

The Palestinian-Israeli Management of Shared Groundwater Aquifers: *“Status, realities and lessons learned”*

By:

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*Workshop on
Formulation of a policy framework to support the establishment of mechanisms for
inter-state cooperation on shared groundwater aquifers in the Mediterranean Region
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The Palestinian-Israeli Management of Shared Groundwater Aquifers: “Status, Realities and Lessons Learned”

- 1. Shared Groundwater Aquifers between Palestine and Israel**
- 2. The Political Process and Existing Agreements**
- 3. *Difficulties to implement policies and agreements for the management of shared Groundwater Aquifers***
- 4. *Guidelines for Comprehensive Framework for the Palestinian/Israeli Management of shared Groundwater Aquifers***
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1. Shared Groundwater Aquifers between Palestine and Israel

Water Resources in Historical Palestine (Mcm/yr)								
Resource	Natural Flow / Recharge	Total Utilization	Palestinian Water Control			Israeli Water Control		
			Volume	% from Total Utilization	% from Recharge	Volume	% from Total Utilization	% from Recharge
Groundwater	1454	1503	251	17%	17%	1252	83%	86%
Jordan River	965	870	0	0%	0%	870	100%	90%
Runoff	215	197	20	10%	9%	177	90%	82%
Total	2634	2570	271	11%	10%	2299	89%	87%

Reference Year period: 1980 -1999

1. Shared Groundwater Aquifers between Palestine and Israel

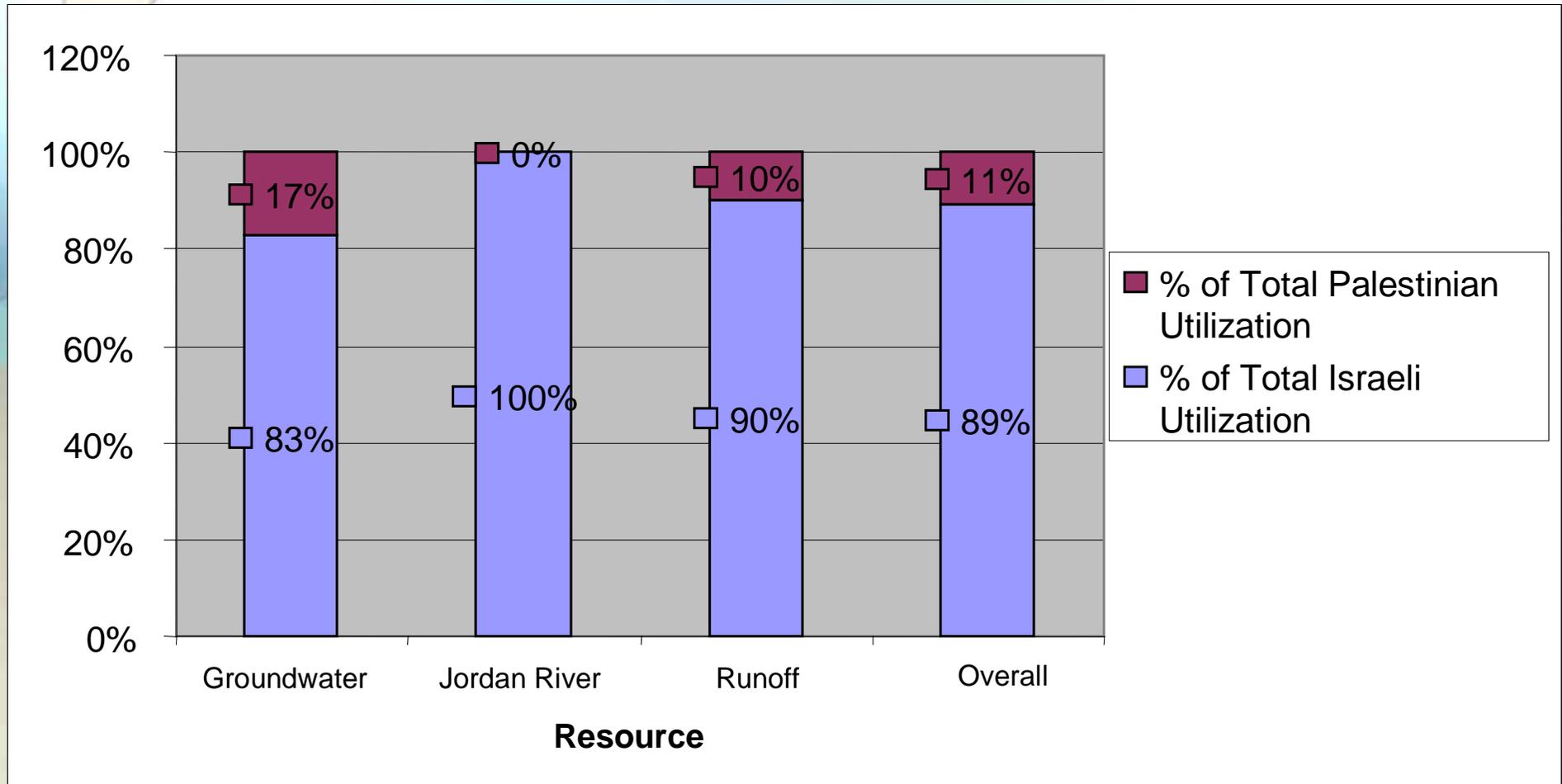
The available water resources are shared through:

- Transboundary aquifers.
- The Jordan River.
- Wadi Runoff.

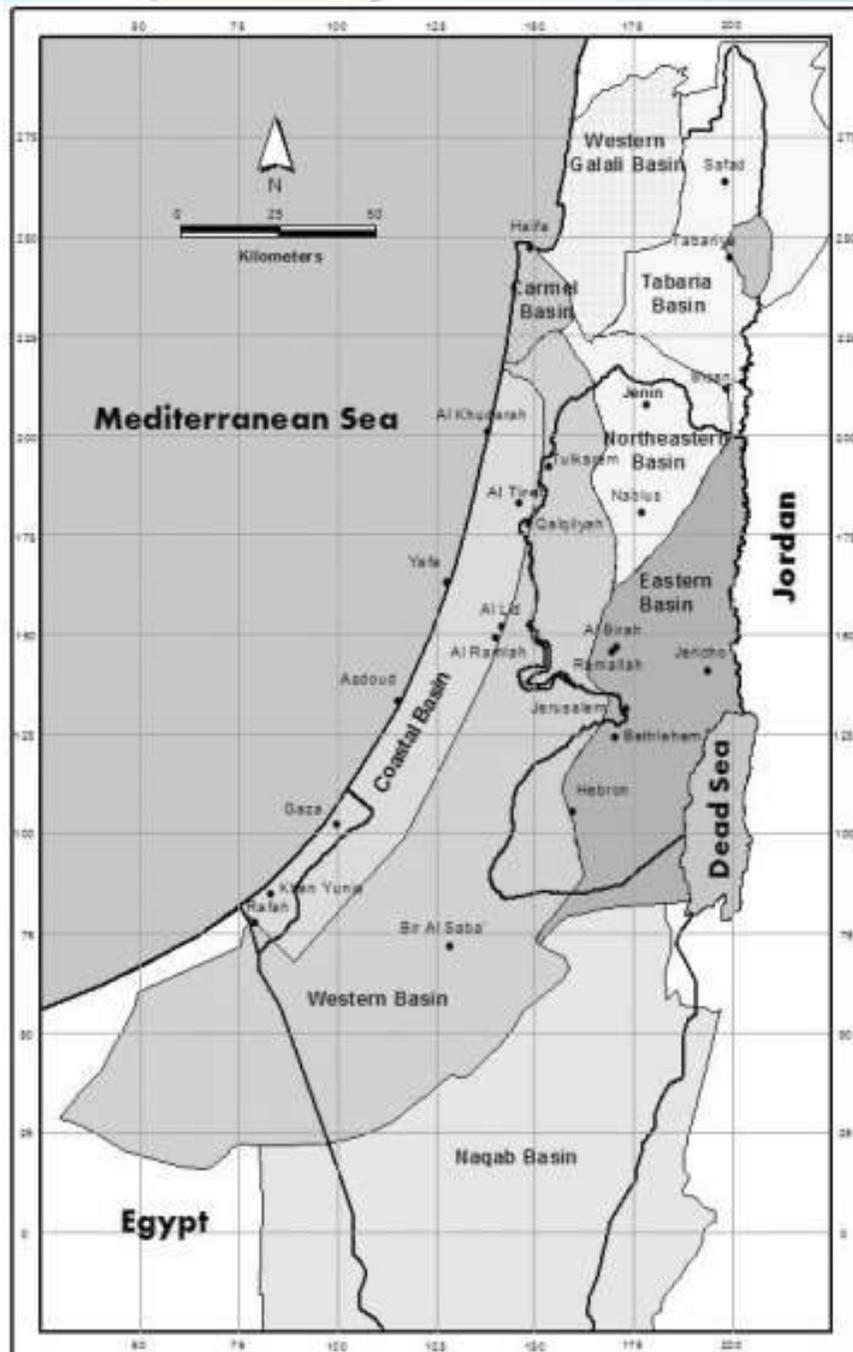
Analysis of 1998/1999 Data shows:

- Shared utilisation of aquifers is 86%/14% in favour of Israel.
- For all sources including the Jordan River and Wadi Runoff, the overall split is 89%(Israel) and 11% (Palestine).
- When viewed in terms of per capita consumption, the ratio of Israeli to Palestinian consumption is roughly 4:1

Israeli and Palestinian utilization of water resources in Historical Palestine (Mcm/yr).



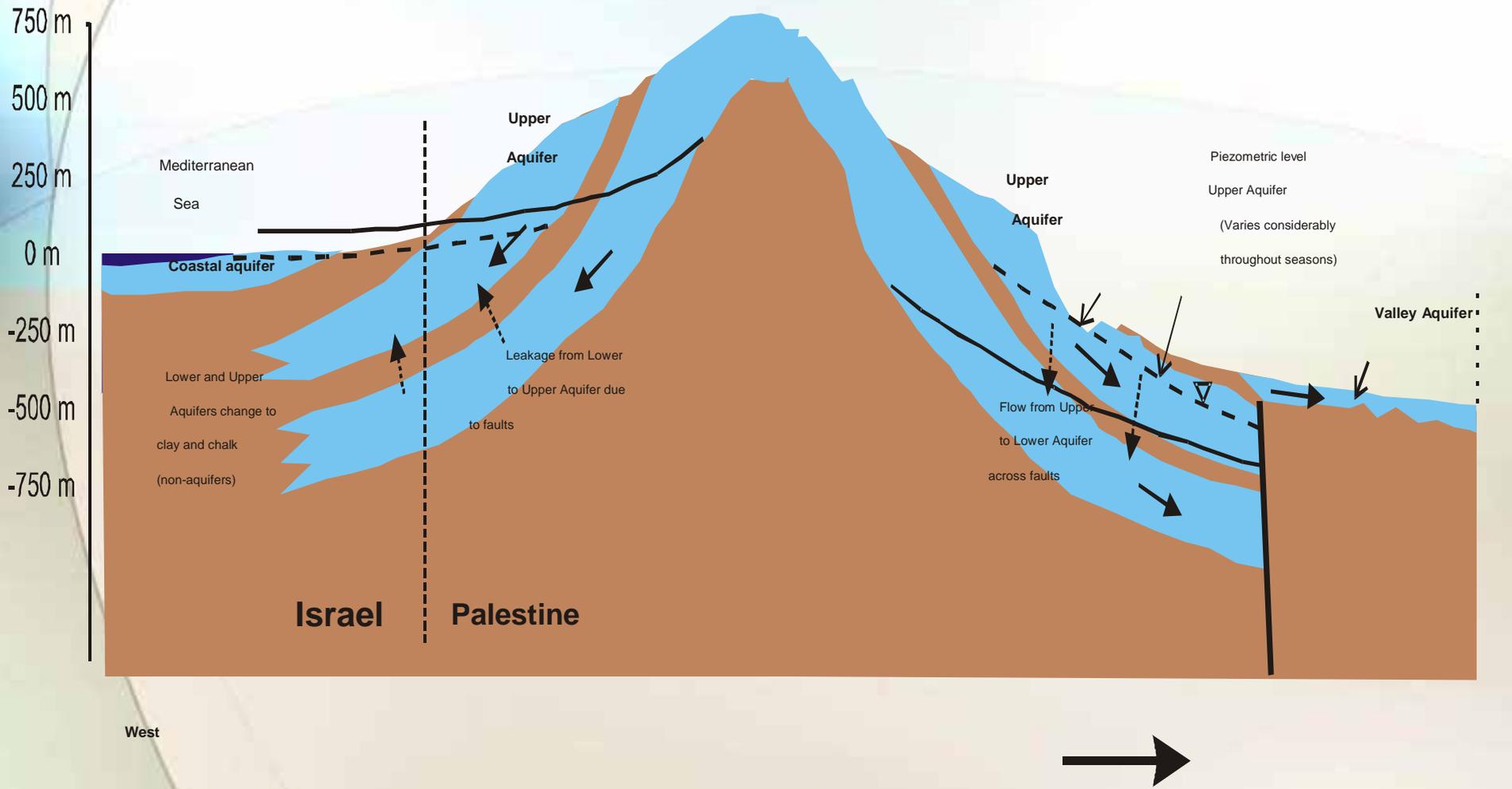
Shared and non- shared Groundwater Aquifers in Historical Palestine



