

# يلا ع المي BLUEGOLD

OF LEBANON

5-YEAR PLAN

An innovative holistic vision  
for Lebanon's water resources

Inspired and initiated by the  
Civic Influence Hub







# **BLUE GOLD 5-YEAR PLAN**

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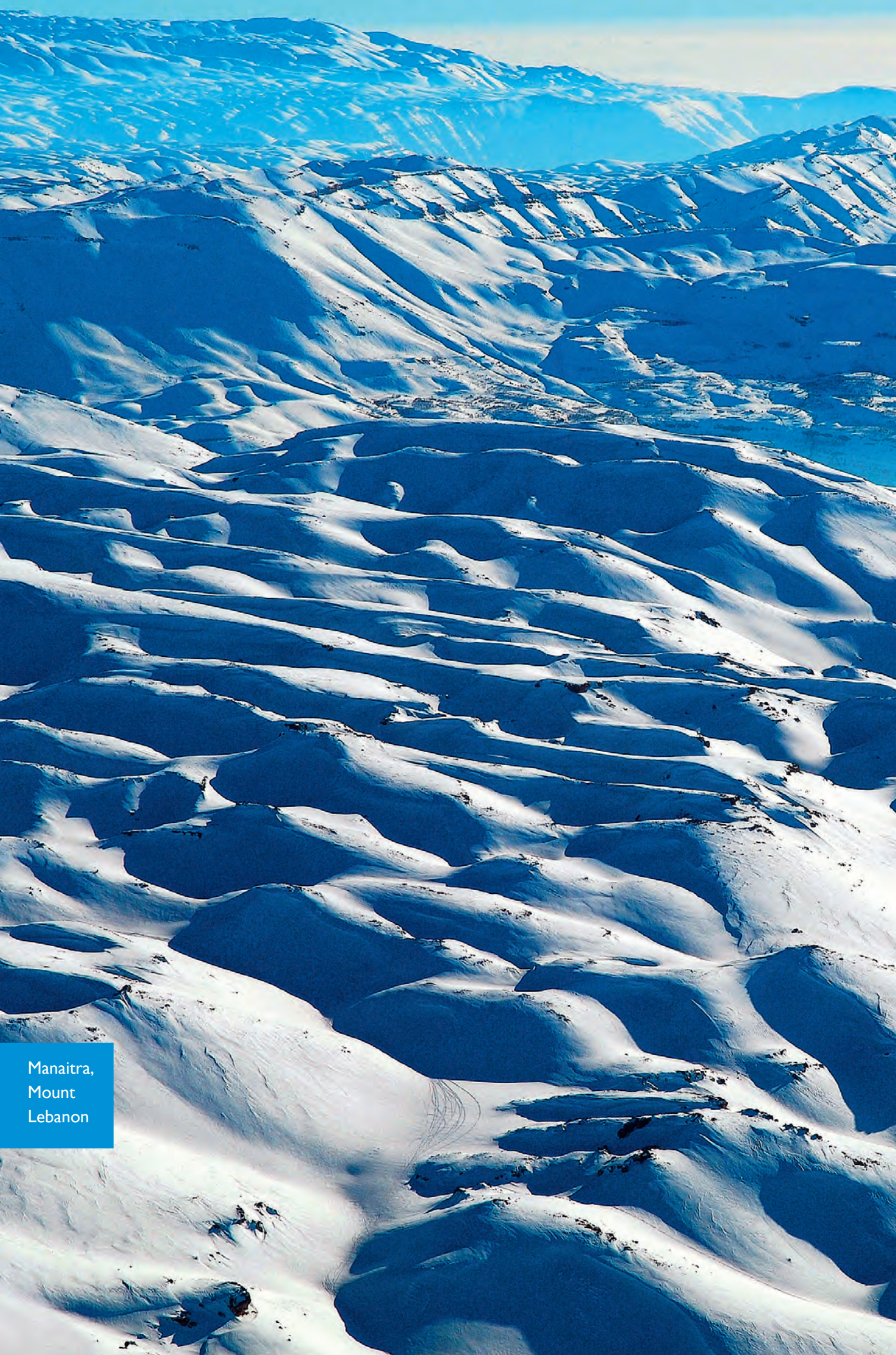
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# يَلَّا عَ الْمَيِّ


صاحب الحقّ سلطان





Manaitra,  
Mount  
Lebanon





*“Building a promising future and a perennial Lebanese nation through the sustainable development of our most important resource: water.*

*This development is promoted by a Civic and Apolitical Group of Influencers nurtured by the participative action of the Lebanese people in all their diversity. Discover the unexploited, true potential of our water.”*

*Clement Tannouri*

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**Dedicated to the Lebanese people  
from the Lebanese people**

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# ACKNOWLEDGMENT

*As we are all in search of a way out of the current political quagmire that plagues Lebanon, a group of apolitical citizens who believe in the true meaning of water decided to offer their fellow citizens a national solution outside the political game.*

*Project **BLUE GOLD**, the 5-Year Water Plan, is the result of vision, good will and shared faith in Lebanon. **BLUE GOLD** is a demonstration of the constructive collaboration of Lebanese citizens, of what Lebanese civil society can do when stimulated by common goals away from destructive politics.*

*The **BLUE GOLD** project took ten arduous months of long-hour days to design and configure. The team's revolutionary vision builds on exhaustive knowledge of Lebanon's geographical, social, national and regional realities, as made apparent in this study.*

*The combined cooperation of all participants was instrumental in achieving the broadest, most objective understanding of the water situation in Lebanon. The best water experts in Lebanon willingly offered their services to help make this ambitious project a reality. Activists and members of the civil society invested their time to research all relevant water studies conducted since the country's independence. Member of the economic society, far from politics and politicians, also imparted their advice and wisdom to this pioneering initiative.*

*The **BLUE GOLD** Steering Committee want to express its deepest gratitude to the contributors who made **BLUE GOLD** a reality. The project could not have materialized without their generous contribution. It also wants to thank Lila Kasparian and Clement Tannouri for their generous photographic contribution to the book.*

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**BLUE GOLD** project is a proof that Lebanese citizens can work together without hidden political agendas, clientelism, religious restraints or sectarianism.

**BLUE GOLD** is the road to our future.

Afqa,  
Mount  
Lebanon





## INTRODUCTION

---

# BLUE GOLD: A UNIQUE INITIATIVE OFFERED FROM THE LEBANESE TO THE LEBANESE

---

Dear Lebanese Citizen and future partner in **BLUE GOLD**,

Lebanon has water, lots of it. Water is our main and most important resource. The snow crowning our mountains has more to offer than just ski slopes and beautiful scenery. In fact, snow is a vast water treasure that can help the bountiful natural resource unify the nation.



Barouk Cedars,  
Mount  
Lebanon



Water



Crude Oil

The problem is that we do not realize the wealth we have. We see water as a cheap commodity ignoring the fact that the value of a bottle of water is the same as a bottle of crude oil. And what do we do with it? We lavishly throw it away. We waste the equivalent of 1 trillion of 1.5 L water bottles a year!

It rains on average 8 billion m<sup>3</sup> a year, the equivalent of 3 million olympic-sized swimming pools. In 2011 alone, more than 10 billion m<sup>3</sup> of blue gold poured down on us. Sadly, we only make use of 17% of the available water if not less, due to inefficient management. In fact, much of this treasure is lost in storage: the sponge-like nature of our soil literally sucks water from the dam; in distribution: our pipes are either depleted or not connected to the storage facilities; in misuse: archaic irrigation methods and lack of water consumption discipline.

Nahr  
Ibrahim,  
Mount  
Lebanon



Aware of the current situation, the government is trying to implement change and recently presented an 8-year plan that is supposed to raise the quantity of available water from 17% to 22%.

**The objective of this book is to show that we can do better. BLUE GOLD project is an innovative, visionary 5-Year plan that will increase the amount of available water to 500 million m<sup>3</sup> as of 2020 – only 7 years from now! By 2030, the amount will be 1 billion m<sup>3</sup>, equivalent in today's money to more than 2 billion USD of wealth for the entire country to share.**

Rivers of  
Lebanon,  
Arteries of  
our Future



The hydraulic map of the country illustrates the even dispersion of rivers from north to south, like arteries nourishing Lebanon's body. If we inject new oxygen into our water streams, chances are that the sick Lebanese body will heal. But how? Four steps can help us to get there.



**Step One: Be  
Aware of the  
Problem**

As long as there is water shortage, as long as we do not have quality tap water, as long as we are buying bottled water and hiring expensive transportation trucks to provide for our water needs, our basic water rights as citizens are not being met.



**Step Two:  
Understand  
the Cause**

The poor management of our water resources is the main cause of shortage. Our forefathers did not have to worry much about water as nature managed collection and storage for them. They were only required to find sustainable springs and get the water home. Today we have much bigger tasks:

- ◀ Securing water for agriculture, industries and all Lebanese homes.
- ◀ Securing water to boost our economy.
- ◀ Securing water from neighborhood countries' ambition.



