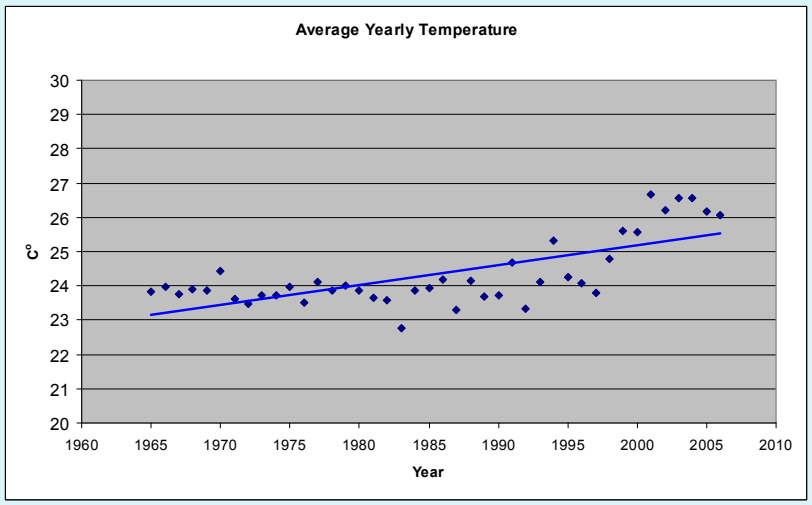


Source: IPCC, 2007

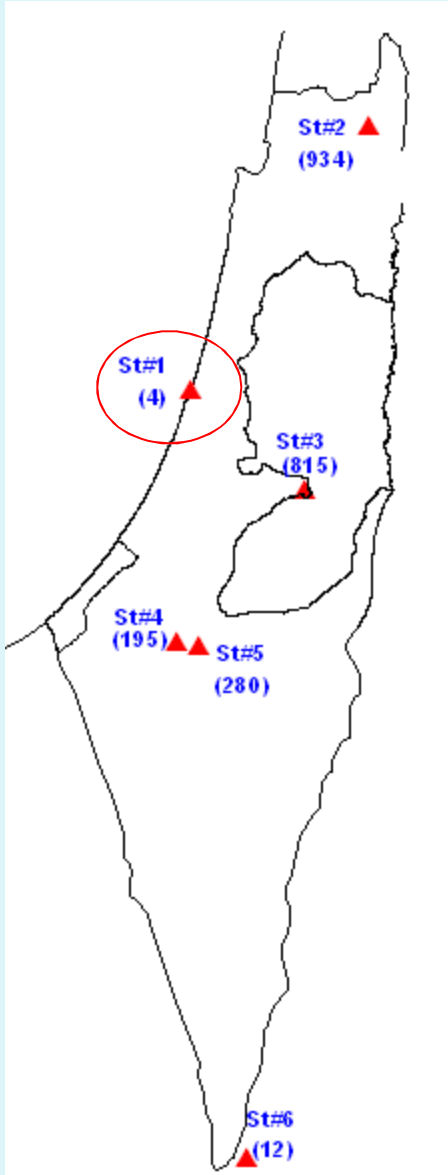
St#1



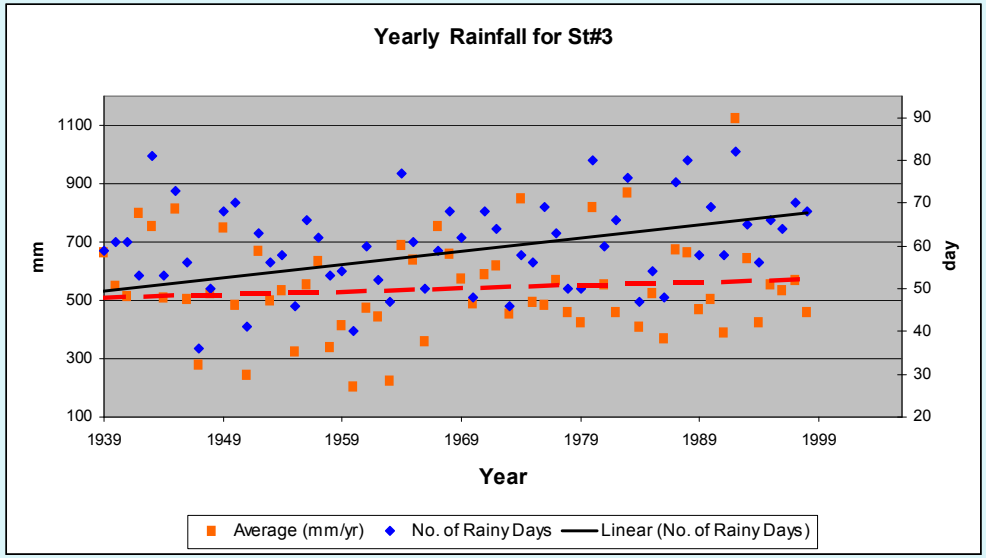
- Period: 65 years
- Mean annual average rainfall= 526 mm/yr
- Mean annual average rainy days= 60 days
- Change in rainfall trend= -22.4 mm (decrease)
- Change in rainy days trend= -10 days (decrease)