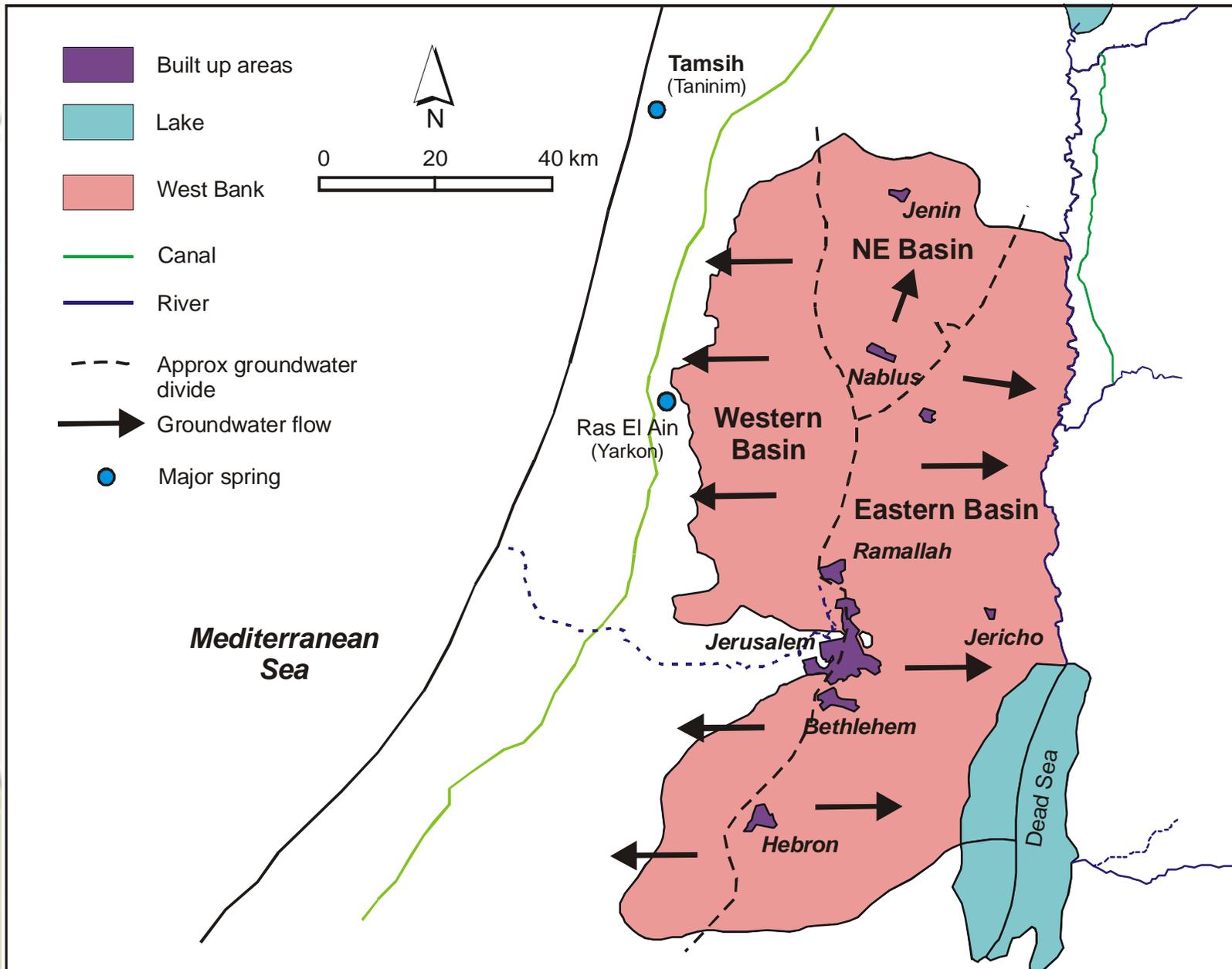
■ The Shared groundwater aquifers are:

- **Western Aquifer Basin**
- **Northeastern Basin**
- **Coastal Aquifer Basin**

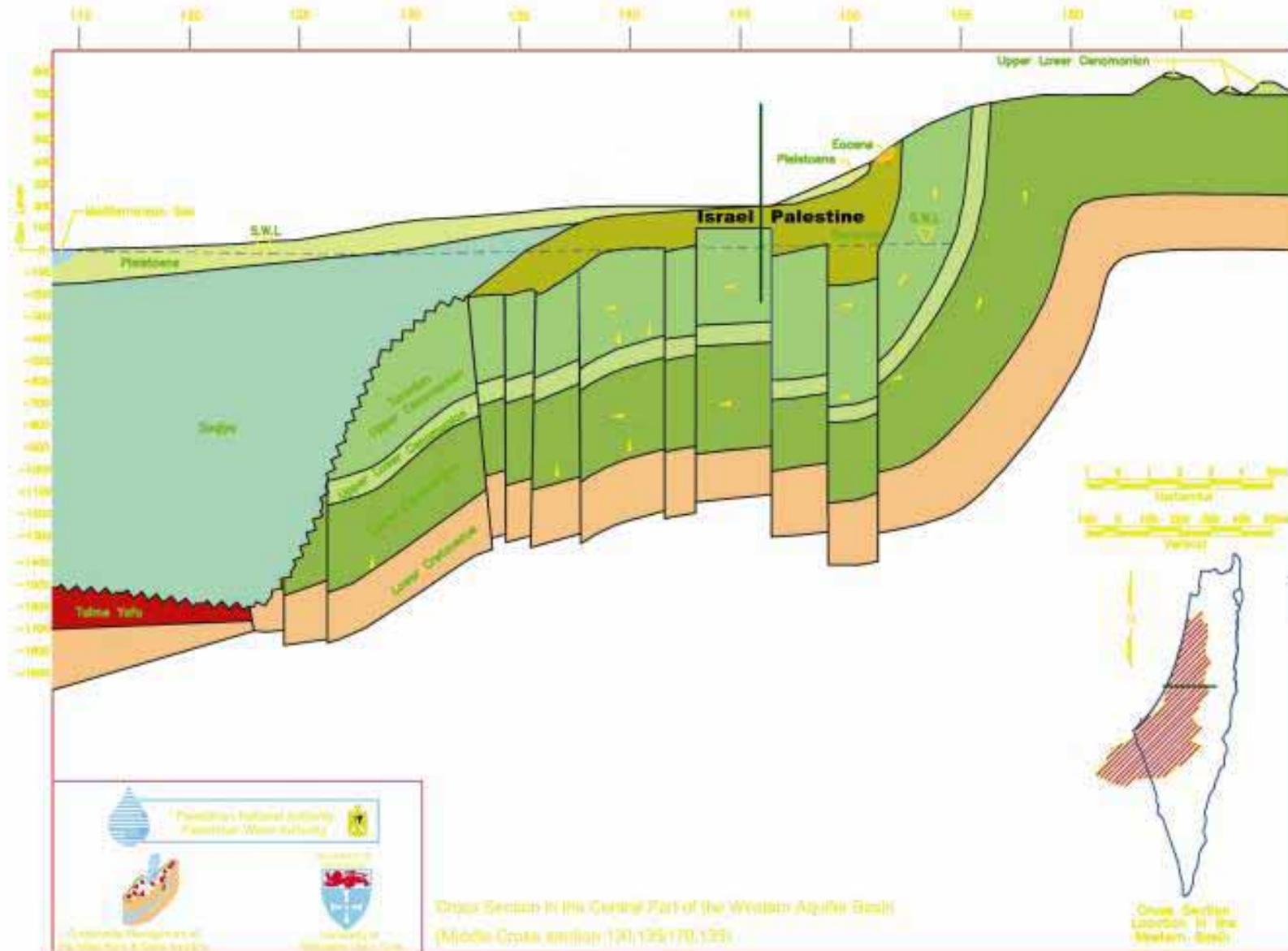
Schematic Presentation Showing the Extent of Palestinian Aquifers inside Israel



The West Bank Aquifers

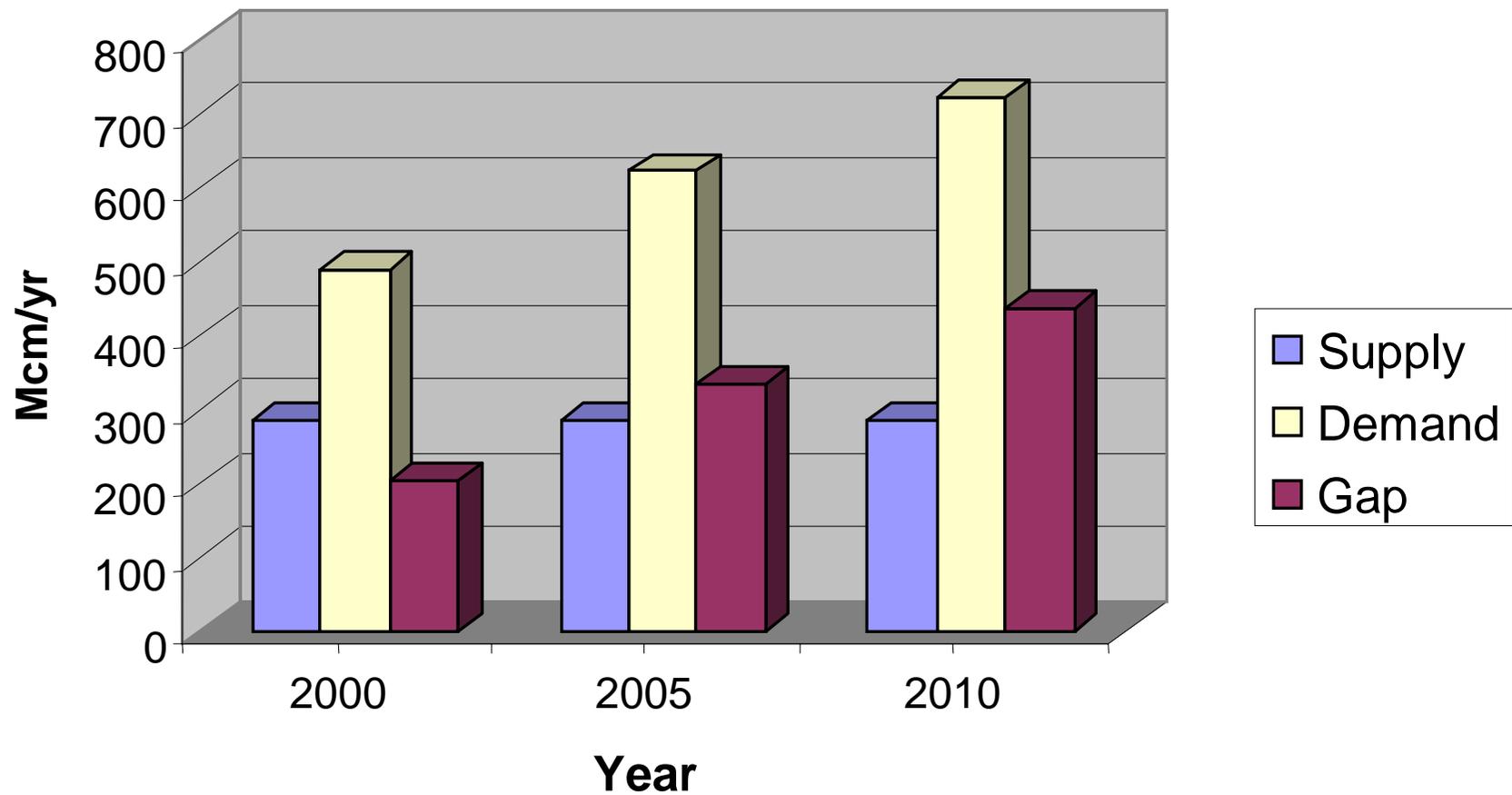


A geological Cross Section through Latron Area showing that the Western Aquifer Basin is ideally shared between Palestine and Israel.