Springs,  
West Bekaa  
Highlands,  
Lebanon

**Step Three: Provide a Nationwide Solution** A close look at the geography of Lebanon shows a succession of 17 river basins\* that can be grouped in 6 big regions. At each basin there are institutions that handle the collection, storage and distribution of the river water. More often than not, the managing bodies are subject to political influences, tend to disagree, and therefore do not work together effectively. For example, two institutions that do not want to cooperate with one another may manage the same dam's maintenance and water distribution.

Imagine we replaced our divided, deadlocked public institutions with a citizen-state partnership that would unify management outside of politics. Envision that these shared institutions ran all the water basins\* under one unified structure – a National Water Council – leading to a single, national strategic water plan unprecedented in Lebanese history.



Connecting the Water Basins

**IMAGINE NO MORE**

Project **BLUE GOLD** offers such a solution, guaranteeing:

Qaraoun Lake, Bekaa, Lebanon





- ◀ The **optimal dam selection** for the entire country. A **national grid** will be created so that water flows continuously. Water will run to all cities, factories and farms throughout the country. Water will continue to fill dams so that their use is increased. Therefore, if a city or region needs water in the dry season, the entire country's water infrastructure can meet its need. Water bottling industries and water exports will generate more than 600 million USD from surpluses of pure water, creating ample employment opportunity.
- ◀ Rehabilitation of water **distribution networks** that will save 310 million USD due to technical losses.
- ◀ **Forestation\*** covering all regions. **Forests increase to moisture, stop desertification\***, and **capture as much water as dams**. In 1960 forestation was at 30%, where as today it is at a mere 13%. Through project **BLUE GOLD**, the forestation of the Lebanese territory can be initially increased to 20%. In addition to water provision, forestation is our surest bet to protect our country from global warming, insufficient evaporation and uncontrollable soil erosion, since forests create an environmental cycle that yields an increase in rain and a drop in temperature.



Ain Zhalta  
Cedars,  
Mount  
Lebanon

- ◀ **Water recycling schemes** for all cities and villages.
- ◀ Ideal **water recharging schemes** according to the specific nature of soils.
- ◀ **Exploitation of submarine springs\*** for the financial benefit of all citizens.

Laqlouq  
Hill Lakes,  
Mount  
Lebanon



- ◀ **Agriculture** and **state-of-the-art irrigation technologies** customized for all soils. The Agriculture Industry can increase its profits by 120%, meaning more exportation and progress for the economy.

The increase in efficiency and effectiveness is how the future annual 1 billion m<sup>3</sup> of surplus water will be made. The subsequent profits allow us to sustain and enrich water and other industry developments. Money generated by water, however, is neither the main motivation nor the only reward for the **BLUE GOLD** project as water provision can achieve far more important benefits for Lebanon, such as unifying the country and bringing its citizens together.

Priority in each region will be given to its citizens. To ensure that all Lebanese can participate, **people already under financial stress are not required to pay any money. BLUE GOLD** will help with financial schemes that can insure long-term security. As for institutional renovations and infrastructural developments, **we also do not ask the financially stressed state** to fund the project. **Armed with a national consensus** we can support the national water plan through international development institutions that are already aware of what has become a global water problem.

Partnerships will take place through **establishments where the state and the citizen both have shares**. To ensure that every citizen has the right to participate, a law banning monopoly and putting a ceiling on percentage of ownership will be passed.

With your support, we will remove all obstacles hindering the project so we can focus on water sustainability.



**Step Four: Take Part in Change** Water will refresh our lives, our economy and our country!

**The first edition of the BLUE GOLD project** draws a clear water strategy for the nation. Each number, fact, projection and initiative has been carefully studied and assessed by prominent experts, though there is always room for improvement and fine-tuning. The 5-Year plan will evolve with the national vision that makes it so different, specially with **upgraded versions of the BLUE GOLD project expected in the years to come.**

**We invite you and all Lebanese citizens to participate and welcome the contribution of Lebanese state institutions.**

The project description has been made straightforward, attractive and interactive. So please, dig in, unravel, decipher! Upload your feedback and suggestions on [www.bluegoldlebanon.com](http://www.bluegoldlebanon.com) where you can follow updates and actively help the project develop.

As of today, invite everyone you know to join in the water movement! We can begin sharing **BLUE GOLD** on Facebook, Twitter, and other social media outlets. This would be the first step we take together to build an economy that unites Lebanon. The second step will be to vote for the **BLUE GOLD** Project.

Fellow citizens, we need your active participation to make this dream a reality.

The project cannot aspire without you. **Together we are strong. Together we can.**

**Yalla 3al may!**  
**The Civic Influence Hub**



Chouwane  
Lake,  
Nahr Ibrahim,  
Mount  
Lebanon



## PART 1

---

# BLINDNESS, IGNORANCE, POLITICS OR ILL WILL? A COMPREHENSIVE ANALYSIS OF 65 YEARS OF WATER MANAGEMENT

---

*Lebanon is a country of diverse eco-systems*, climate and vegetation. Geographically positioned on the eastern coast of the Mediterranean Sea, it is characterized by a high precipitation rate and freshwater wealth. In fact, Lebanon has more renewable water resources than its neighboring countries.

The central Mount Lebanon mountain range divides the country into two hydrological regions:

- The **Coastal Watershed**, which runs along the Mediterranean Sea and includes rivers flourishing from the mountains.
- The **Interior Watershed** that consists of the eastern Bekaa Valley and its major watercourses.

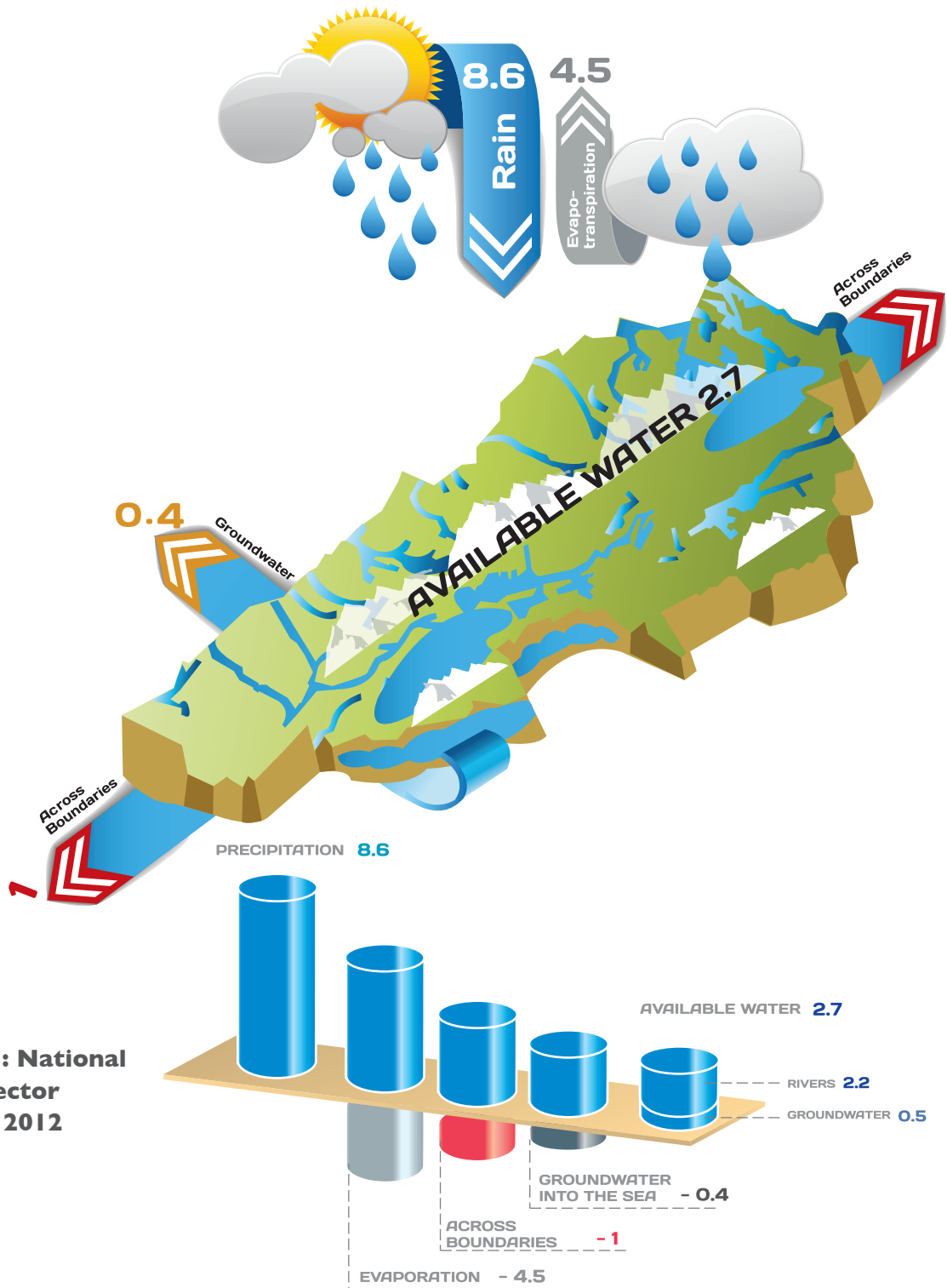
Although abundant with water, Lebanon is rapidly heading towards a water crisis. A number of circumstantial and institutional factors are straining available resources: population growth, socio-economic development, industrial and agricultural activities, uncontrolled urbanization, ineffective sectoral management, overlapping responsibilities, and the lack of appropriate legislation, to name a few. Water losses are majorly due to obsolete schemes and lack of awareness. A brief and thorough overview of water demand, supply, quality and current managerial practices and legislation confirm this future threat to water availability and quality in Lebanon.