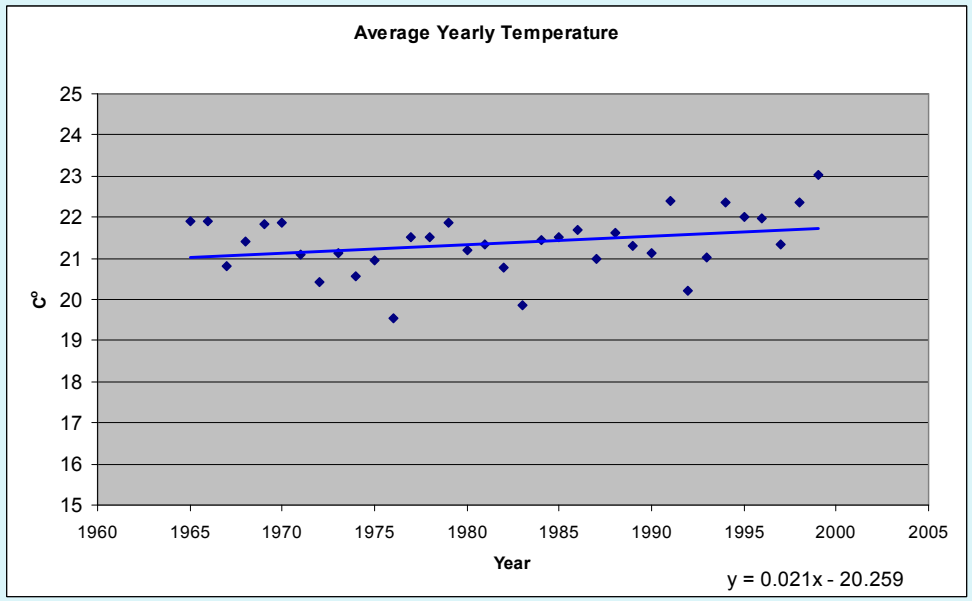
- Period: 41 years
- Mean annual average temperature= 24.3 C°
- Change in temperature trend= 2.3 C° (increase)



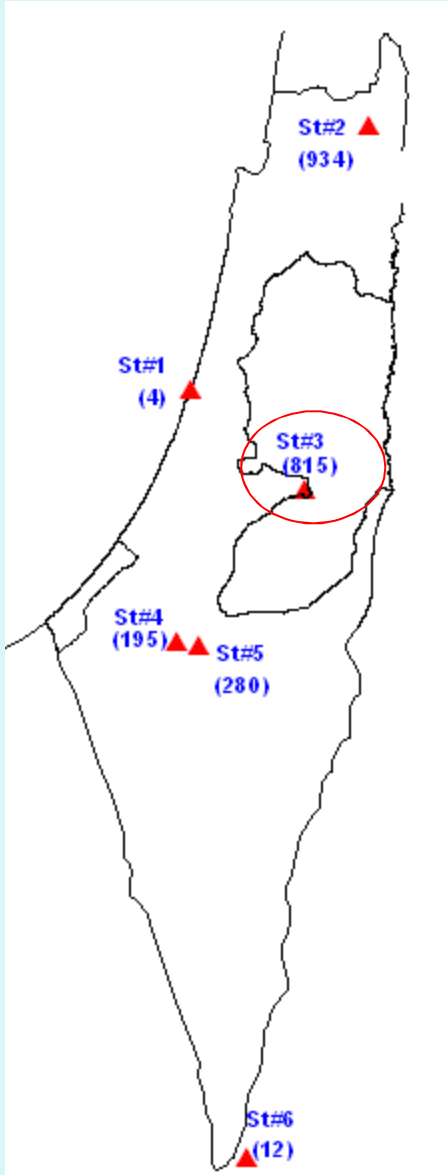
St#3

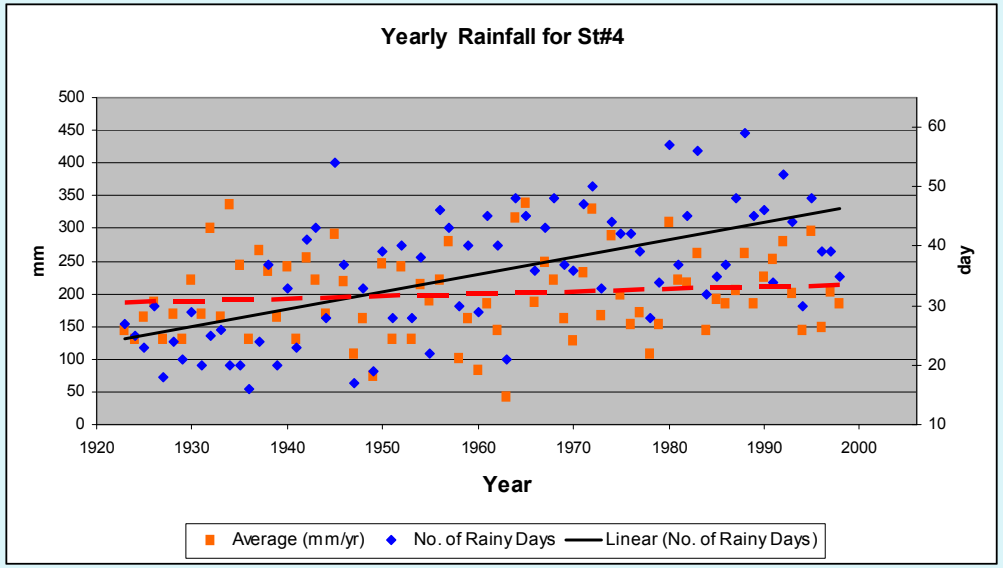


- Period: 97 years
- Mean annual average rainfall= 522.7 mm/yr
- Mean annual average rainy days= 54 days
- Change in rainfall trend= 106 mm (increase)
- Change in rainy days trend= 30 days (increase)