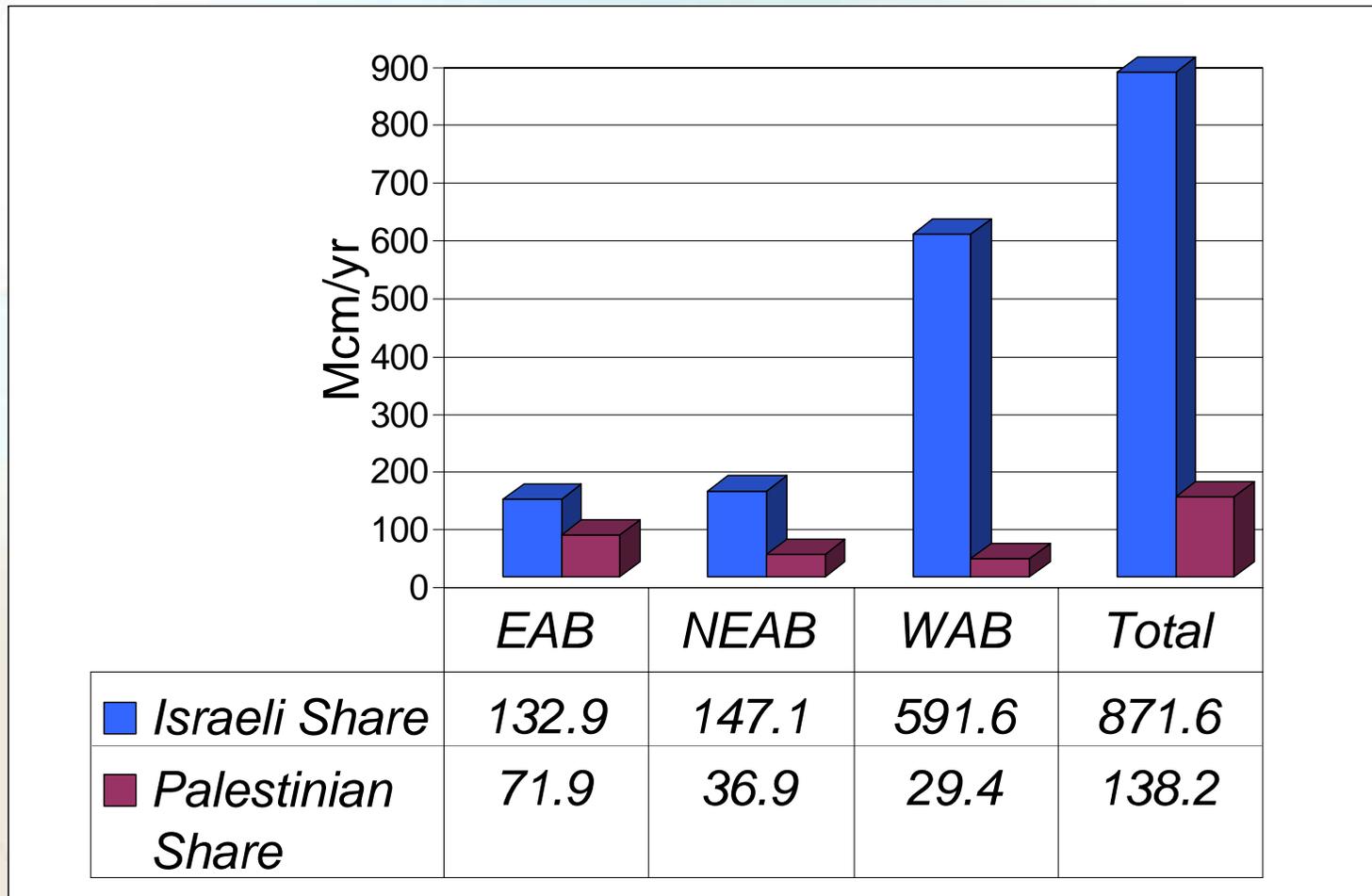


In-equitable Utilisation of Shared Groundwater Aquifers led to a huge Gap between the Palestinian Supply and Demand.

Palestinian Water Supply-Demand Gap

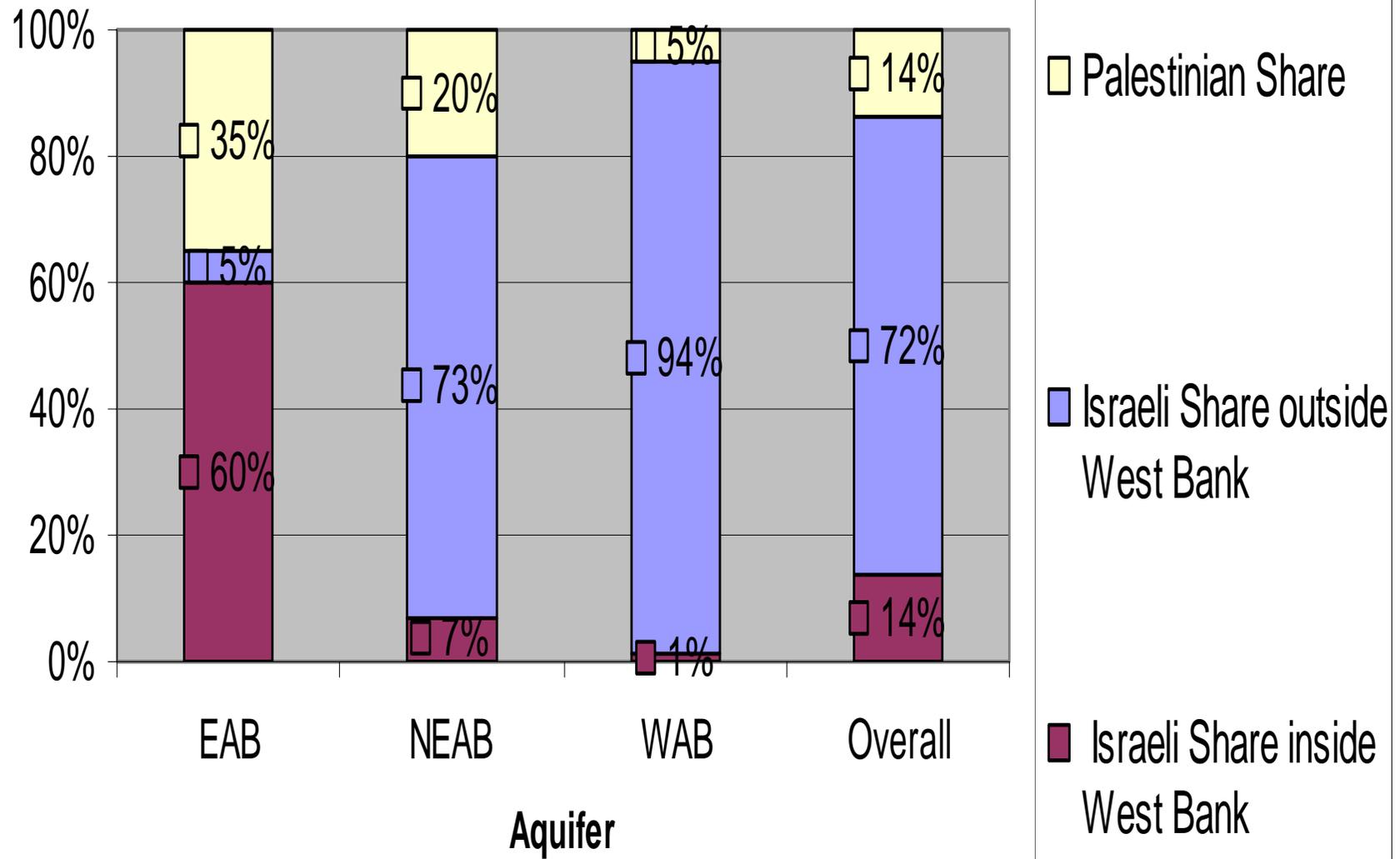


Israeli and Palestinian Aquifer utilization (Mcm/yr) through wells and springs (1998/99) in the West Bank

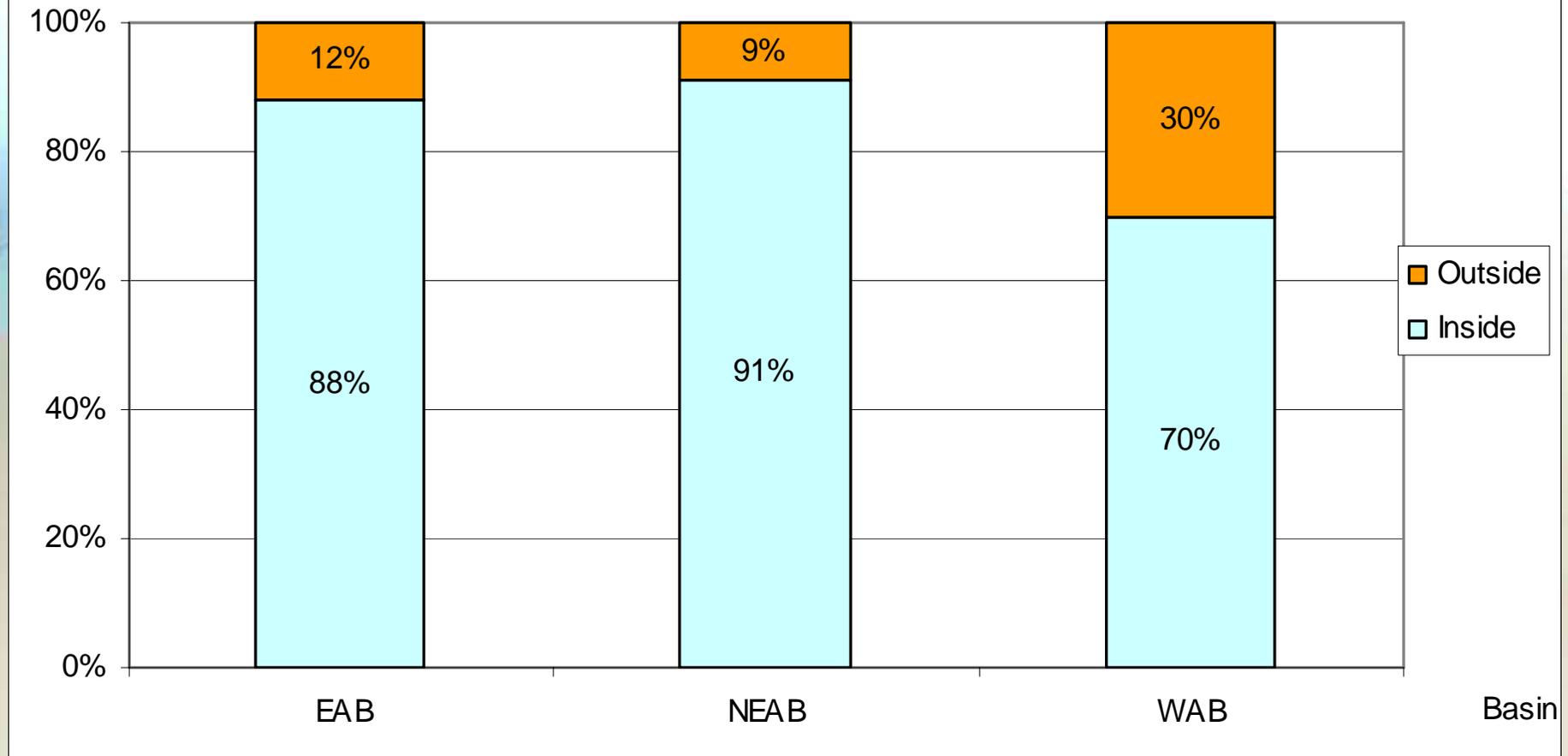


The total utilization (1010 Mcm/yr) exceeded the estimated total average recharge for the three aquifers (679 Mcm/yr according to Oslo II agreement) by almost 50%.