## I. WATER SUPPLY

8 aquifers\* and 17 perennial rivers\* fed by more than 2000 springs bring the available water estimation of the government to 2.7 billion cubic meters (m<sup>3</sup>).

Diagram A illustrates the estimated water resources in Lebanon as according to governmental figures\*.

**A** Lebanon Water Resources in billion m<sup>3</sup>



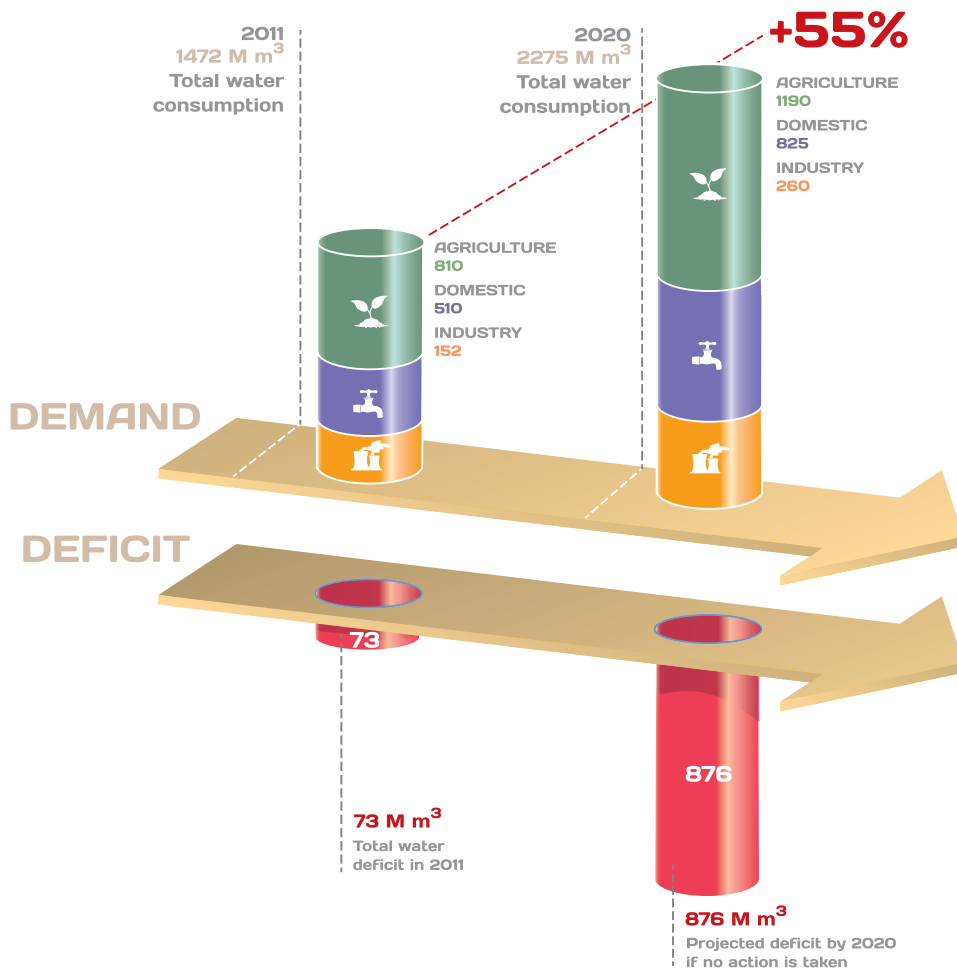
\* Source : National Water Sector Strategy 2012



## 2. WATER DEMAND

Agriculture is the primary driver of water demand in Lebanon at 55% of total demand. In 2011 the water consumption by the agricultural, domestic and industrial sectors combined was greater than the amount of extracted water. A demand deficit of 73 million m<sup>3</sup> of water was recorded (Diagram B). Unless drastic changes are made across the board, Lebanon will likely experience a demand deficit of 876 million m<sup>3</sup> by 2020 – three times the current water consumption of Greater Beirut.

**B** Demand / Deficit in million m<sup>3</sup>

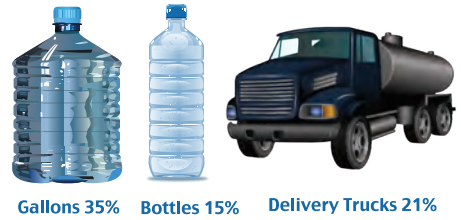


Water losses are majorly due to obsolete schemes and lack of awareness. Due to the lack of adequate infrastructural facilities and institutional organization, only 1.4 billion m<sup>3</sup> of the available 2.7 billion m<sup>3</sup> of water are currently being used. That leaves 1.3 billion m<sup>3</sup> in untapped water.

The consequences of exceeding demand coupled with the effects of climate change are expected to add further strain on local and regional water resources, making the Lebanese even more dependent on bottled water, and who knows? On imported water one day?

Today, the average household pays close to 700 USD a year for water supply networks, bottled water and truck delivered water, a very high rate compared to other countries. Beirut is the most dependent on bottled water since it only receives 3 hours of water per day during dry seasons. Other areas receive at least 6 hours, such as Tripoli which has water 24-hours a day.

Lebanese Dependence on Bottled Water

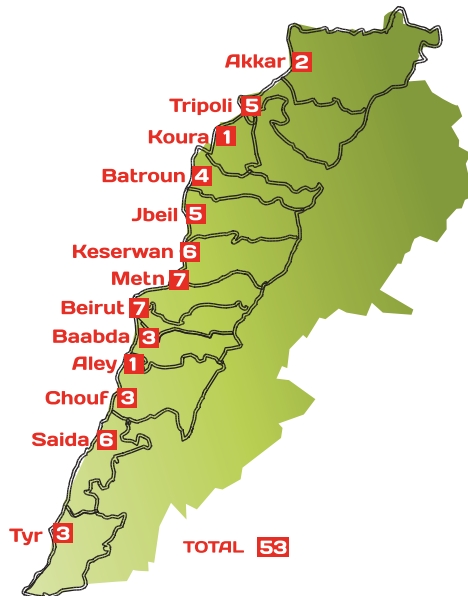


### 3. WATER QUALITY

Various factors affect water quality in Lebanon. Agricultural, Industrial and Domestic activities expose groundwater\* and surface freshwater\* sources to progressive physical, chemical and microbiological degradation.

Almost all rivers and groundwater\* sources in Lebanon have been subjected to different pollutants due to the lack of adequate wastewater\* treatment and uncontrolled, unmonitored industrial practices (Diagram C & D).