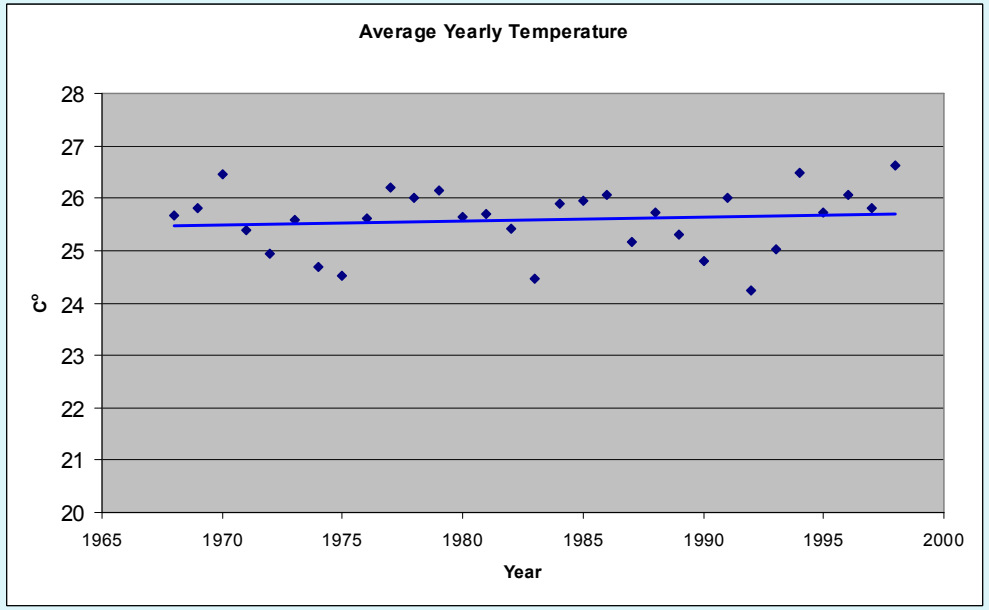


- Period: 34 years
- Mean annual average temperature= 21.4 C^{o}
- Change in temperature trend= 0.7 C^{o} (increase)

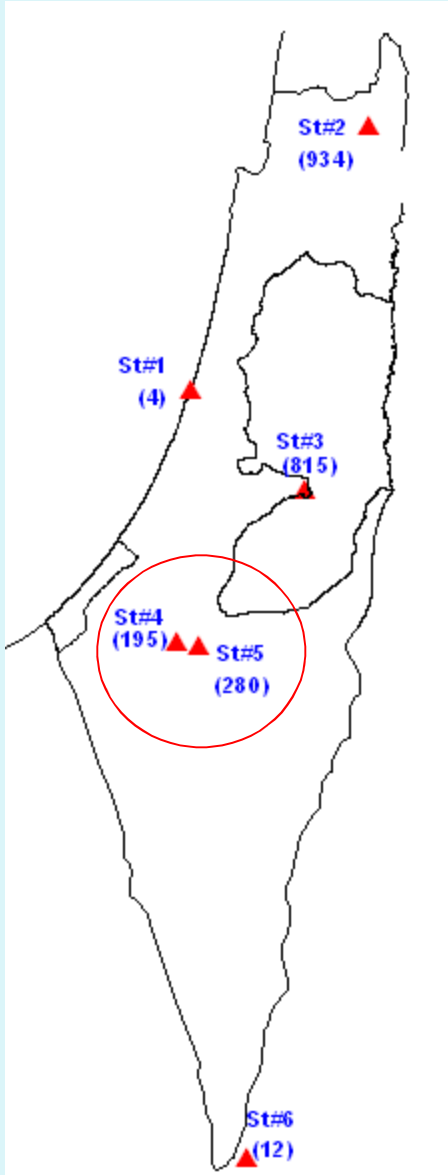




- Period: 75 years
- Mean annual average rainfall= 198.5 mm/yr
- Mean annual average rainy days= 35 days
- Change in rainfall trend= 28 mm (increase)
- Change in rainy days trend= 22 days (increase)



- Period: 30 years
- Mean annual average temperature= 25.6 C°
- Change in temperature trend= 0.2 C° (increase)