Palestinian and Israeli Utilisation of Aquifers inside and outside the West Bank

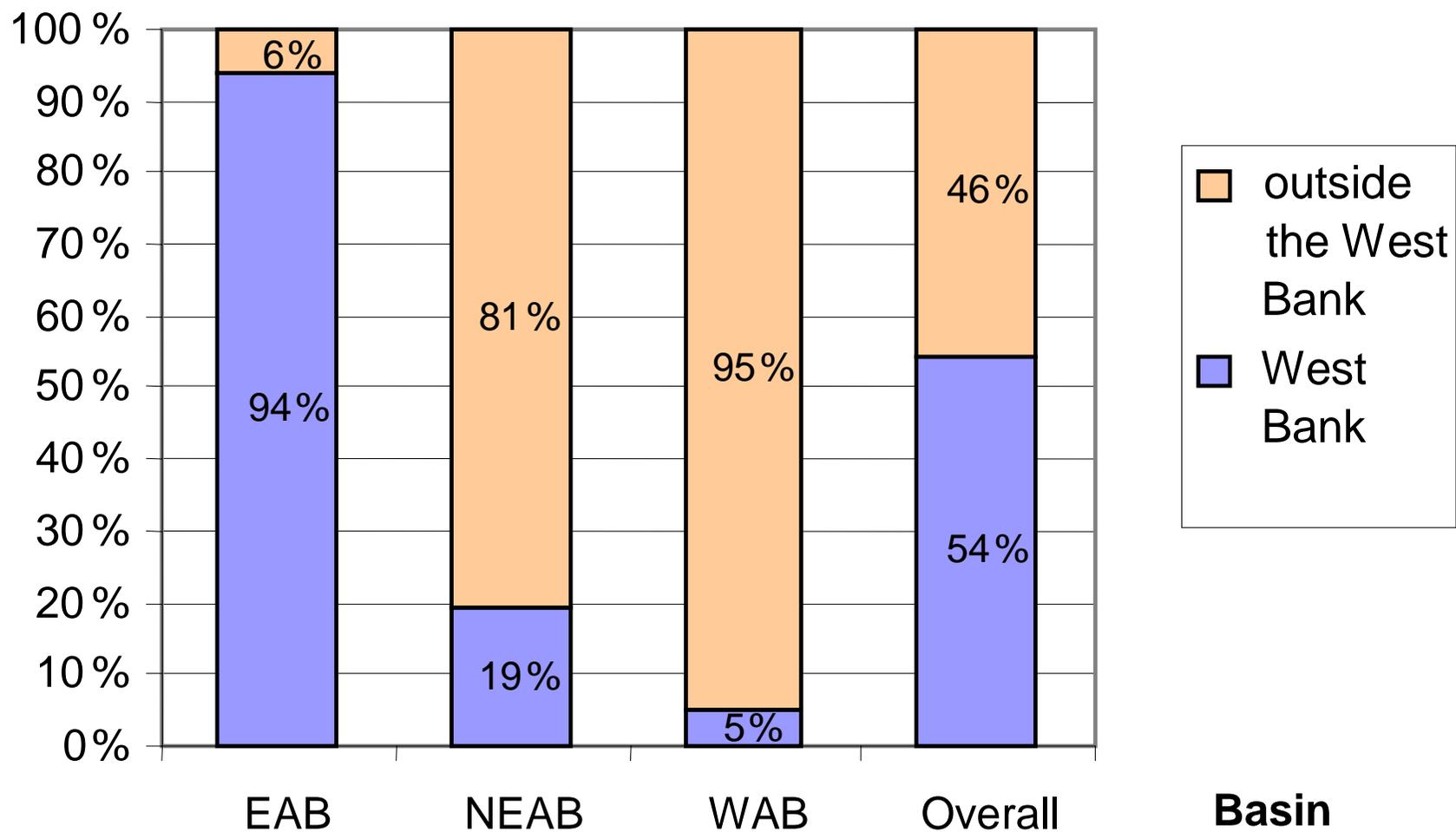


Distribution of outcropping aquifer formations inside and outside the West Bank

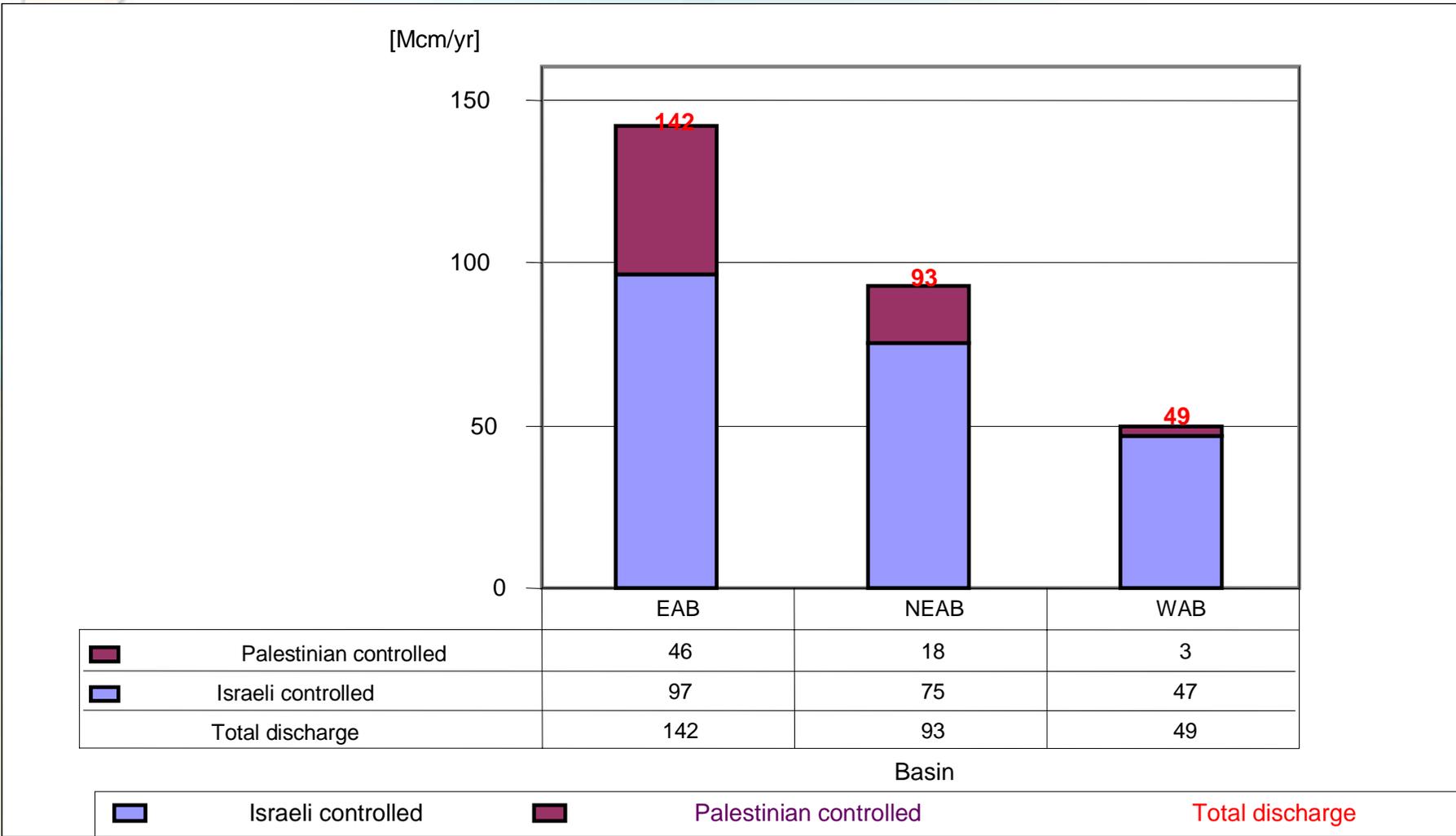


- The 12% outcrop of EAB inside Israel is insignificant for aquifer utilisation.

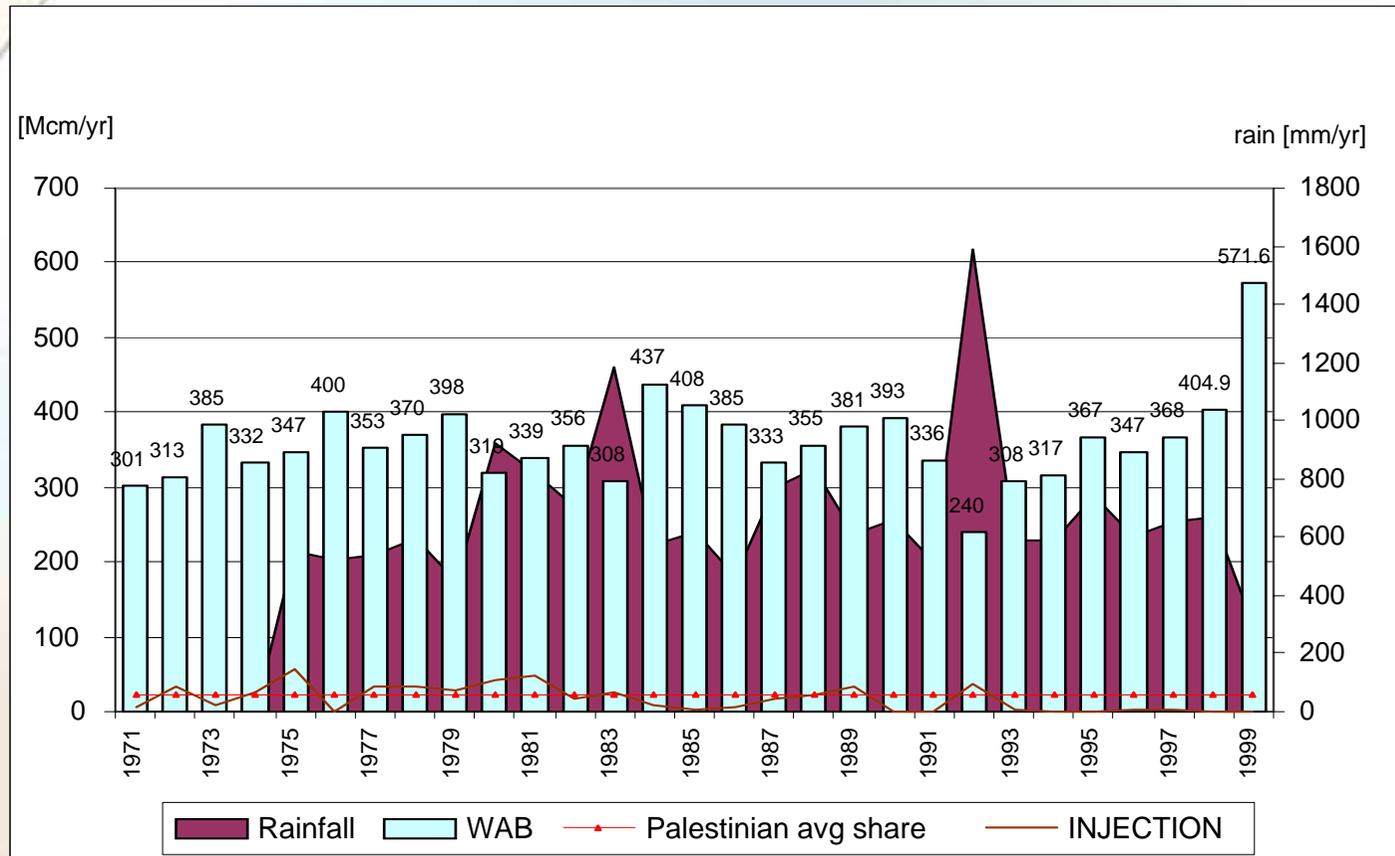
Geographic distribution of spring discharge for the EAB , NEAB and WAB



Control of EAB, NEAB and WAB springs inside and outside the West Bank.



Mismanagement of Western Aquifer Basin By Israel since they alone control this shared Aquifer Basin.