**C** *Number of Waste Water Outfalls Along the Coast by Caza*



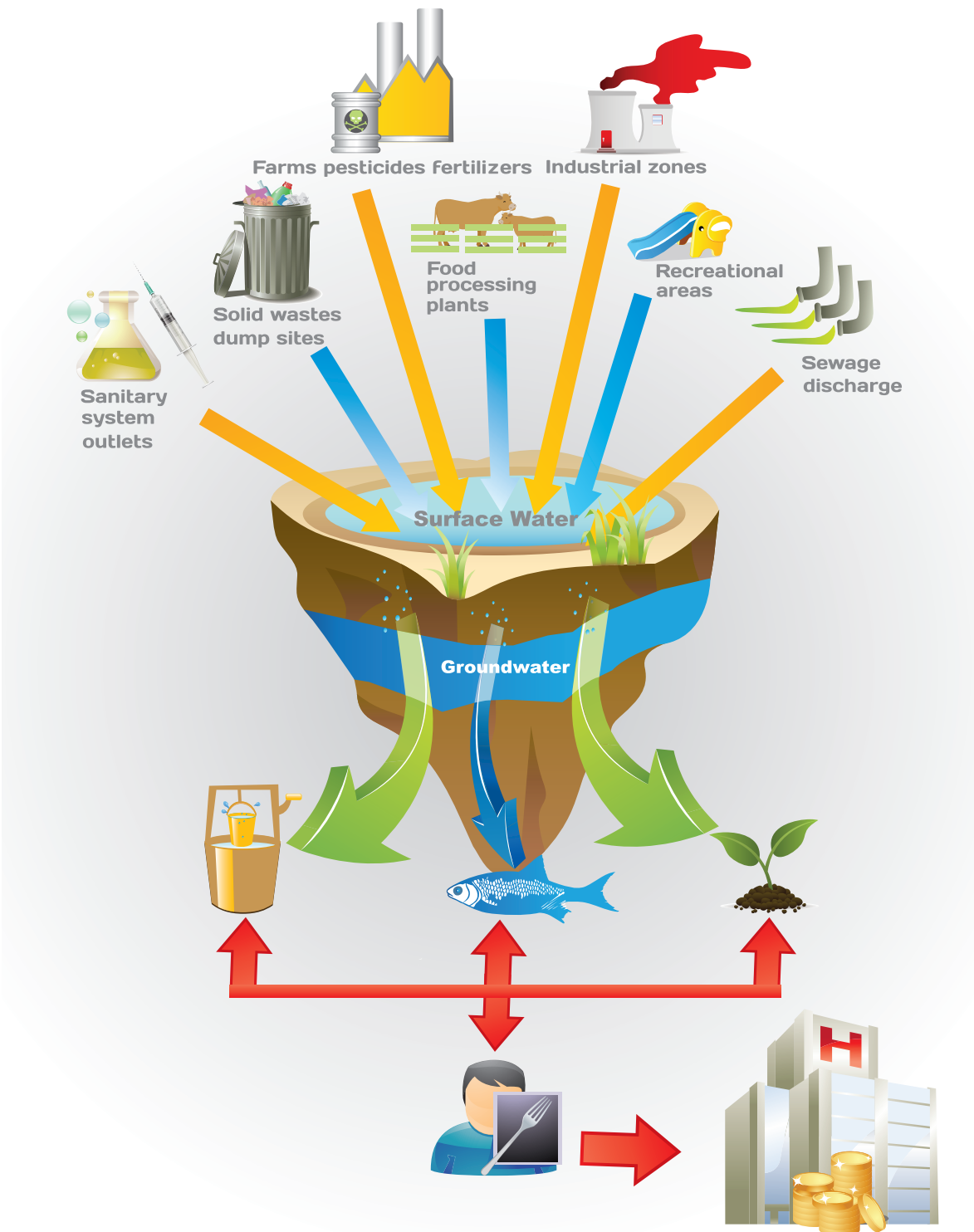
**Cost of disease related to polluted water amounts to 800M USD, equivalent to 2% of the annual GDP.**

- Studies conducted over the past 10 years indicate that the levels of Cadmium\* and other dangerous pollutants have increased by 55% in almost all of Lebanon’s rivers.
- Most potable wells do not comply with the Lebanese quality water standards. Fifty-three wastewater\* outfalls\* along the coastline have affected the water aquifers\*. It has also been well established that seawater infiltrates the wells of the major coastal cities of Beirut, Tripoli and Saida.



- About 82% of Lebanese industries are located outside industrial zones. They are usually unable to properly treat their industrial wastewater\*, which they dispose of by streaming into the sea or underground water sources used by residential areas.

### D Water Pollution Sources & Impact



Cost of water related diseases = 2% of GDP

The water extracted from many of these contaminated, polluted sources has many applied uses including the irrigation of crops that yield the fruits and vegetables Lebanese consume on a daily basis. Poor treatment and haphazard wastewater\* discharge result in the increase of water related diseases that significantly impact health, social welfare, the economy and the environment.

#### 4. WATER MANAGEMENT

The mismanagement of water resources in Lebanon is largely due to outdated laws, discontinuous reforms and inefficient organization (Diagram E).

##### 4.1. Legal Framework

In 2000, Water Law 221 was promulgated to improve transparency between public institutions, water utilities and end-users. This law was not fully implemented and therefore increased the managerial deficiencies it aimed to improve. Law 221 was amended the following year granting additional functions to Water Establishments (WEs).

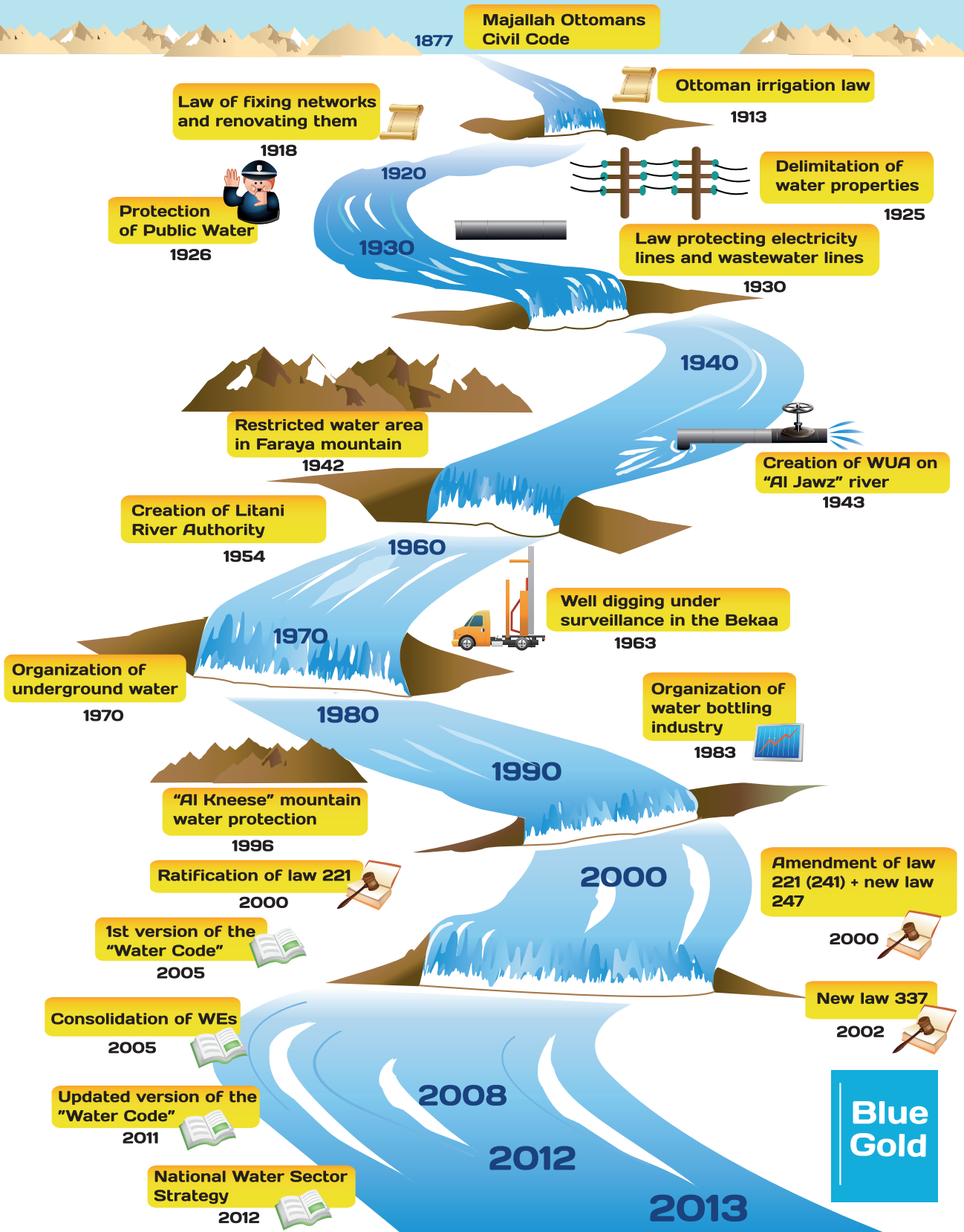
The Water Code, initially prepared in 2005, was recently presented to the Council of Ministers for discussion (2012); it stipulates the following:

- A National Council for Water headed by the Minister of Energy and Water (MoEW) will be established to play the role of a Regulatory Authority. This proposed setup will make the management of the water sector completely dependent on the MoEW.
- The MoEW and the WEs would be directly responsible for the monitoring of water sector management.
- The Public Private Partnership (PPP) is defined as an option where companies in the private sector can be delegated by the MoEW to manage potable water, wastewater\* and irrigation upon approval by the Council of Ministers.
- Creation of hydrographic basin frameworks.
- New definition for water status as National Wealth.
- Implementation of a Water Police.

The Water Code does not clearly state the level of participation by the private sector as a private operator. Despite the deterioration of the water sector, the [Lebanese Government has not taken any serious action towards involving the private sector in water provision, distribution and sanitation](#), knowing that many countries in Europe and the Middle East, such as the UK, France, KSA, Qatar and Jordan, depend on the private sector for efficiency.