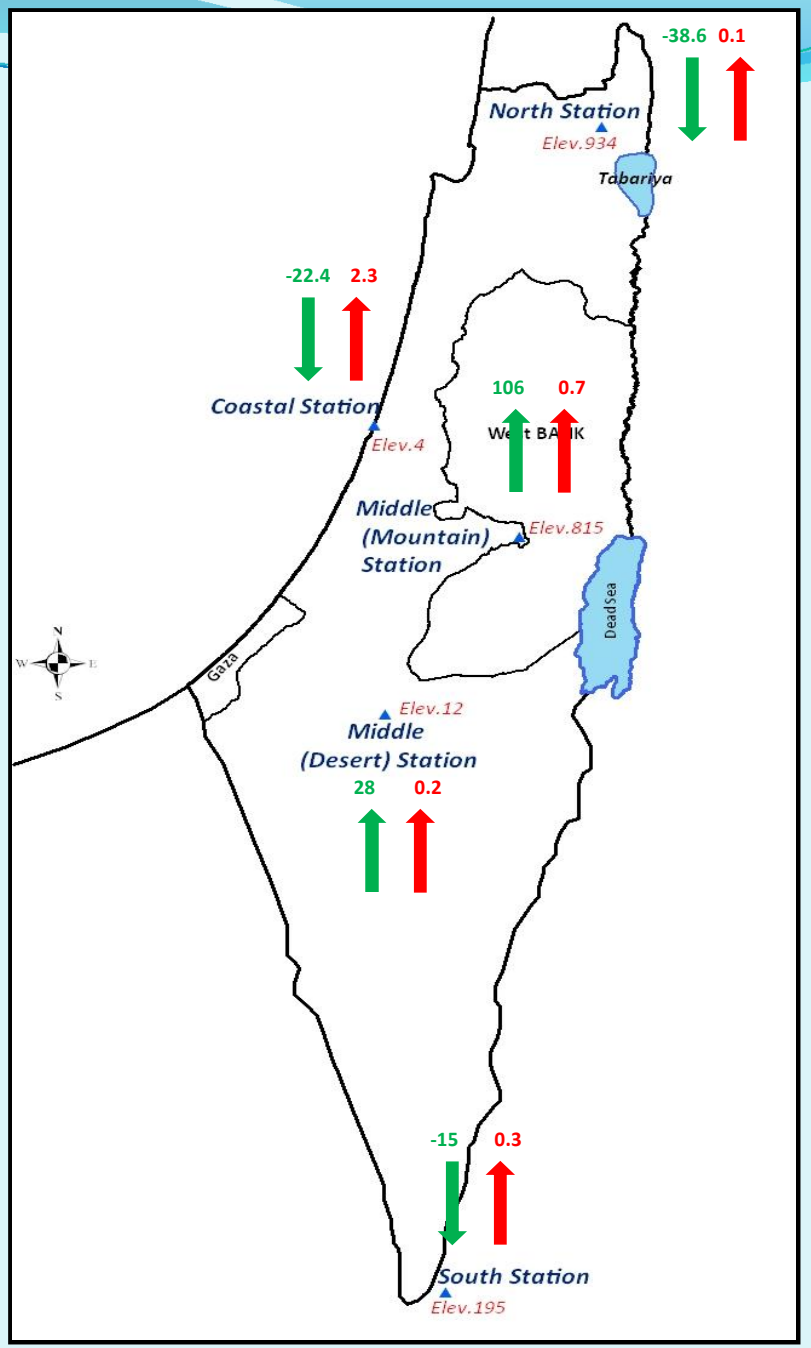


Temperature & Precipitation Trend Analysis for the late 20th century

Where;