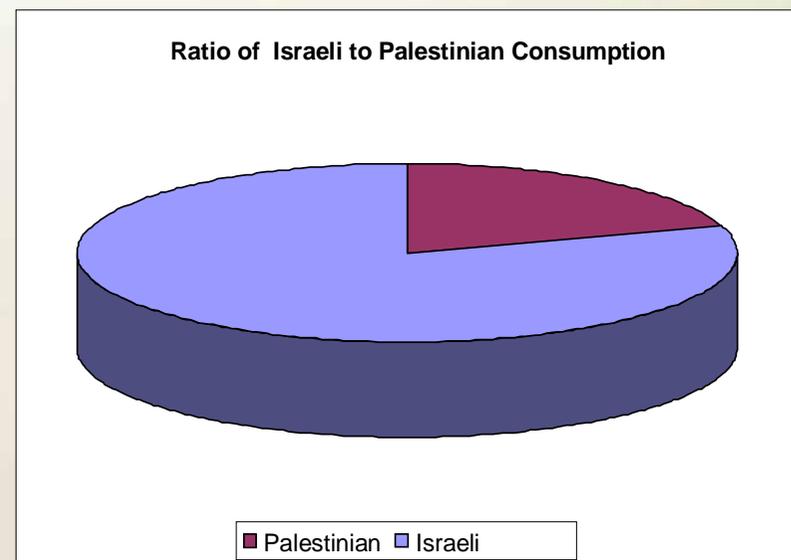
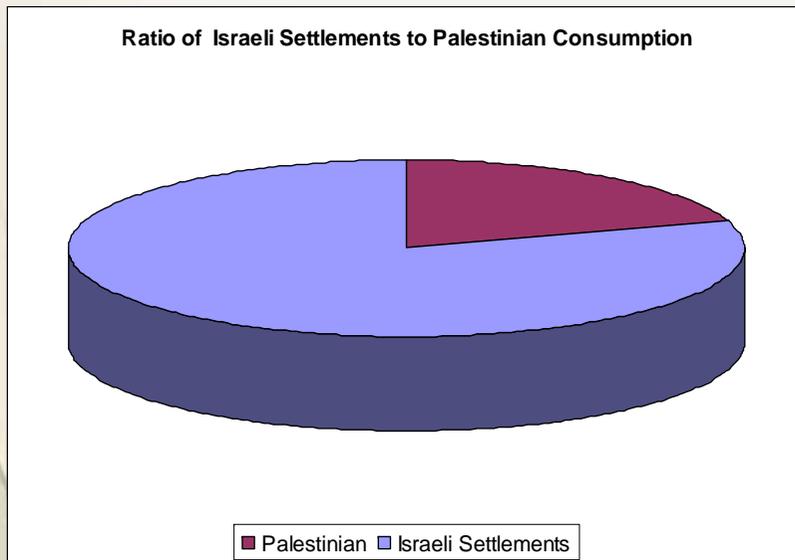
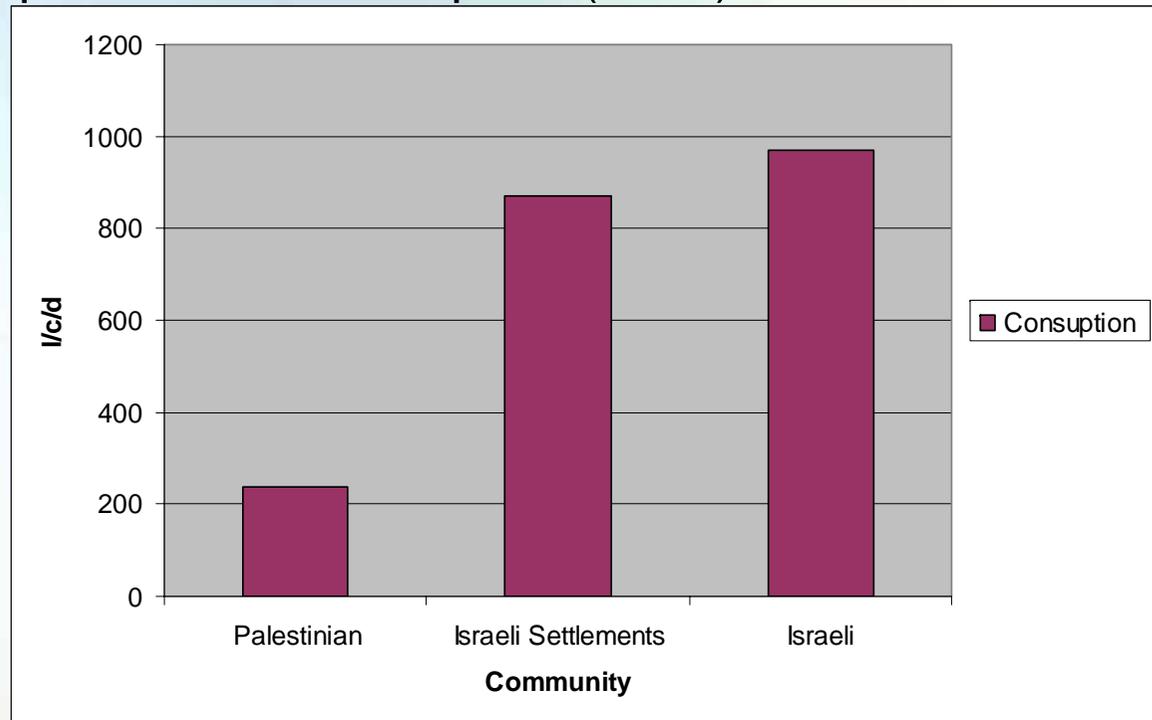


- In 1999 Israel pumped 572 Mcm/yr when rainfall was about 480 mm/yr (i.e, recharge in that year was about 225 Mcm/yr), meaning they abstracted 2.5 times its recharge.

Israeli and Palestinian per capita water consumption (1999)

Community	Population	Consumption For All Purposes (Mcm/yr)	% of Allocation	Consumption (l/c/d)	Ratio of Palestinian to Israeli Consumption
Palestinian	2,895,683	252.4	11%	239	1
Israeli Settlements	172,200	54.8	2%	872	4
Israeli	5,869,200	2074	87%	968	4
Total		2381.2	100%	2079	

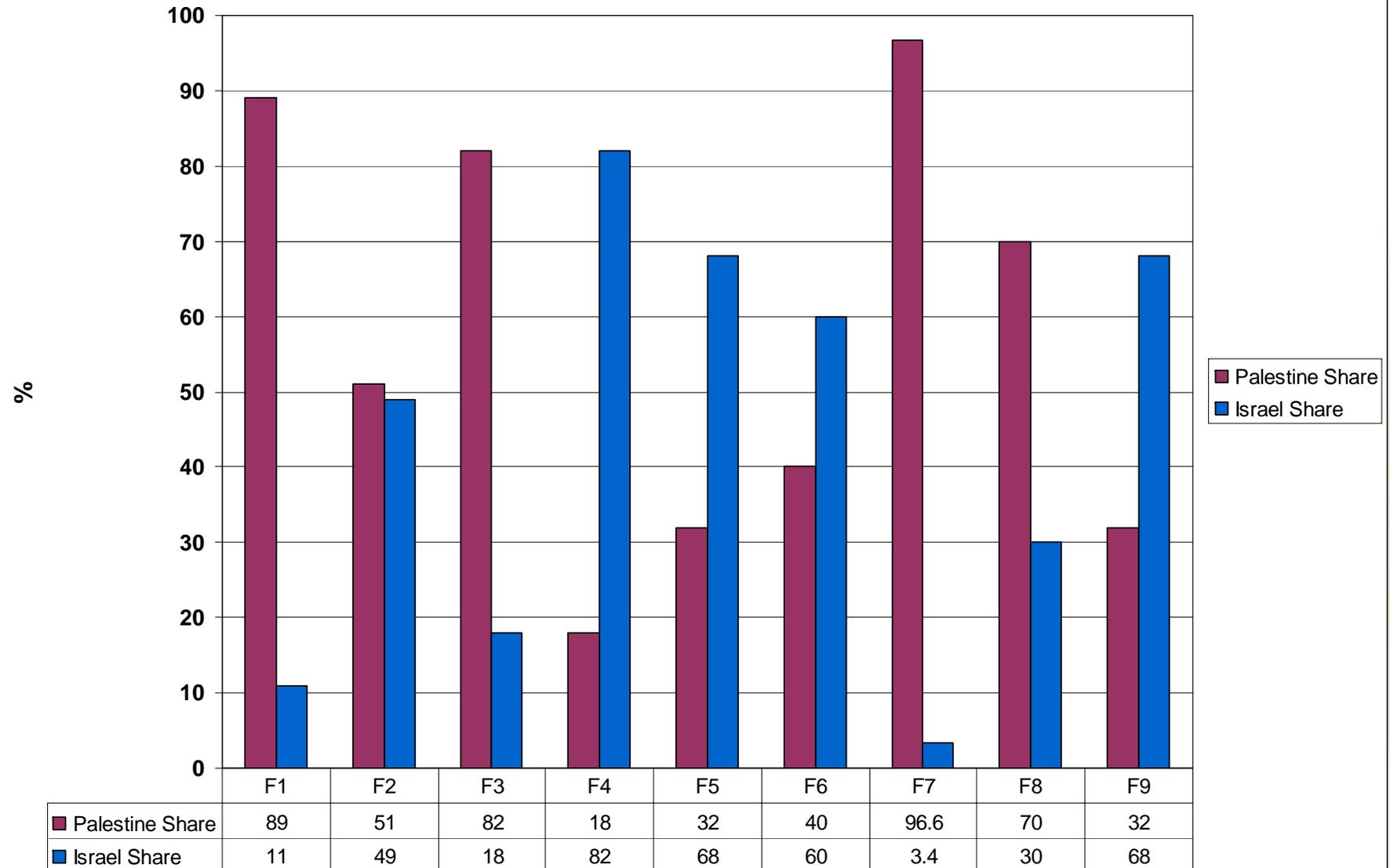
Israeli and Palestinian per capita water consumption (1999)



Factors affecting Shared Groundwater Aquifer between Palestine and Israel

Factor	Definition
F1	The geography of the basin, including in particular the extent of the drainage area in the territory of each basin state.
F2	The hydrology of the basin, including in particular the contribution of water by each basin.
F3	The climate affecting the basin.
F4	The past utilization of the waters of the basin, including in particular existing utilization.
F5	The economic and social needs of each basin state.
F6	The population dependent on the waters of the basin in each basin State.
F7	The comparative costs of alternative means of satisfying the economic and social needs of each basin states.
F8	The availability of other resources.
F9	The degree to which the needs of a basin state may be satisfied, without causing appreciable harm and substantial injury to a co-basin state.

Alternative equity standards (share in percent)



Weight of alternative equity standards (Based on opinion of experts)

Equity Factor	F1	F2	F3	F4	F5	F6	F7	F8	F9	Total
Average weight (percent)	16	15	10	16	10	7	14	10	2	100

2. The Political Process and Existing Agreements

First Stage:

- The Declaration of Principles signed on 13 September 1993 (Oslo I) which was the first bilateral agreement between the Palestinians and the Israelis.
- According to this agreement, water resources issues would be discussed by the permanent Palestinian-Israeli Committee for Economic Cooperation.
- The parties agreed to prepare plans for water rights and equitable use of water resources.
- However, the agreement did not identify or establish any explicit water rights for the parties.

2. The Political Process and Existing Agreements

Second Stage:

- Article 40 of Annex III of the Oslo II agreement signed on 18 September 1995, formed the basis for water sector planning, and project implementation during the Interim Period (1995-2000) by which at the end a final agreement was supposed to be reached.
- Article 40 of Oslo II scenario specifies that 70-80 Mcm/yr are available for Palestinian utilization from the Eastern Aquifer Basin and other agreed sources including shared aquifers.
- However, since 1995, the implemented quantity has been about 30 Mcm/yr only.

2. The Political Process and Existing Agreements

Second Stage:

- However, Article 40 indicates that both the Western and Northeastern aquifer basins are fully or over-exploited by the Israelis, with no further access and development potential for Palestinians.
- Principle one of Article 40 of the Oslo II agreement is the most significant element of the agreement. It states - and for the first time - that “Israel recognizes Palestinian water rights in the West Bank”.

2. The Political Process and Existing Agreements

Second Stage:

- Article 40 of the Oslo II agreement came far below the fulfillment of the Palestinian water rights and needs. The terms were broad and there was no elaboration on the nature of these rights or the principles governing the rights and obligations of both sides.
- Since 1995, the implementation of Article 40 was restricted and extremely slow. Decision making within the Joint Water Committee was mostly unilateral and dominated by Israel.

2. The Political Process and Existing Agreements

Third Stage: (*Camp David II rounds in July 2001*)

- In Camp David II rounds of negotiations, the Israeli side offered granting additional water quantities to the Palestinians as follows:
 - 50 million cubic meters from the Western Aquifer Basin.
 - 10 million cubic meters from the Northeastern Aquifer Basin.
 - 80 million cubic meters from the Eastern Aquifer Basin.
 - 40 Mcm/yr from the Jordan River.

- The talks collapsed and the Palestinian water rights were never discussed.

- In other words, under the Israeli proposal, Israel would control the Palestinian state's water resources.

2. The Political Process and Existing Agreements

Fourth Stage: Taba Rounds

- These rounds followed Camp David II rounds.
- Discussions continued but with no progress on water.

2. The Political Process and Existing Agreements

Fifth Stage: The Road Map

- The proposed Road Map approach mentions water resources in the Palestine region only once, and in a vague manner and with a regional context.
- The Road Map does not emphasize water as an actual issue for negotiations; it only states in the text of the document the following as one of the Road Map's aims or tasks: “Revival of multilateral engagement on issues including regional water resources, environment, economic development, refugees, and arms control issues” .

2. The Political Process and Existing Agreements

Fifth Stage: The Road Map

- In the road map, the statements were about regional cooperation to solve the problems of water allocations without any mention of the Palestinian water rights.
- Also, there is no reference at all to international law with regard to water rights.

Lessons learned from the Palestinian /Israeli Negotiations about water

1. Israel's Strategic Negotiations Stance

- Israel claims always that there is no water left to negotiate about. They claim that the available water resources in Historical Palestine do not satisfy 50% of Israel's water needs.
- Israel does not want to change the status of its past utilisation under any possible agreement with the Palestinians and other Arab countries.
- Israel does not accept to negotiate any solution that will force it to give up any water that it currently controls or utilises unless Israel guarantees additional waters through projects funded by the international community.