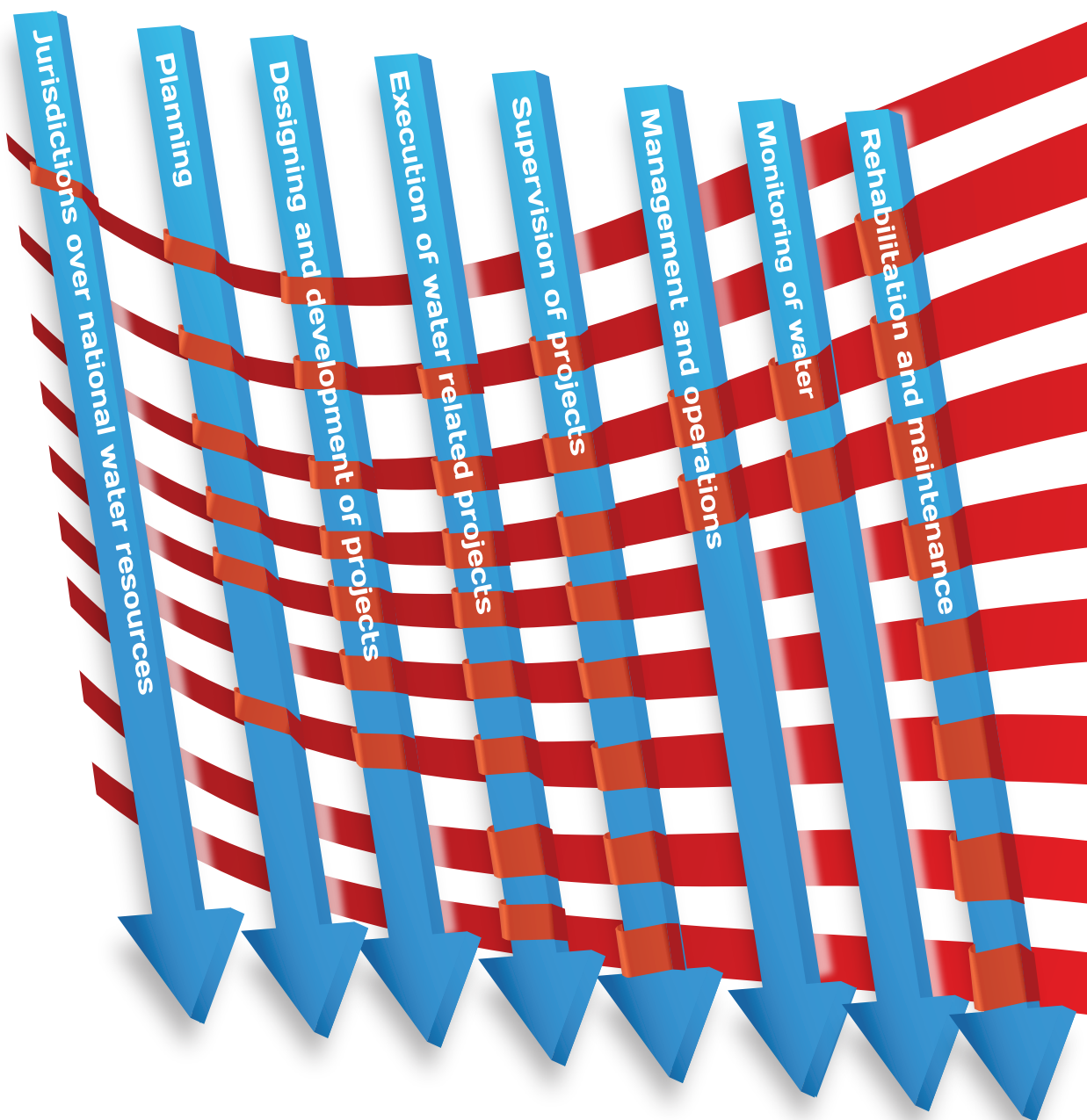
# E History of Discontinuous Water Reforms

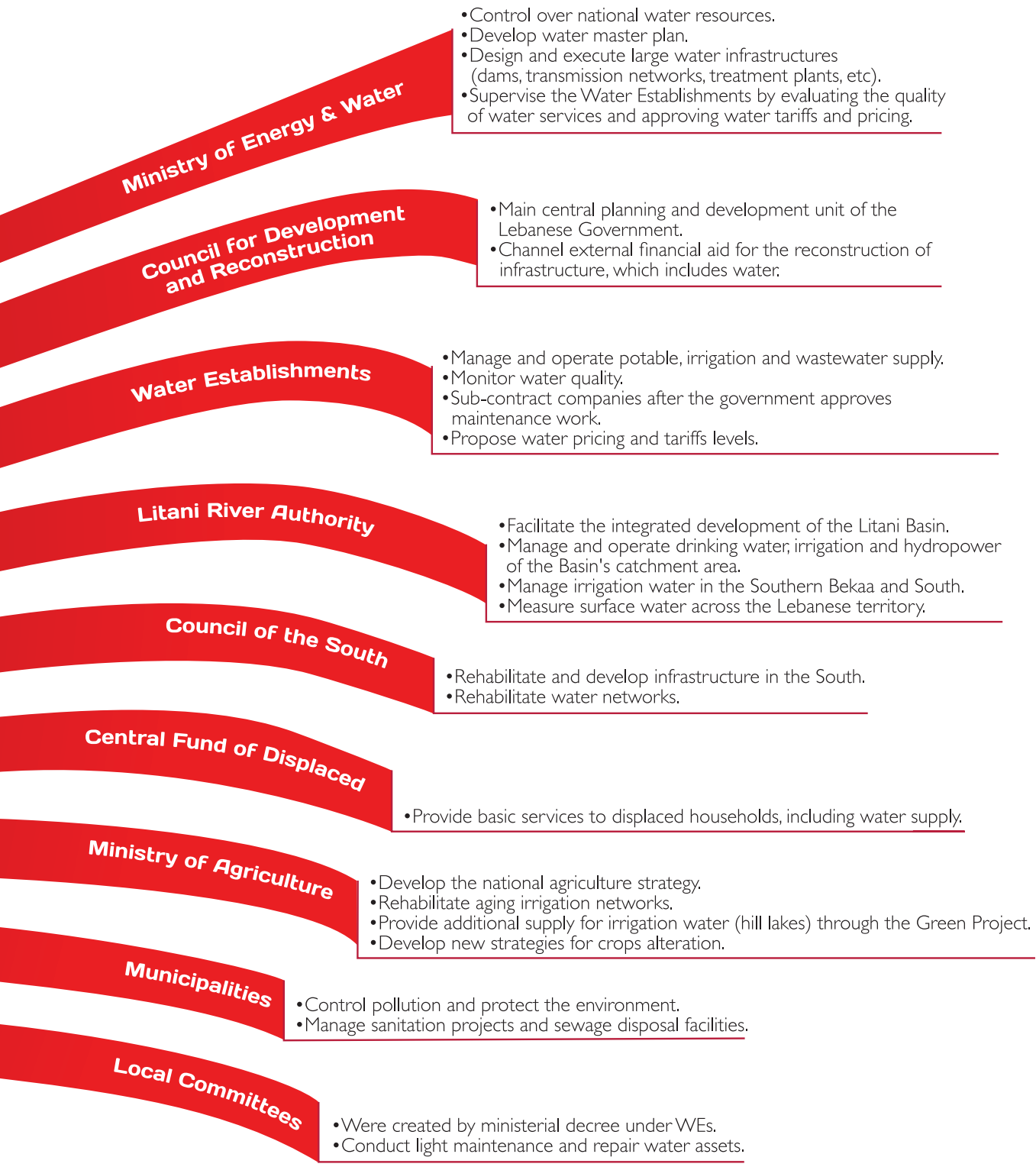


#### 4.2. Managerial Framework

Water management is shared amongst different ministries. A closer look at the water management scheme (Diagram F) shows the overlapping functions of different concerned stakeholders on a local, national and regional level. This current structure of intersecting responsibilities coupled with a lack of coordination makes improving the sector a major challenge, to say the least.