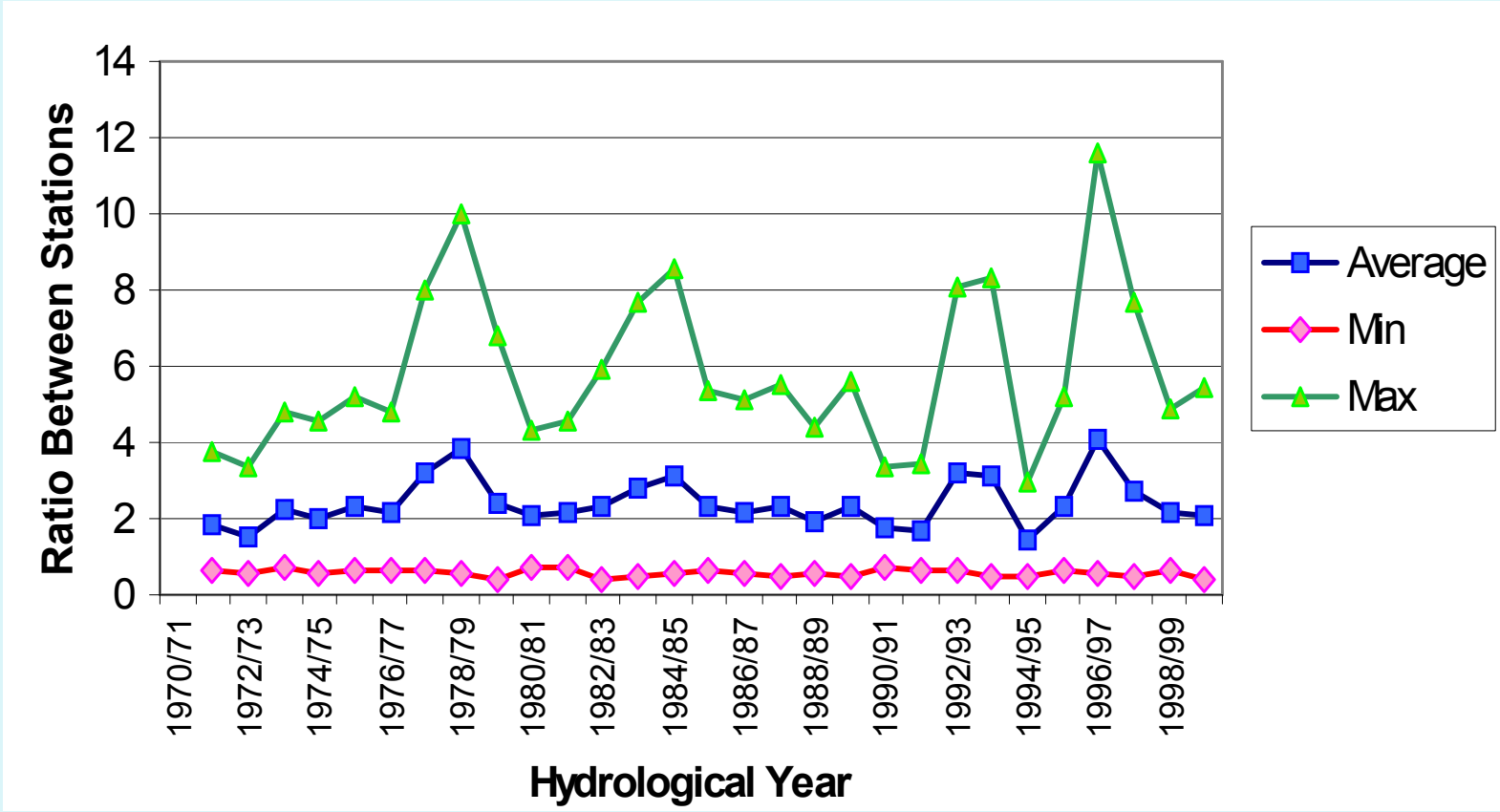
Refers to Temperature change in °C

Refers to Precipitation change in mm



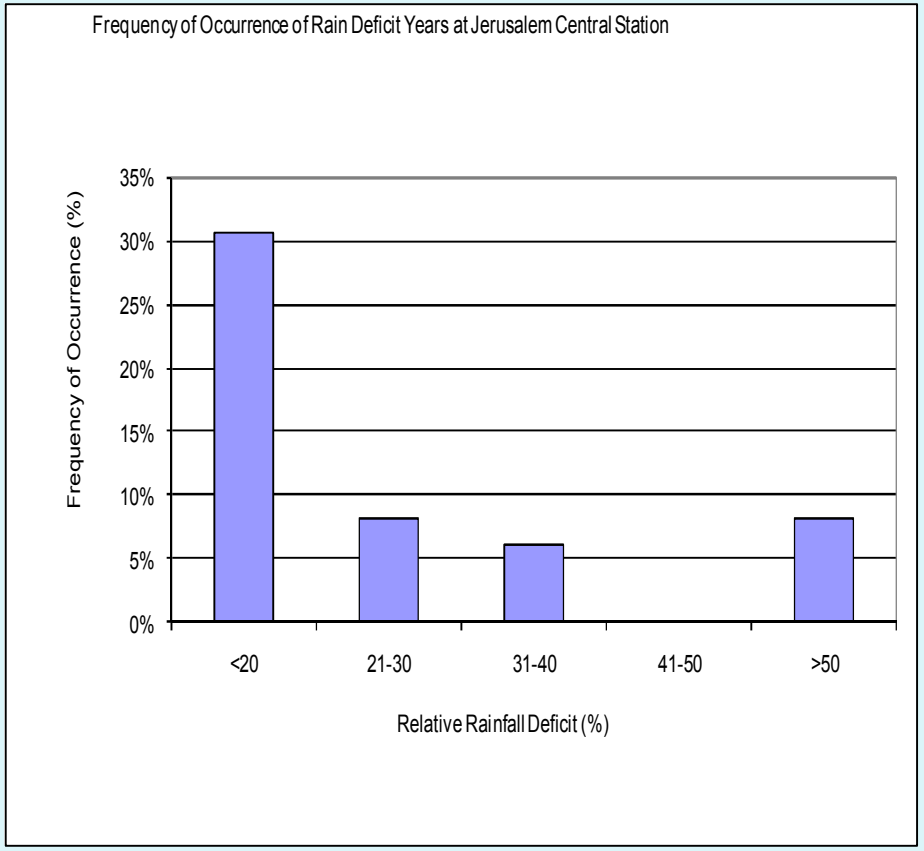
Source: Abu Sa'da, 2007

Temporal Variation of Rainfall



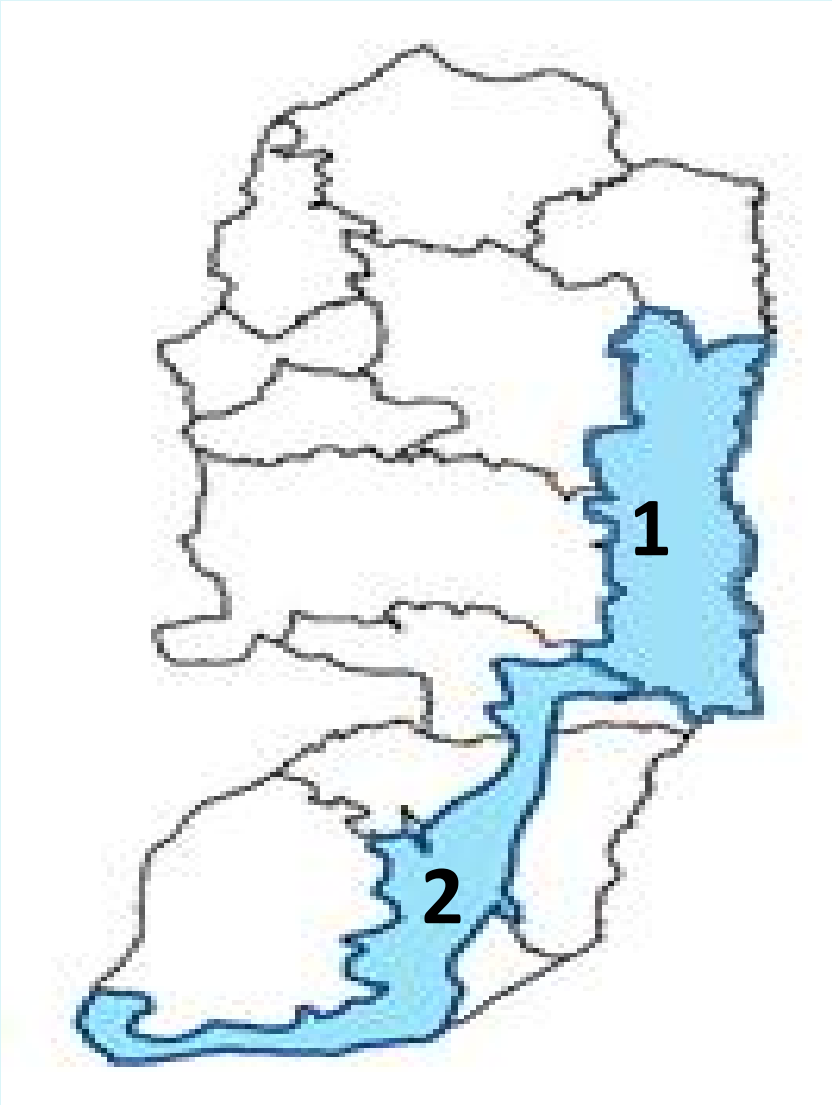
Drought Phenomena

- The frequency and duration of drought in the region is not fixed over time.
- The time between two occurrences of drought can be described as random variable.
- Drought has non-uniform return periods.