Lessons learned from the Palestinian /Israeli Negotiations about water

1. Israel's Strategic Negotiations Stance

- Israel considers that the interim agreement of Oslo II is final and the Israelis would like **“to talk”** not **“to negotiate”** about the future Palestinian **“water needs”** not **“water rights”**.
- These talks should be through the joint water committee (JWC) of Oslo II Agreement only. The Israelis want the JWC to continue as a permanent institution.

Lessons learned from the Palestinian /Israeli Negotiations about water

1. Israel's Strategic Negotiations Stance

- Israel wants to impose on the Palestinians through the JWC measures:
 - ⊗ To force them to reduce agricultural water and to stop drilling additional wells.
 - ⊗ To force them not to impact the Israeli current utilisation of water.
- With regard to the water crisis in Gaza, the Israelis claim that this problem is none of their business and the Palestinians must desalinate as the Israelis will never accept to provide Gaza with water from Israeli resources or from the West Bank.

Lessons learned from the Palestinian /Israeli Negotiations about water

1. Israel's Strategic Negotiations Stance

- Israel is constructing the Separation Wall to prevent the Palestinians from utilising the groundwater Aquifers behind the Wall and to have no access to the Jordan River.
- In general, Israel tries to avoid the international law as a reference to solve the disputes of water with Palestinians and other Arab States.
- Israel supports regional cooperation to get additional waters and establish relations with neighboring countries.

Lessons learned from the Palestinian /Israeli Negotiations about water

1. Israel's Strategic Negotiations Stance

- Israel believes that water shortages in the region could be satisfied from several proposals:
 - Ⓜ Renting agricultural lands in Sudan and establish shared agricultural projects.
 - Ⓜ Purchasing water from Turkey.
 - Ⓜ Purchasing water from Egypt.
- Israel believes that the Arab Gulf countries should be encouraged to establish cooperation with Israel over desalination technologies. By this Israel will establish cooperation relations in the region.

Lessons learned from the Palestinian /Israeli Negotiations about water

2. The Palestinian's Strategic Stance

- It is essential to arrive at a clear and mutual understanding about the political and legal aspects of water negotiations that cover Palestinian water rights in terms of quantities, quality and sovereignty before signing a final agreement.
- To accept the international law and UN resolutions.
- The sovereignty of Palestine to utilise and control its water resources should be recognised.

Lessons learned from the Palestinian /Israeli Negotiations about water

2. The Palestinian's Strategic Stance

- Each party should develop necessary plans that allow it to develop, utilise its water within its international borders without causing harm to each other **after signing agreements not before that.**
- Palestine considers that all actual, administrative and legal actions taken by Israel about the water resources within the borders of Palestine, can not in any case impact negatively on the Palestinian water rights which are the subject for the final status negotiations.

Lessons learned from the Palestinian /Israeli Negotiations about water

1. The Palestinian's Strategic Stance

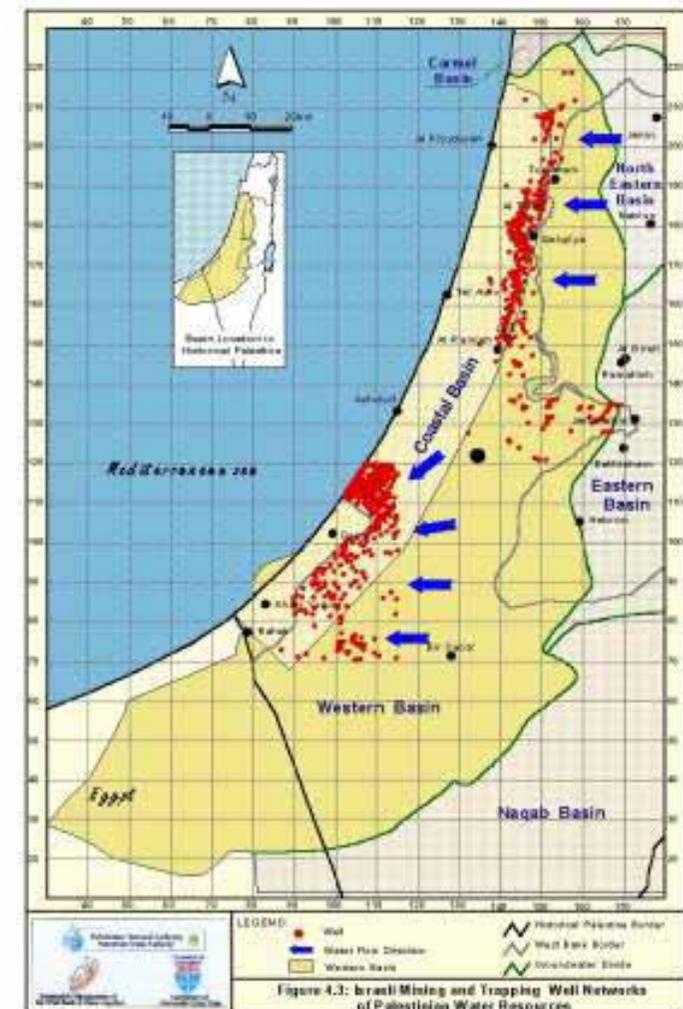
- Israel should admit that its current control and utilisation of the Palestinian water resources has caused significant harm and losses to the Palestinians and hence Israel must compensate the Palestinians over this harm and losses.
- All interim measures agreed in the interim agreement of Oslo II should remain interim and should not in any case influence the Palestinian water rights.
- Palestine is a riparian country in the Jordan River and its basin including all its groundwater aquifers. Therefore, the utilisation and management of the Jordan River and its basin should involve the Palestinians as an equal partner and in accordance to the International law.

3. Difficulties to implement policies and agreements for the management of shared Groundwater Aquifers

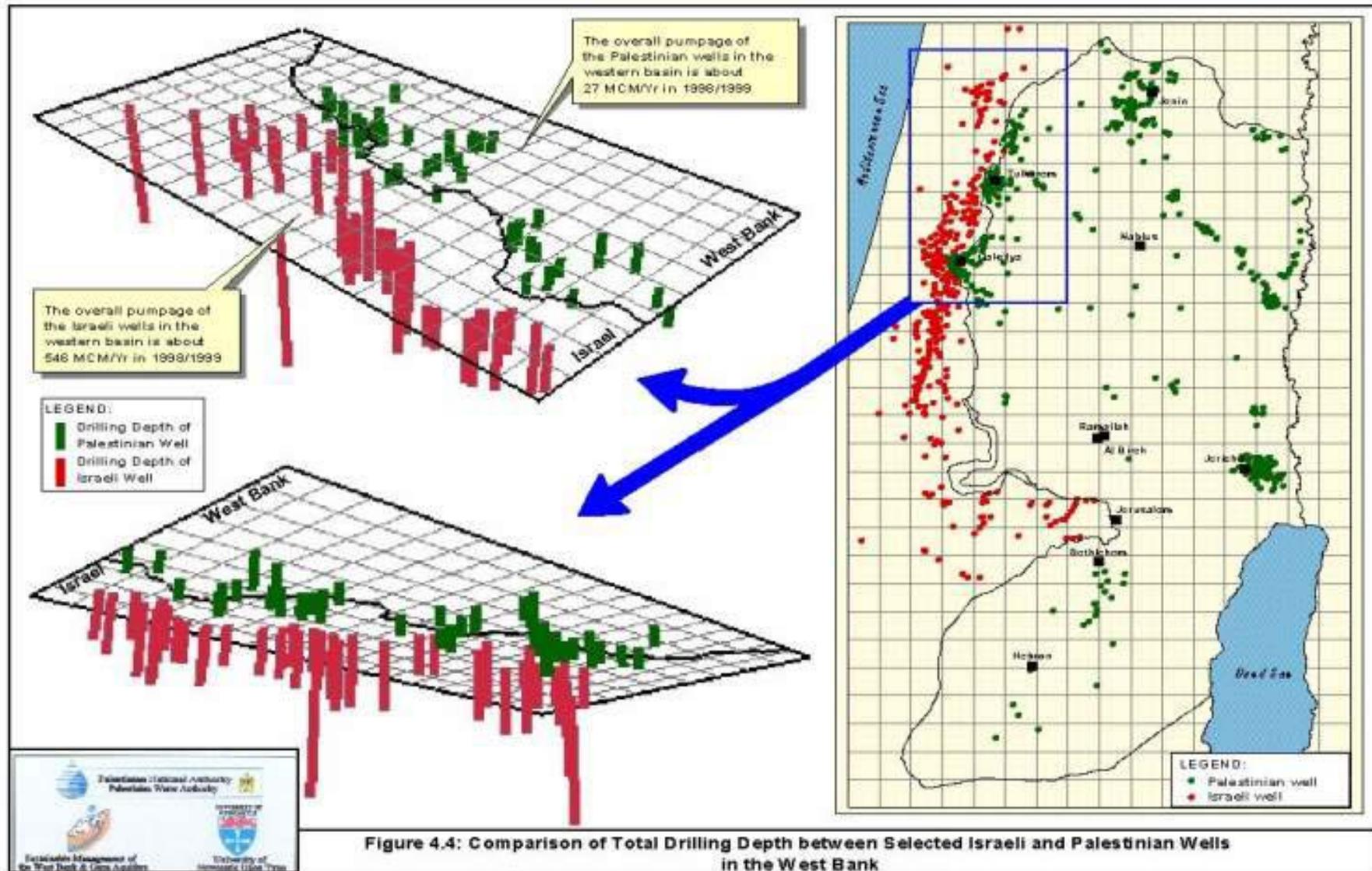
1. **"Status quo" on the ground:** Israel imposes facts on the ground to preserve the *status quo* with regard to the allocation of shared groundwater aquifers without recognizing Palestinian water rights.

- Mining the West Bank and Gaza aquifers by dense networks of wells inside the West Bank and alongside the green lines between Israel and the West Bank on one side and Israel and Gaza on the other side.

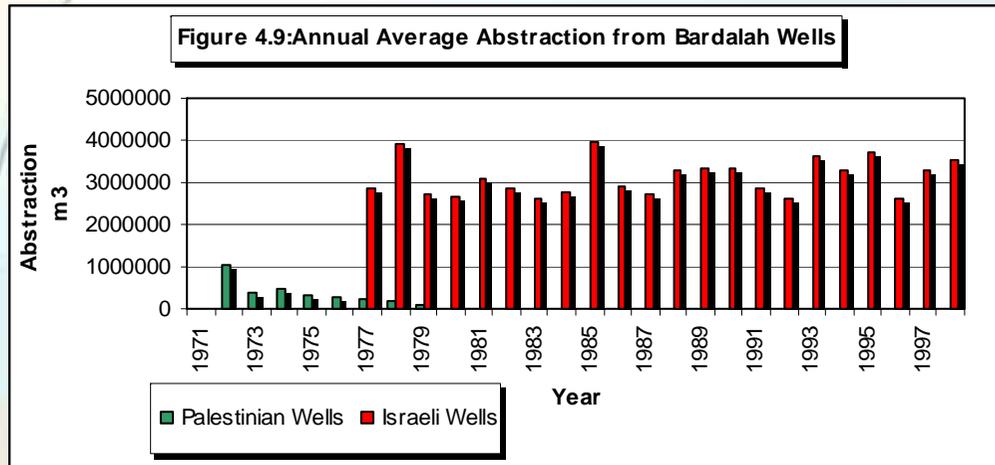
Israeli Pumping Network of wells



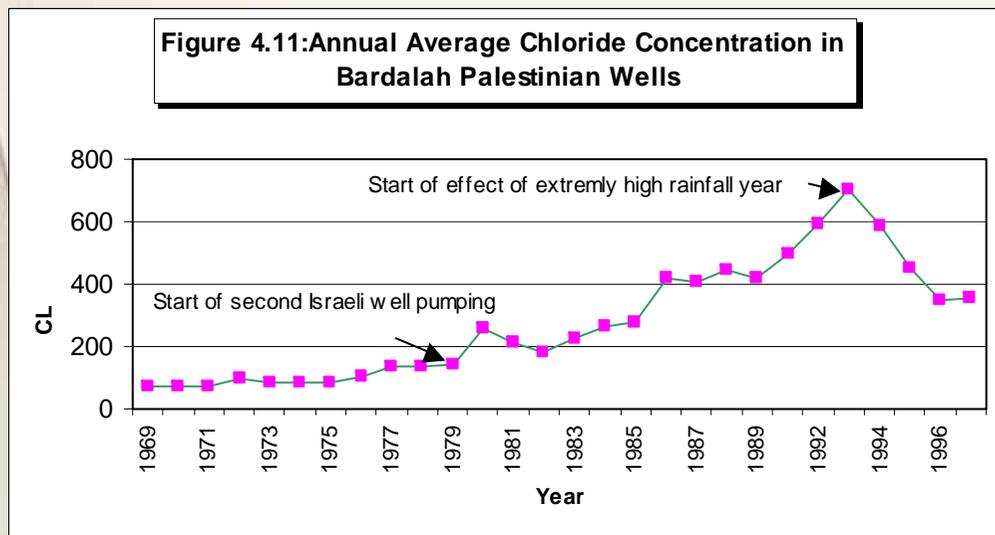
- Unlike Palestinian wells, Israeli wells tap deeper aquifers.