#### **F** *Management Scheme of Water Sector*







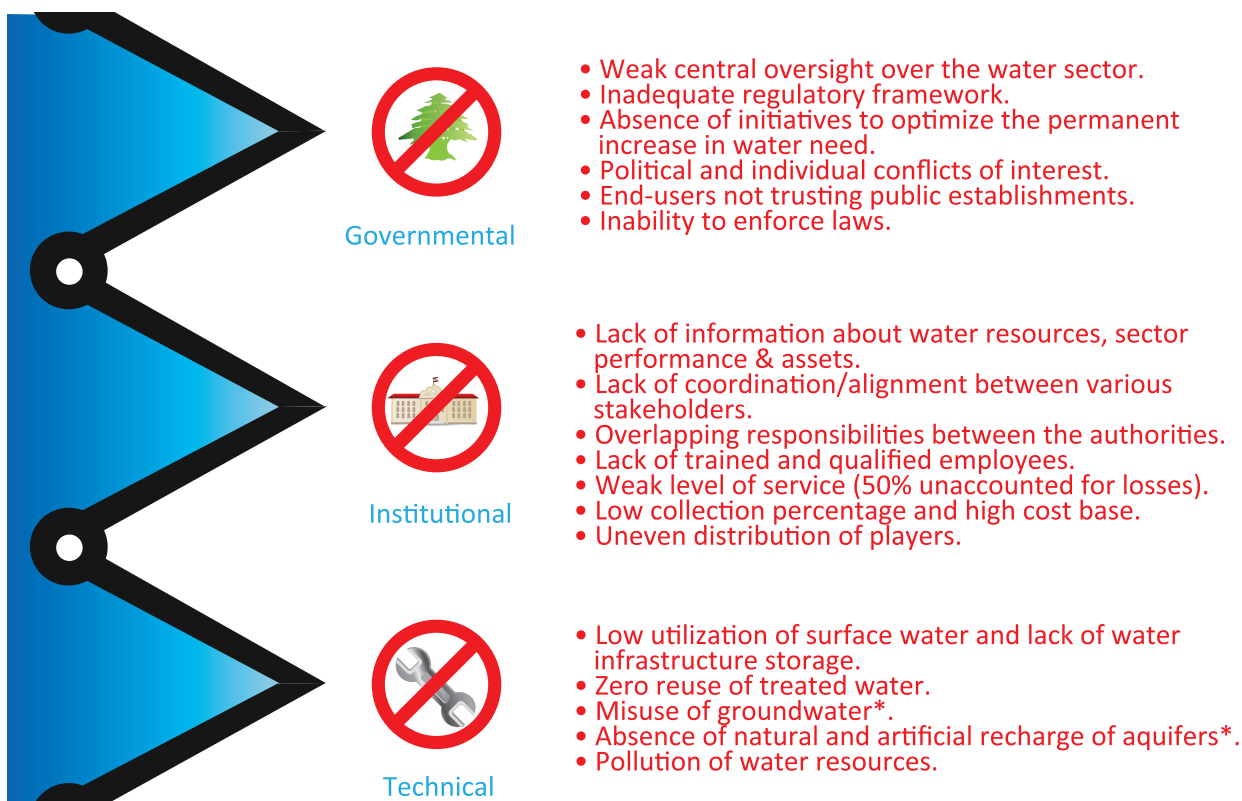
**Low end-user connection rates, poor service delivery and bad water quality are a result of the Water Establishment being solely responsible for the management of all water related services.**

Water Establishments (WEs) are responsible for operating and managing all water related services including supply, transmission networks, metering and billing, in addition to monitoring water quality and conducting maintenance work of water facilities through sub-contractors. Experience shows that the WEs are unable to provide the proper management of the water sector:

- WEs are **understaffed**. While the standard norm is 3 employees per 1000 connections, in reality the number varies between 1.5 to 1.9 employees. Despite the fact that nearly 50% of staff is provided by contractors, major gaps remain in managerial positions.
- WEs **lack commercial and technical competencies**, resulting from the lack of professional development and training programs.
- WEs are **unable to recover total costs** despite notable under-spending on maintenance, technical staff and subsidies, due to problems associated with the unaffordable pricing, collection rates and irregular connections.

4.3. *Lebanon's water sector has accrued numerous problems* that contribute to the mismanagement and misuse of the precious resource. These obstacles can be categorized under three groupings: governmental, institutional and technical (Diagram G).

### **G** *Obstacles to Proper Water Management*



## 5. PLANNED AND ONGOING GOVERNMENT REFORM

Since the 1990's, several developmental plans have materialized (Diagram H). However, due to managerial and institutional deficiencies, limited coordination amongst different stakeholders and delays in regulatory reforms, these plans have failed to yield significant and effective sectoral improvements. Attempts have also been made to privatize water production and distribution as in the case of ONDEO.

### **ONDEO: An Example of Private Sector Participation in Drinking Water Provision**

Current laws in Lebanon do not allow private operators to manage water supplies or collect fees; their role is limited to maintenance contractors. **ONDEO was the first public-private venture to provide drinking water services in Lebanon. From 2003–2007, the private operator succeeded in improving both the technical and managerial performance of the country's water utilities.**

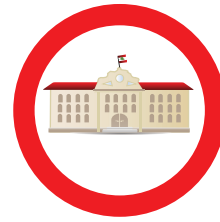


The following was achieved:

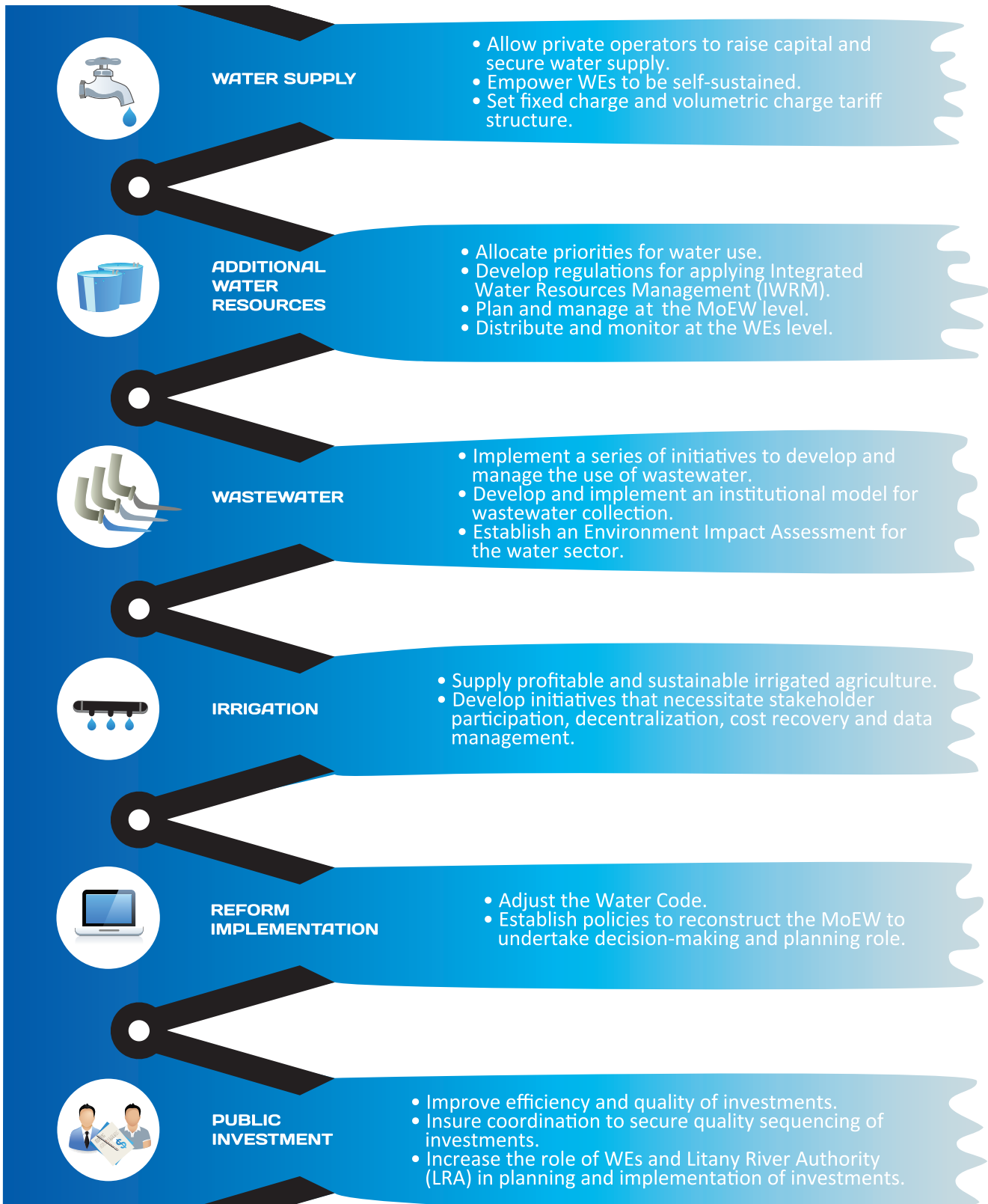
- Decreased water loss from 67% in 2004, to 47% in 2006.
- Provided 24 hours a day water to the whole of Tripoli City by the summer of 2004.
- Improved water quality to meet 99% of international standards by establishing a laboratory.
- Established a client call center for claims and to raise awareness.
- Improved the collection rate from 30% in 2003 and 2004, to 80% in 2005.
- Increased financial revenue from 1.9 M USD in 2003, to 4.4 M USD in 2006.