Arid Areas are the most Vulnerable

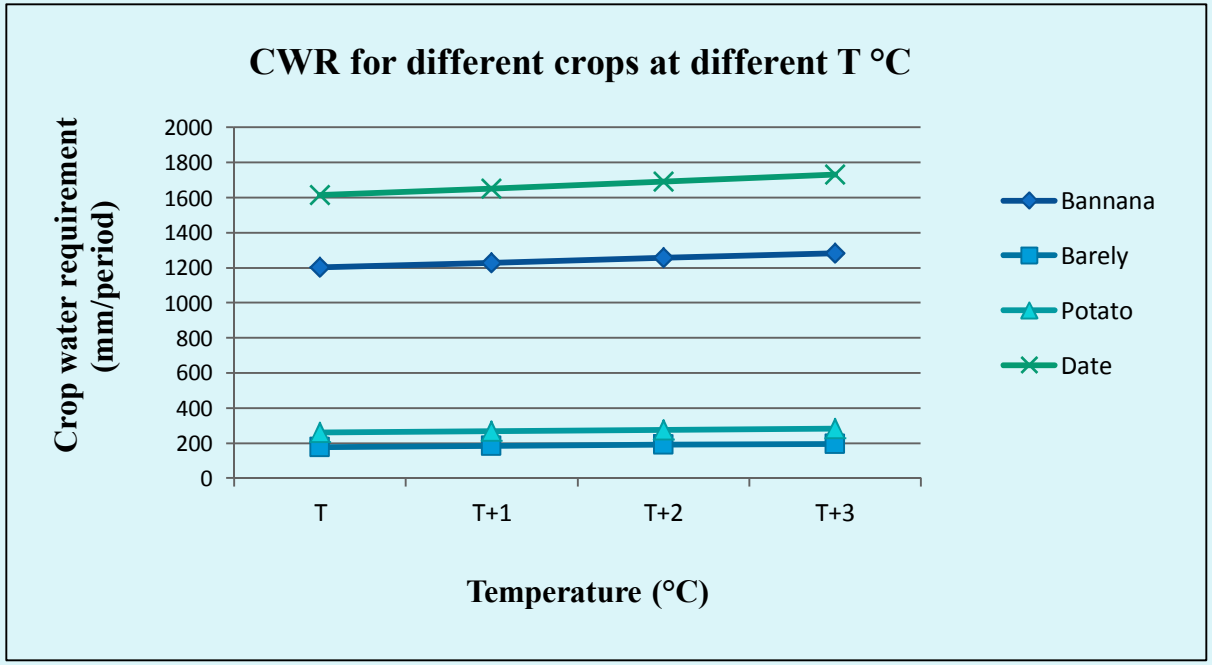
- Both areas are characterized by an arid and semi arid nature.
- Area 1 is the main irrigated agriculture (citrus, dates and vegetables) and is a plain area at 200 m below sea level
- Area 2 is hilly with steep slopes and elevations may go up to 800 m ASL. Most of the area is considered as range land used mainly for grazing.



Impact on Crop Water Requirement (CWR)

Average change rate (%) of CWR with temperature increase;

CWR = Et_o *K_c



	T+1°C	T+2°C	T+3°C
CWR change rate	2.7%	5.4%	8%

Impact on Irrigation Water Requirement (IWR)

Annual IWR for the total area under consideration;

∑ IWR for each crop x corresponding area

IWR= CWR – effective rain

	P-20%	P-10%	P	P+10%	P+ 20%
IWR (MCM/year)	21.05	20.24	19.95	19.66	19.38
Change rate %	5.53	1.47	0.00	-1.44	-2.84.

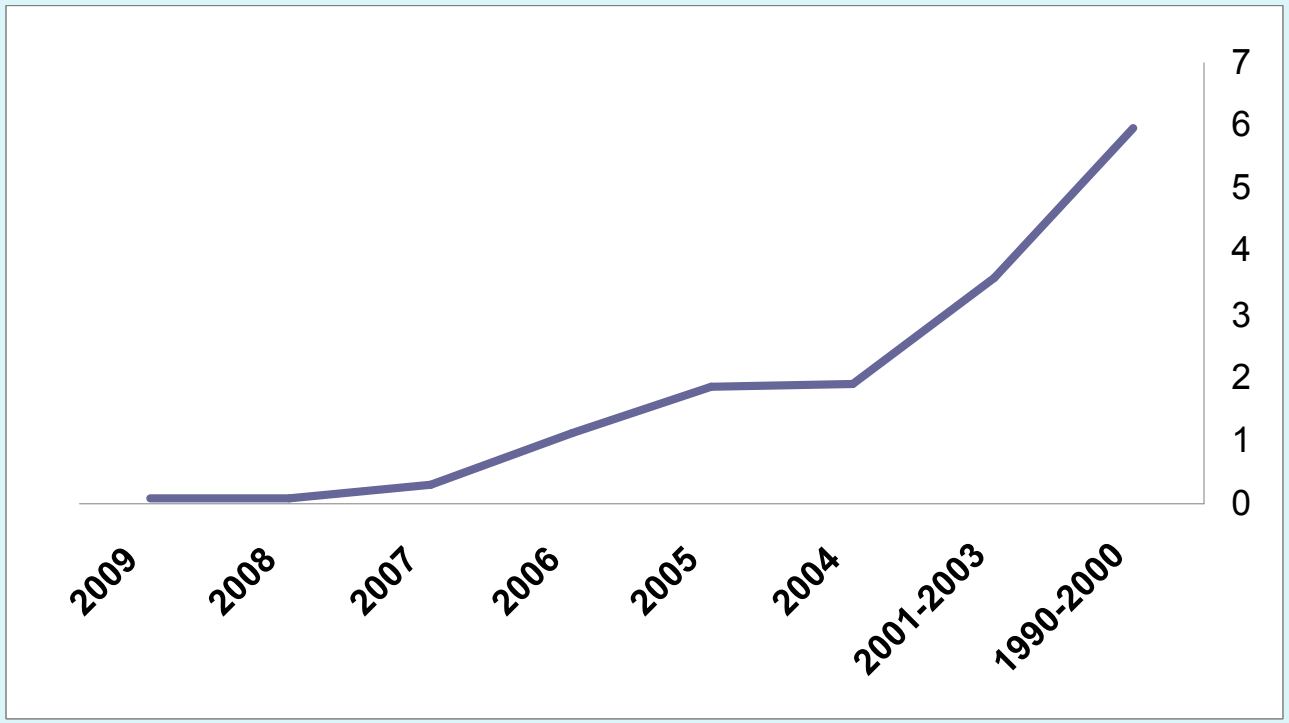
Irrigation Water Deficit/Surplus Under Hypothetical Climate Change Scenarios