- The deep wells drilled by the Israeli authorities in the area have affected water quality and quantity of Palestinian wells.



The abstraction of Palestinian wells versus nearby Israeli wells abstractions in Bardala Area



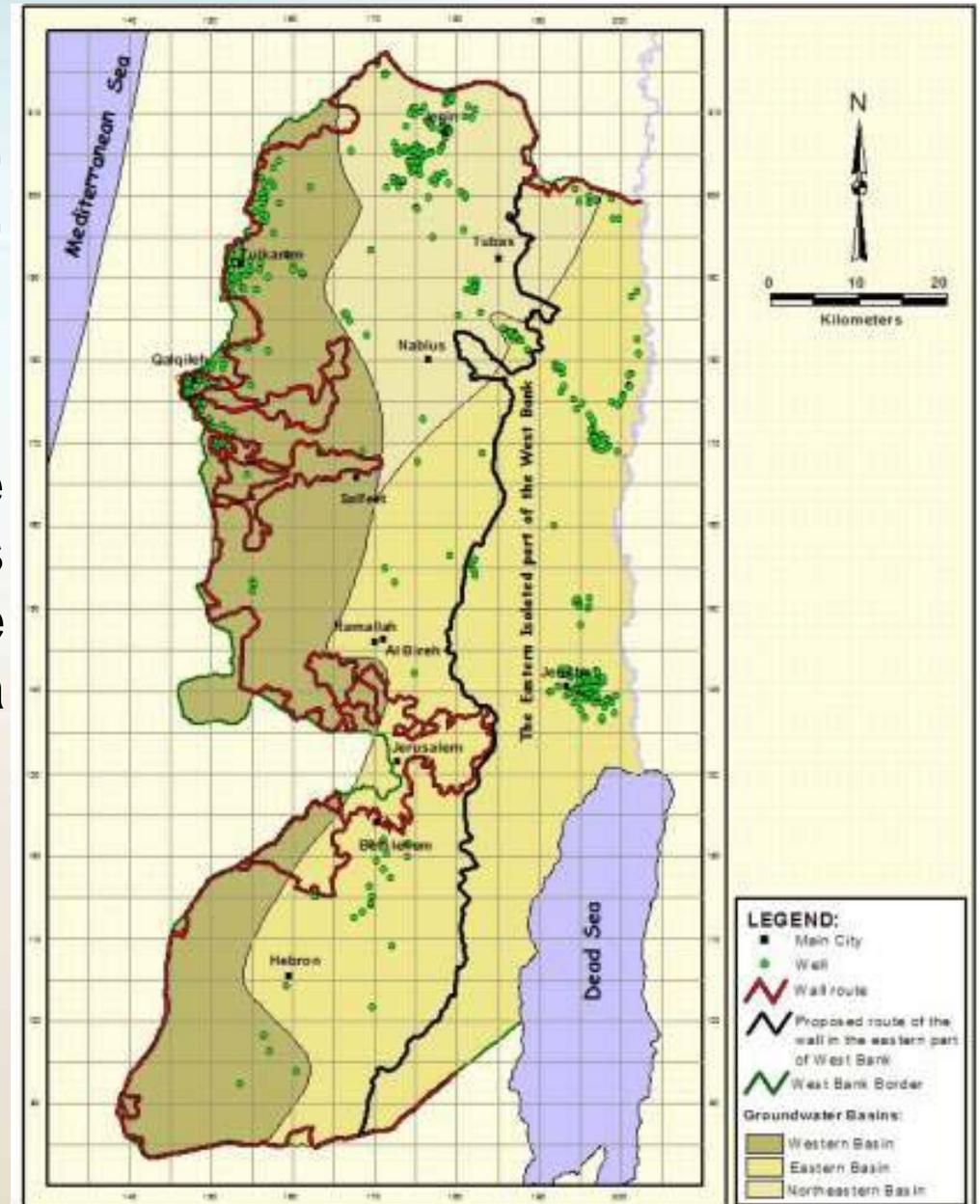
Water quality deterioration in Bardalah wells in response to Israeli pumping

3. Difficulties to implement policies and agreements for the management of shared Groundwater Aquifers

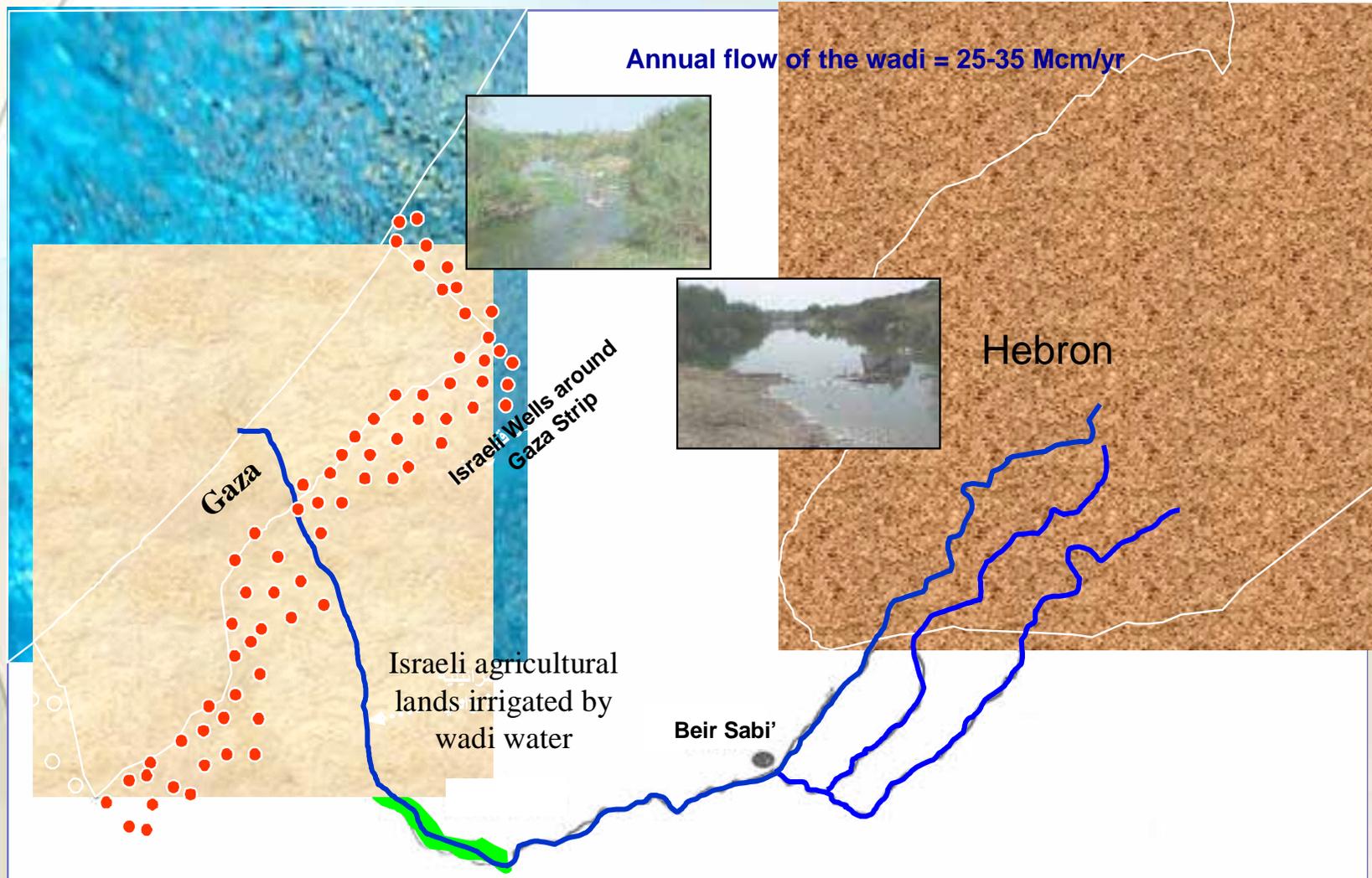
- The Israelis imposed obstacles before the Palestinians from drilling new wells to meet their needs in shared groundwater aquifers. No permit was given in WAB since 1967.
- The Israeli control the utilization zones of the shared groundwater aquifers and recently they confirmed that by constructing the Separation Wall.

The New proposed location of the separation wall as appeared in Al-Quds newspaper on 5/5/2006

- The Israelis plan to build the wall according to the map, thus confiscate land, aquifers, springs and wells
- The Israeli authorities have built many parts of the wall as shown in the map except for the eastern part which is still a proposal.



- Intercepting groundwater from reaching the Gaza coastal aquifer
- Intercepting surface wadis flowing to Gaza.



Intercepting Gaza Wadis and intercepting groundwater flow to Gaza



- Diverting the route of the Jordan River to the Negev



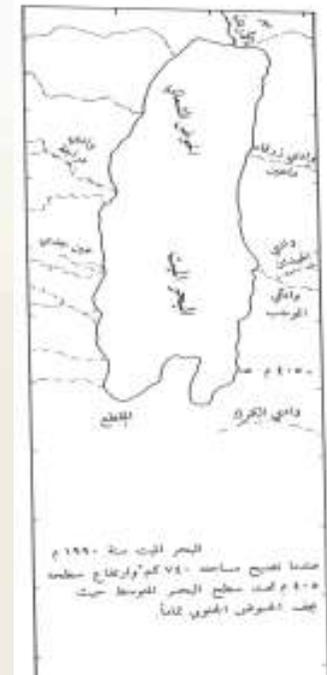
1948



1967



1982



1990

- Polluting the groundwater aquifers especially by the wastes of the Israeli settlements.
- The shared aquifers have been exposed periodically to the problem of illegal trans-frontier dumping.



Example of pollution of Palestinian Wadis near Tulkarm

- The resources of pollution are dumped on the outcrops of the shared aquifers knowing that these outcrops are karstified and thus provides easy paths for pollutants to reach water levels.



Example of pollution of Palestinian Wadis near Tulkarm

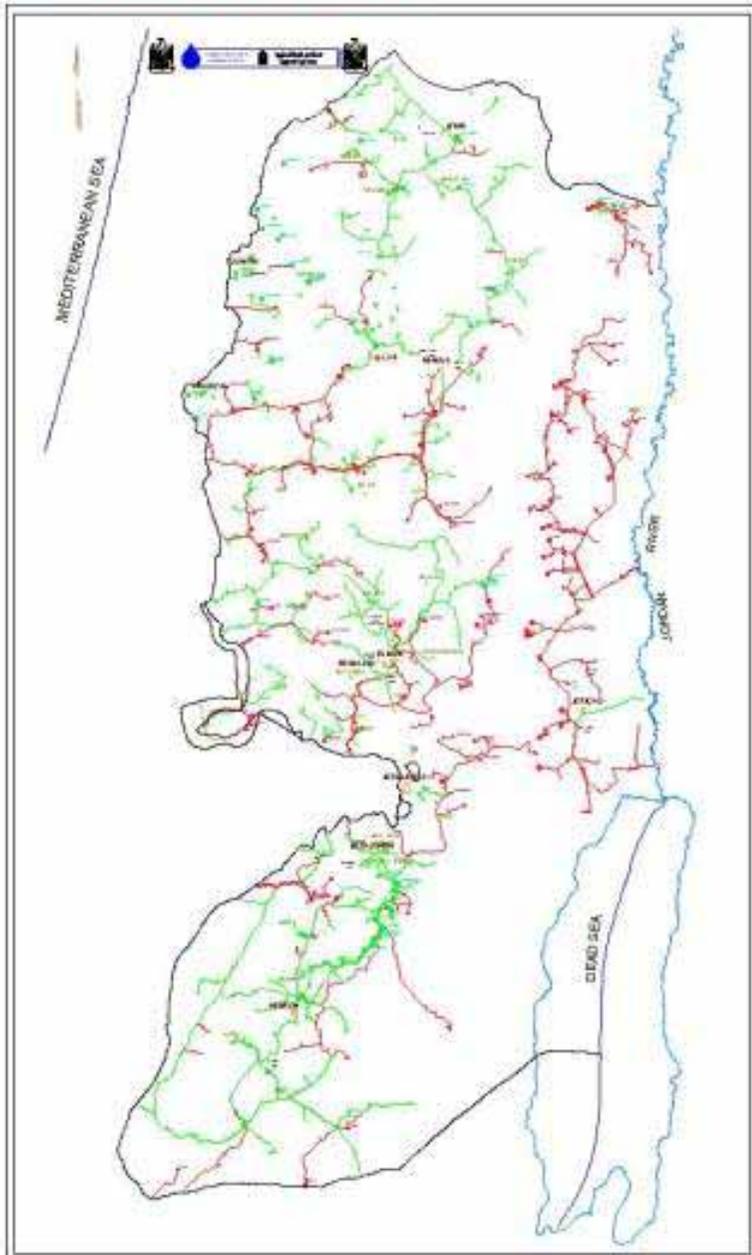


■ There is insufficient capacity infrastructure to manage hazardous wastes safely:

- ⊗ The area suffers from inappropriate storage and disposal facilities.
- ⊗ It lacks the requisite skills to evaluate risks and monitor controlled dumping.
- ⊗ It lacks the capacity to undertake detection, remediation or possible treatment.