Despite ONDEO project's achievements, technical losses remained high and below the target of 80% efficiency rate:

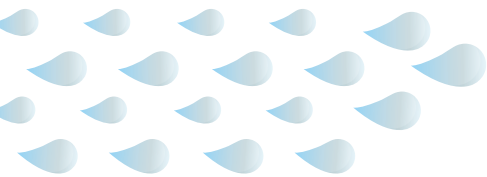
- Network rehabilitation and meter installations were postponed due to lack of funding.
- Public establishments were remunerating ONDEO's employees.
- A conflict of interest arose due to the mandatory hiring of managers from the public water establishment to the supervisory board in charge of monitoring operation performance.
- The financial basis of the contract was weak and the contractor lost money since private operators were, by law, forbidden to collect water fees or raise the collection rate.



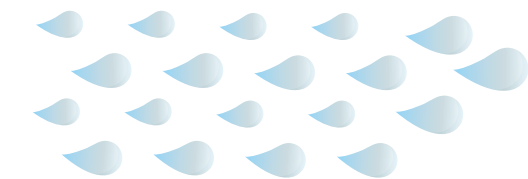
## H Government Measures for Improvement



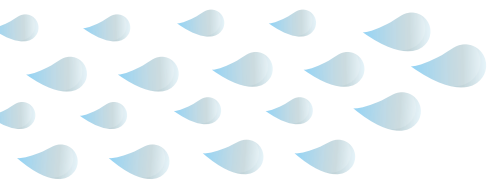




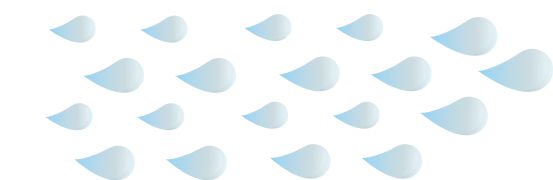
- Develop infrastructure to secure continuous access to high-quality water.
- Increase network coverage and distribution services.
- Replace aging transmission systems.
- Enhance water supply distribution system and establish metering targets.



- Protect and control groundwater\*.
- Establish private and public wells and artificial recharge to increase the groundwater\* by 120 Mm<sup>3</sup> by 2015, in addition to 80 Mm<sup>3</sup> between 2016 and 2020.
- Expand the water storage capacity to meet increased demand by establishing 44 dams and several uphill lakes.



- Develop wastewater infrastructure.
- Optimize sludge disposal and wastewater treatment processes.
- Reuse treated water when possible.



- Implement new irrigation schemes to control water use and enhance efficiency.
- Rehabilitate over-aged irrigation networks and systems.
- Establish an extra 15,000–30,000 irrigated hectares of lands.



In 2010, The Ministry of Energy and Water (MoEW) developed the National Water Sector Strategy (NWSS), which was adopted by the Government in 2012. Through the NWSS, the MoEW aims to secure an integrated and sustainable national water sector. The duration of the NWSS is eight years and covers six main areas: water supply, additional water resources, wastewater\*, irrigation, reform implementation and public investment.

For each area of intervention mentioned in Diagram G, the NWSS identified institutional and infrastructural measures to be undertaken (Diagram H).

The Council for Development and Reconstruction (CDR) also proposed a plan to establish 40 wastewater\* treatment plants along the coast. In 2010 the CDR started three projects to be completed in 2012; another 28 projects are to be implemented between 2013 and 2015 for a total cost of 526 million USD. It is worth mentioning that the NWSS and the CDR plans will not yield the desired changes in the water sector unless necessary regulatory and institutional reforms are passed.

**In most cases project execution has been unsustainable because it is based on the availability of funds and short-term priorities.**

Water resources collected through the Government plan will only cover the 2020 projected deficit in demand estimated at 876 million m<sup>3</sup>, with no surplus, for a total cost of 7.74 billion USD.

In conclusion, the water advisors and consultants that helped design the government's successive water plans over the years are to be applauded for their resilience, input, engagement and quality analysis. The people who drafted the numerous government and institutional water plans have also contributed to **BLUE GOLD**. After all, the problem is not with particular people or expert collaborators, but with the political implications that influence the success or failure of the proposed water plan.

**BLUE GOLD is founded on the essential paradigm of political neutrality: zero-base thinking in geography and nation-base thinking in performance. This core value is what permits BLUE GOLD to build on the latest government plan and push it beyond the influences of people, power and politics.**



# Bank Audi

Water is the source of life, it's becoming more and more scarce. Our Lebanon is blessed with enough water yet we are letting it go to waste. This is why I believe in Blue Gold as it would help us conserve this vital resource for the generations to come.

Samir Hanna.  


Water is the source of life, it's becoming more and more scarce. Our Lebanon is blessed with enough water yet we are letting it go to waste. This is why I believe in "Blue Gold" as it would help us conserve this vital resource for the generations to come

Samir Hanna  
Group CEO





*Blue Gold is certainly the most ambitious project ever launched by our civil society.  
It is at the heart of the Middle East and Lebanon issues.*

*Water, source of conflicts and source of life,  
The Water that quenches thirst,  
That gives life  
And the hope of a better tomorrow and a better Lebanon.*

*We salute a Federative, Unifying, Founding Project.*

*Walid Raphaël*  
GM Banque Libano-Française



Sharing smiles

*An ambitious, audacious and Generous project... A great contributor to the well being of our community and our Lebanon!*

*Joe Tayard  
Group Bel*





Water is not only necessary for life, but also constitutes a link among people and link between all people and earth. Every person on the planet needs water to quench his/her thirst; it is a unifying factor.

Who has not experienced the emotional relief of bathing in cold water, or the soothing comfort of warm water on the body?

Water comprises more than 70% of our bodies and of the planet we live on; it is a necessity for us and for earth, it is life!

Runners in particular know the importance of water, of hydration that keeps the body healthy and moving.

Water is a bridge that unites all human kind with each other and with EARTH

May el-Khalil  
President  
Beirut Marathon Association

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May El Khalil  
President  
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# DIAGEO

*«I congratulate all of you who have created the Civic Influence Hub to inspire our fellow-citizens to work together to preserve and develop our national economy and society.»*

*By choosing the Blue Gold five year plan for water management as your first project, you have tackled one of the most pressing long-term needs for our country. I wish you every success in this courageous endeavor to find solutions around which we can all unite.»*

*Gilbert Ghostine*  
*DIAGEO Asia Pacific*



Because,  
we Respect Gold  
we Love Blue  
we Believe in Lebanon

Rony JAZZAR

Because,  
We Respect Gold  
We Love Blue  
We Believe in Lebanon

Rony Jazzar  
Imagic



## IMPACT **BBDO**

*There has never been anything greater  
that unites all Lebanese than this precious  
gift from God, the water that we drink for  
centuries that runs in our soil and soul.*

*This same water shall unite us all around  
the single vision of Blue Gold, elevating Lebanon  
to a prominent position to become the fountainhead  
of the region and beyond for generations to come.*

*Dani Richa*

There has never been anything greater that unites all Lebanese than this precious gift from God, the water that we drink for centuries that runs in our soil and soul.  
This same water shall unite us all around the single vision of BLUE GOLD, elevating Lebanon to a prominent position to become the fountainhead of the region and beyond for generations to come.

Dani Richa





I have been always amazed how much  
Common battles Forge Teams. Blue Gold is  
more than an initiative to harvest our  
water resources. I see it a Path to Reclaim  
The Soul of Lebanon!

*Neemat*

I have been always amazed how much common battles forge teams.  
Blue Gold is more than an initiative to harvest our water resources.  
I see it a path to reclaim the soul of Lebanon!

Neemat Frem





# JWT BEIRUT

Water is life. Water is fluid and soft,  
but wears away rock. This is the paradox  
of water: Its softness is its strength.

Harvesting our water wealth will make us  
a better nation, a stronger nation.

Blue Gold is an initiative that we, all,  
should stand behind to make them stronger  
to achieve their objective to lead us to  
a better nation.



"Water is life. Water is fluid and soft, but wears away rock. This is the paradox of water:  
Its softness is its strength.

Harvesting our water wealth will make us a better nation, a stronger nation.  
Blue Gold is an initiative that we, all, should stand behind to make them stronger to  
achieve their objective to lead us to a better nation."

**Roy Haddad**  
Chairman, JWT MEA





I believe that is the kind of National project that can truly bring together the Lebanese people and protect our most precious source of wealth. It is my conviction that such an endeavor should be free of politics and untainted by personal interests, agendas, greed & incompetence. Then, and only then, will be able to distribute this wealth to Lebanon as a whole.

C.E.O MENA.

"I believe that this is the kind of National project that can truly bring together the Lebanese people and protect our most precious source of wealth. It is my conviction that such an endeavor should be free of politics and untainted by personal interests, agendas, greed & incompetence. Then, and only then, will be able to distribute this wealth to Lebanon as a whole."