	T	T+1	T+2	T+3
P-20%	1.104	1.685	2.285	2.881
P-10%	0.294	0.877	1.469	2.065
P	0.00	0.581	1.172	1.763
P+10%	-0.286	0.291	0.880	1.470
P+20%	-0.566	0.010	0.596	1.181

•Values are expressed in MCM/Year

Area2: Impact on Rangeland and livelihood

- Deterioration and retrogression of rangeland productivity



Range Land Deterioration

- The range land deterioration enhances the unpalatable shrubs domination
- Lack of field crops seeds
- Extinction of some grass species
- Overgrazing
- More purchase of animal feed

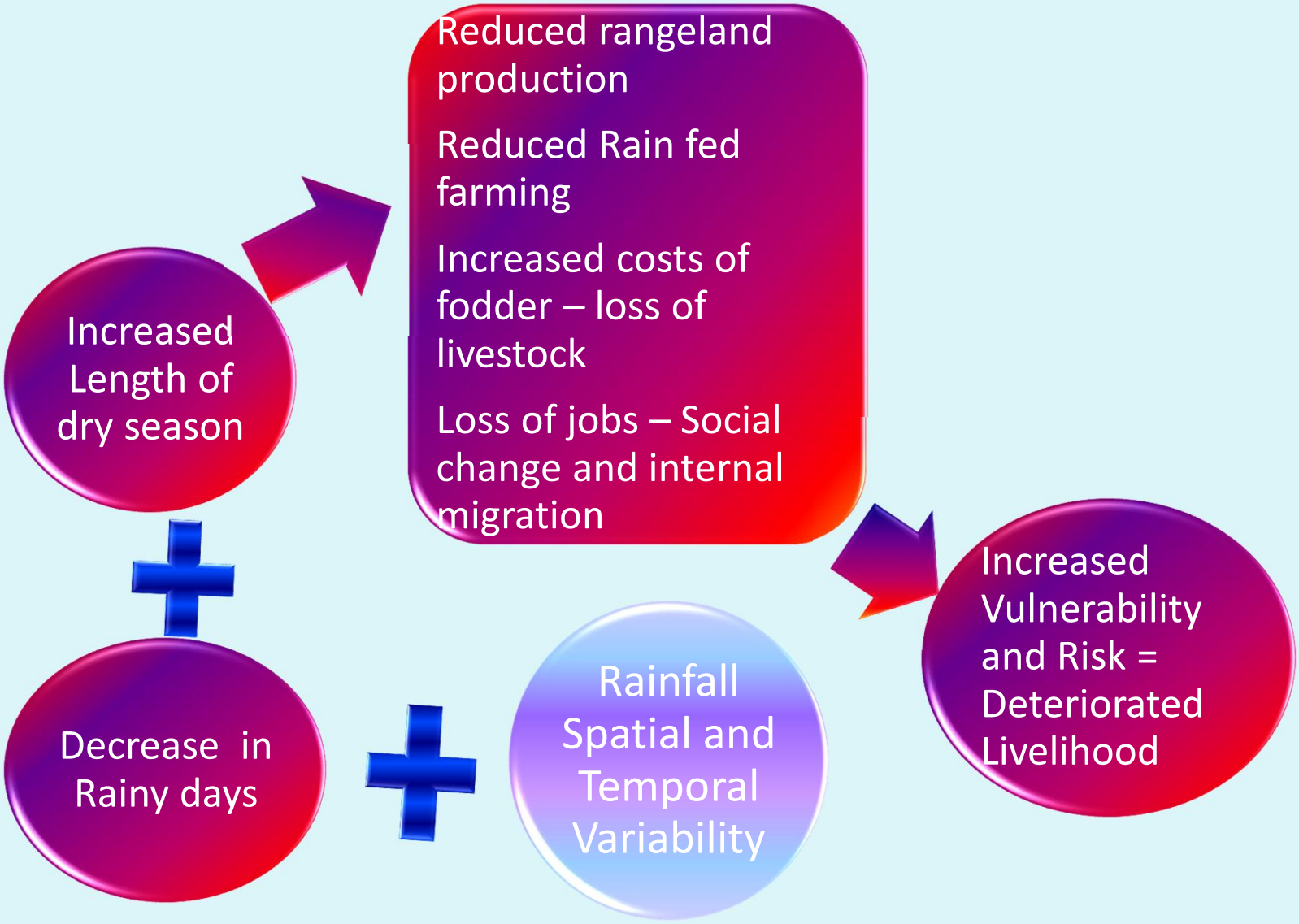
Impact on livestock- main source of income