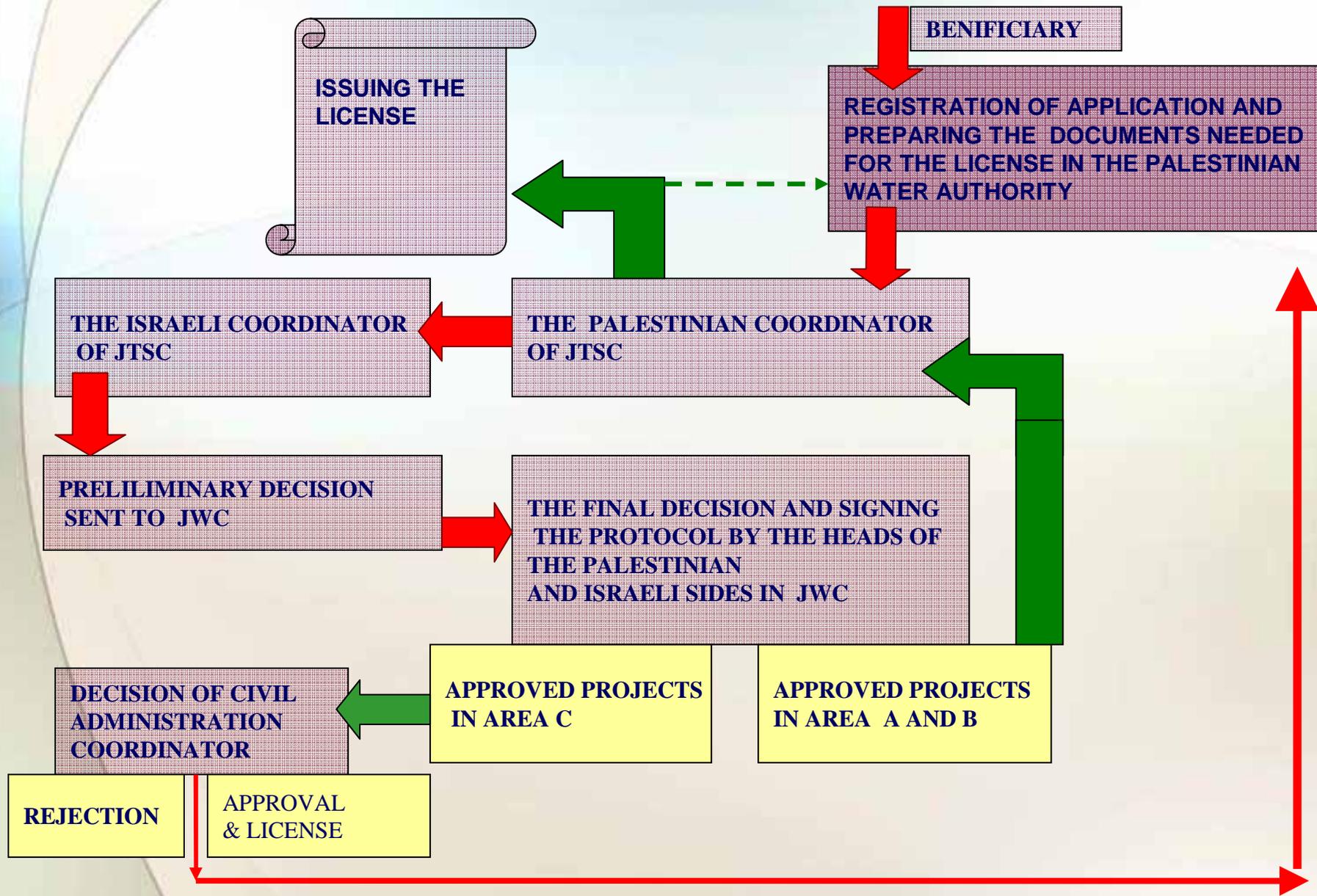
Example of pollution of Palestinian Wadis near Shibteen village

- PALESTINIAN EXISTING RESERVIOR
- ISRAELI EXISTING RESERVIOR
- PALESTINIAN EXISTING PIPES
- ISRAELI EXISTING PIPES



- Forcing Water Supply Systems and their infrastructure in the West Bank to be mixed (mish-mash).

- Complicated Procedures of Licensing Palestinian Water Projects including drilling wells.



3. Difficulties to implement policies and agreements for the management of shared Groundwater Aquifers

2) Lack of funding

- It is a major difficulty to the implementation of agreed policies and the enforcement of laws.
- It also impedes vital data collection, the establishment of databases, information sharing and application of contemporary technology.

3. Difficulties to implement policies and agreements for the management of shared Groundwater Aquifers

3) General Israeli policy:

- The entire period from 1967 to the present day was accompanied by the degradation of existing infrastructure and limited development in new infrastructure for water supply, sewerage and solid waste.
- This resulted in insufficient and unreliable service (40% of Palestinian communities unserved) with poor quality and with large losses in the systems (25% - 40%).

3. Difficulties to implement policies and agreements for the management of shared Groundwater Aquifers

3) General Israeli policy:

- The Israeli “operator” also cut off supplies periodically, thereby discriminating unfairly between Palestinians and Israeli settlers when shortages or problems occurred (especially during periods of droughts, since water supply networks are mixed).
- The general acceptable policy concerning shared aquifers should not be limited only to equitable utilisation and control but it should also include optimal use and ecological protection of shared aquifers as well as the sustainable development of these resources. The over-utilisation of shared groundwater aquifers and their pollution further bedevil the cross-national implications of water scarcity in the Palestine-Israel region.

4. Guidelines for Comprehensive Framework for the Palestinian/Israeli Management of shared Groundwater Aquifers

The Framework has 3 pillars:

1. Political

2. Policies

3. Cooperation

1. Political Pillar

- The region of Palestine and Israel are subject to recurrent political volatility and insecurity which further hinder communication and cooperation within and beyond the boundaries of these two countries.
- The shared groundwater aquifers is not only an issue about management, development and environment but also it is essentially a political issue.
- Mobilise Political attention through effective dialogue between scientists and decision makers followed by politicians.

1. Political Pillar

- The concept of benefit sharing should always be promoted to influence the politicians towards a win-win scenario in shared aquifer management.
- The Concept of re-allocation of use of water between different sectors should be promoted so that the politicians can see the entire picture of the region and that shared groundwater aquifers and other water resources can not be managed separately.
- Both parties should realise water rights and water allocations for each party while accepting permanent sovereignty of each party (Palestine and Israel) over their shared water resources in their lands according to 1967 international border lines and international law.

2. Policies Pillar

- The Policy statement should provide opportunity for integrated management of shared groundwater aquifers, other shared water resources and water supplies which include strategies for the benefits of the riparian countries.
- Protection of shared groundwater aquifers from pollution through providing legislation about every potential contaminating activity such as:
 - Wastewater and solid waste release
 - Land use
 - Agricultural practices
 - Location of storage facilities for toxic and hazardous materials.

2. Policies Pillar

- The Policy statement should establish long term standards and procedures including permits for well drilling and operation as well as abandonment of all groundwater wells.
- The Policy statement should include long term plans to monitor and limit drawdowns in shared aquifers and abstractions from wells affecting shared aquifers.
- The policy statement should provide opportunities to strengthen the institutional capacity of shared groundwater aquifers management.

2. Policies Pillar

- The Policy statement should promote opportunities for bi- lateral, regional and international cooperation in research, management and development of shared groundwater resources.
- The Policy statement should promote measures to update and harmonize water legislations between countries sharing groundwater resources.
- The Policy statement should provide opportunities to mobilize and develop expertise on legal, institutional and socio – economic aspects of the management of shared groundwater aquifers.

3. Cooperation Pillar (*including lessons learned*)

- Cooperation between Palestine and Israel over shared groundwater aquifers should aim at:
 - Building confidence and trust between them and hence help implement unified policies and defuse potential conflict.
 - Managing these shared aquifers sustainably.
 - Resource protection towards ecological sustainability
 - Poverty reduction.
 - Enhancing bi-lateral economic productivity and development.
- Cooperation must be promoted on bi-lateral, regional and international levels, that respect the international law concept regarding shared groundwater aquifers.

3. Cooperation Pillar (*including lessons learned*)

- Any regional (bi-lateral and multi-lateral) cooperation or agreements must be built on unifying environmental standards and regulations, information and expertise sharing and public involvement.
- The cooperation between the Palestinians and Israelis should be based on the items presented in pillars 1&2 in order to serve the interests of both nations towards prosperity, peace, regional safety, reciprocal benefits and good neighborhood.
- In the context of cooperation, the Israelis should acknowledge the Palestinians as an equal partner and a riparian to shared groundwater aquifers.
- Cooperation should not be limited only to the Palestinian part of shared groundwater aquifers, the Israeli part and their utilisation should also be involved.

3. Cooperation Pillar (*including lessons learned*)

- Any development of shared groundwater aquifers should be based on:
 - The socio-economic needs (current and future domestic, agricultural, etc) of both nations based on equity and riparian rights.
 - Protection of shared groundwater aquifers.
 - Sustainable development of shared groundwater aquifers to face the challenges of water shortages and climate change that affect every aspect of life from ecosystems to human health, food security, human rights and cultural heritage.
 - Developing additional water resources (conventional and non-conventional).

3. Cooperation Pillar (*including lessons learned*)

- The cooperation over the environmental preservation of shared groundwater aquifers should be looked at from the point of view of environmental security which is a core element for promoting peace and stability between Palestine and Israel.
- Cooperation should develop a clear and practical mechanism to control and monitor the implementation of signed agreements.
- Cooperation should continue during peaceful and violent periods with respect to management of shared groundwater aquifers.
- Cooperation should cover data sharing and information exchange including the establishment of common integrated databases derived from existing and reconciled data.
- Cooperation should include assessment of risk and uncertainty especially for periods of consecutive droughts.

5. Conclusions

- The region of Palestine and Israel is plagued by conflict and thus the political and security situation can only sharpen the critical need to formulate well defined transboundary policies and mechanisms for cooperation to enhance the resolution of disputes over the sustainable management of shared groundwater aquifers.
- The failure to maintain close cooperation in preserving the shared groundwater resources will lessen the ability of the two sides to cope with dangers such as pollution, salinity, and a lower water table during droughts.
- In reality, Agreements award Israel veto power over the Palestinians' ability to alter the unfavorable “status quo”, because joint management does not apply to Israel's water sector and control on the ground is largely in its hands. The political arrangement would have to give way to a joint regime that covers common water resources on both sides of border.

5. Conclusions

- Palestinian sovereignty is a decisive issue because most of the recharge areas of the shared aquifers are within the Palestinian lands.
- Equitable utilization would be based on the division of the shared water resources in Palestine and Israel as a whole on the basis of water rights and the long-term social and economic needs.
- However, the current mechanisms of joint management of shared groundwater aquifers between Palestine and Israel fall short of playing a decisive and conclusive role.

5. Conclusions

- Capacity building is an important component of effective joint management of shared aquifers:
 - First acknowledge and understand the transboundary challenges.
 - Then foster the regional cooperation through policies, institutions, ministerial forms and regional organisations and NGO's.
 - Capacity building can also be achieved by improving management skills and environmental technology skills and expertise.

- International water law stipulates that joint management ought to be built on mutuality, equality, and respect for sovereignty.

5. Conclusions

- A joint management regime requires a definition of the tasks to be undertaken and the structure and composition of a joint management body.
- Discussions about a joint management regime should factor in other water-related political and economic considerations, notably sovereignty and cost benefit sharing.
- Peace achievement between nations and states is not only a humanitarian issue, it is a very complex process that has to achieve an accepted balance between the interests and demands of both sides, otherwise, it will be the domination of the oppression on the oppressed .

THANK YOU



House of Water and Environment