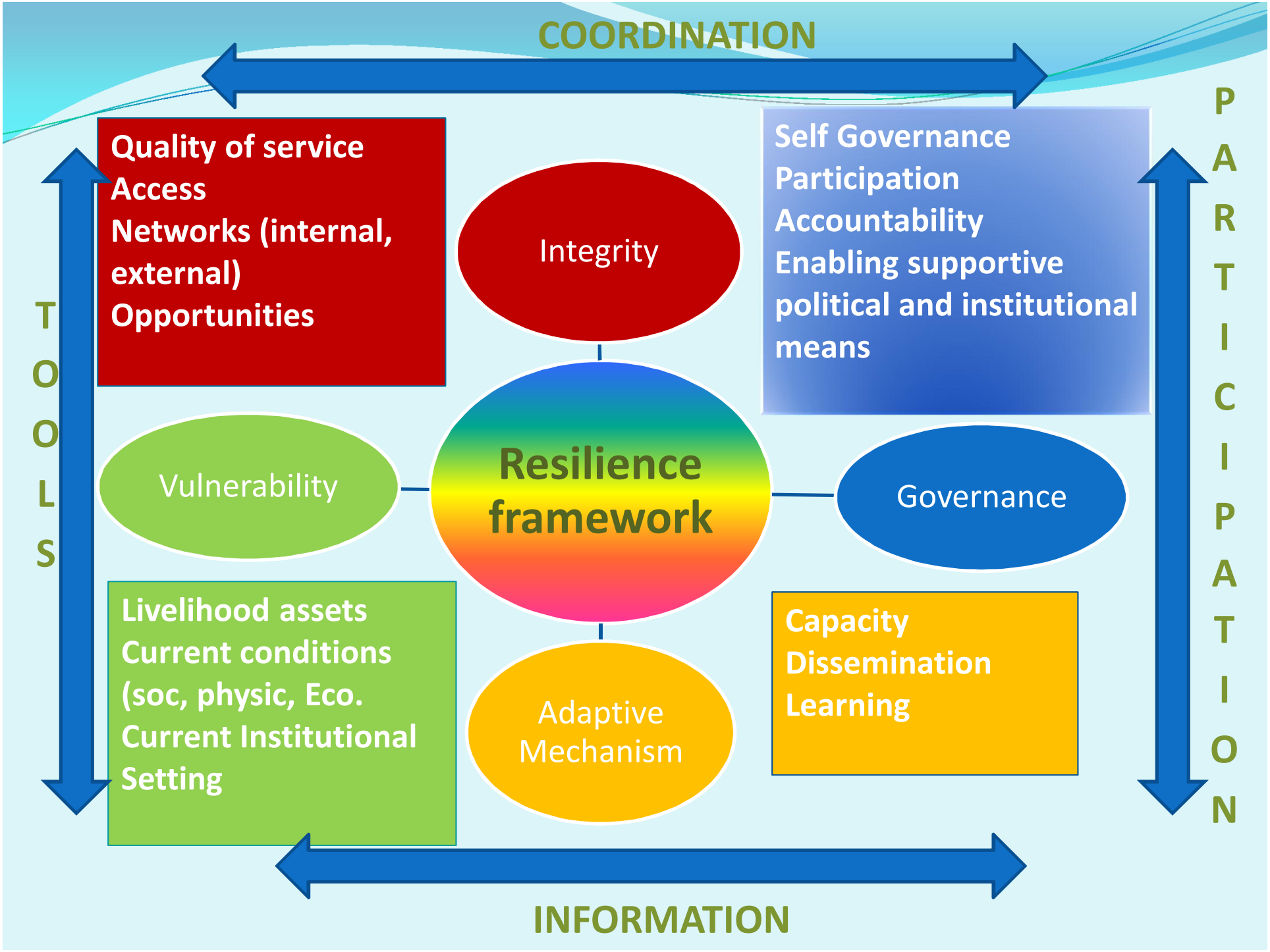
- Increases livestock mortality rate with 10% at least
- Decrease the quantities of the produced milk with 48%
- Delaying the breeding season for one month at least
- Increase animal water demand as a result of reliance on grain feeding
- Reduction in the flock sizes – livestock sold to afford buying water tankers and other life subsistence

Socio-economic impacts

- Less water collected and Increased water costs
- Internal Migration reaches 40% in some communities
- Social instability
- Reduction in percentage of population relying on raising livestock
- Change in profession-shift from farming
- Less expenditure on basics affecting household nutritional levels.

Impact of Livelihood




COORDINATION
Quality of service
Access
Networks (internal, external)
Opportunities
Integrity
Self Governance
Participation
Accountability
Enabling supportive political and institutional means
TOOLS
PARTICIPATION
Vulnerability
Resilience framework
Governance
Livelihood assets
Current conditions (soc, physic, Eco.
Current Institutional Setting
Adaptive Mechanism
Capacity
Dissemination
Learning
INFORMATION

Conclusion

- The impact of political restrictions imposed by Israeli Occupation coupled with the change in climate conditions is certainly increases the vulnerability of Palestinian People and reduces their resilience to coup with the already very limited and insufficient water available for their use.

Recommendations

- No Business as usual can continue
- It is important to re-assess the available potential water resources (ground and surface) in the light of this change and work hard to acquire the Palestinian Water Rights in these resources.
- Develop appropriate means to increase the water availability (Demand and Supply Management) and accessibility to all Palestinian People.

Recommendations

- Develop an alternative plan for both irrigated agriculture as well as Rain fed farming. More drought resisting varieties, less water requiring crops, reuse, etc.
- Develop plans to improve rangeland production - regenerate the grazing areas and to maintain the current pattern of land use in those areas.
- Adopt more appropriate plans to eliminate internal migration from the vulnerable areas, invest in infrastructure, health and education services as well as WATSAN services.

THANK YOU