Raja Trad  
CEO mena





*At Pepsi, performance with purpose guides how we do business. Our promise for Environment Sustainability is to be a good steward of our planet's natural resources.*

*Pepsi strongly encourages the Blue Gold initiative which will increase water availability, deliver safe water to the local community and protect the natural resources of Lebanon.*

*Walid Assaf  
Chairman / GM*

A handwritten signature in black ink, appearing to read "W. Assaf", written over a horizontal line.



LE VENDÔME

**PHOENICIA**

BEIRUT

*“The Phoenicia and Le Vendôme Hotels are in full support of the Blue Gold Project which we feel can have a tremendous impact and benefits for Lebanon and its people.”*

*Mazen Sallia  
InterContinental Hotels & Resorts*





*“Wishing all the possible success”*

*Antonio Vincenti  
Picasso*





*God brought us to life equal, and we all leave it equal as well. The almighty has not forsaken us with the beauty of Mother Earth, and has chosen to offer each country a different treasure of nature. To us it was Water. And Water is Life. Let us embrace it and celebrate it.*

*Joseph D. Raidy*

*Raidy printing press*



*“At Sannine, we believe it is essential to preserve our country’s water wealth as it is one of our main resources. We have endorsed the Blue Gold project the day it was presented to us as we believe in its benefits and ideals”.*

*Marc Tabourian*





Water is Lebanon natural  
Treasure...

Blue Gold is the project that  
Wardieh will endorse to contribute  
to the Lebanese community!

A handwritten signature in black ink, appearing to be 'Dania Nakad', with a horizontal line underneath.

"Water is Lebanon natural treasure...  
BLUE GOLD is the project that Wardieh will endorse to contribute to the Lebanese  
community!"

**Dania Nakad**  
General Manager  
& Board Member



## PART 2

---

# WHEN THERE'S A WILL, THERE'S A WAY

---

For 65 years, Lebanon's many governments have tried to implement plans to optimize water resources. Politics, regional pressures, wars, change of administrations and the lack of long-term vision have plagued these efforts. Moreover, water has always been considered a cheap commodity and has not received the attention it deserves from governments and politicians alike. **BLUE GOLD** offers an innovative approach to tackling the water issue while keeping in mind the enormous challenges facing the water sector.

**BLUE GOLD** aims to:

**Transform water from a commodity into wealth and raise awareness.**

**Enhance the government plan so that sustainable approaches to water sector management are adopted.**

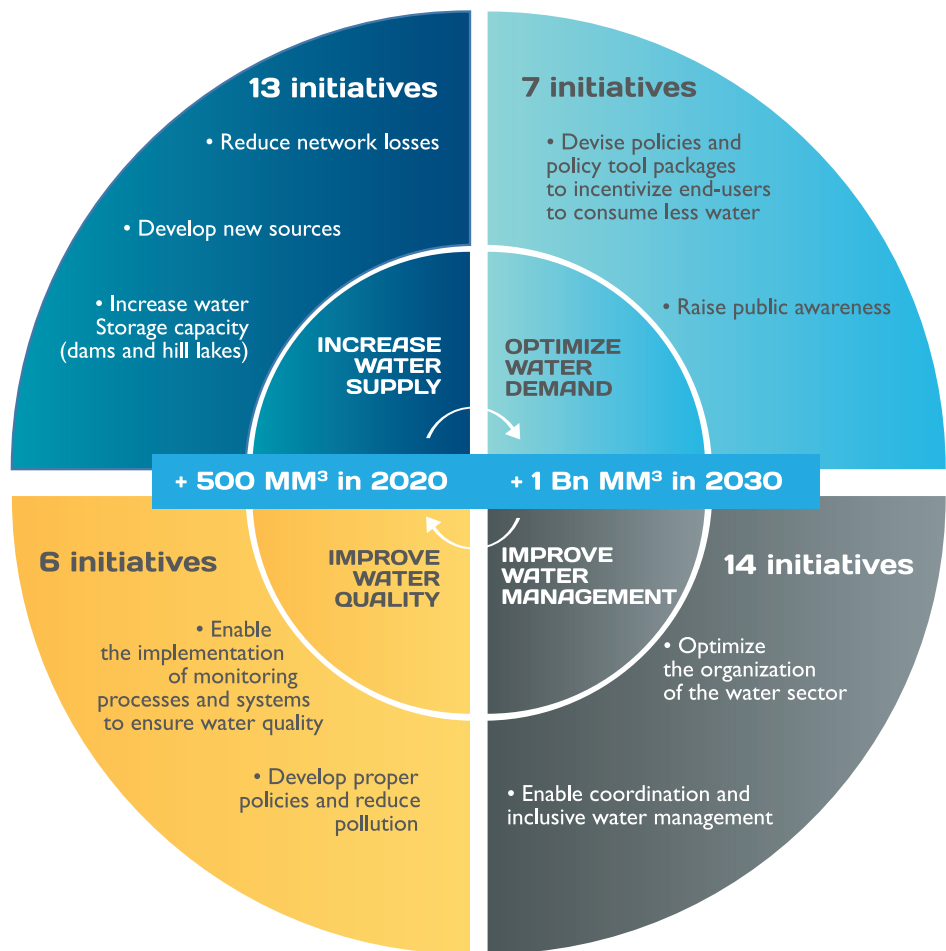
**Create the proper platform for the private sector and entire Lebanese population to participate in the development of the water sector.**

**Federate the Lebanese population around common interests.**

I. In order to achieve these aims, **BLUE GOLD** will work on:

I.1. **Implementing 40 innovative initiatives by 2030** that largely focus on four specific objectives: increase water **supply**, optimize water **demand**, ensure up-to-standard water **quality**, and improve water **management** efficiency.

## I BLUE GOLD 40 Initiatives till 2030

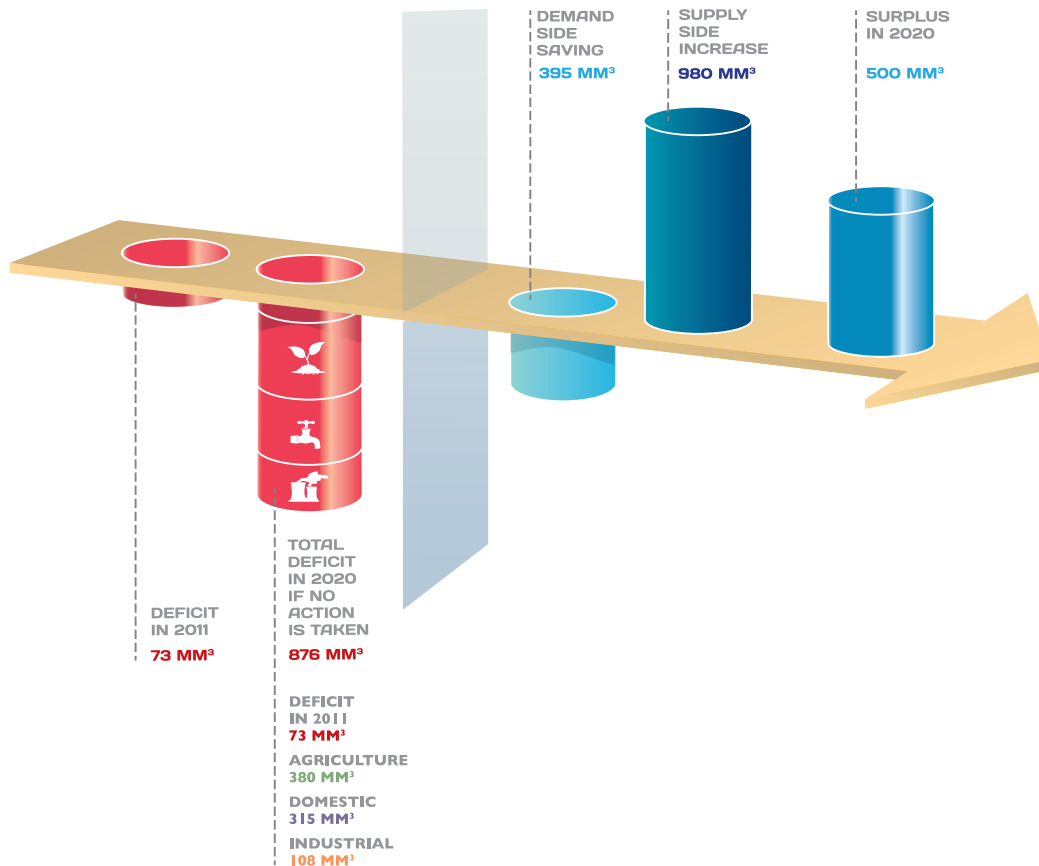


I.2. **Setting-up institutional and legal structures** that ensure transparency\*, accountability and the participation of all concerned stakeholders including the private sector (refer to Part 4).

The National Water Council of Lebanon would be founded as the highest instance for the strategic planning of water resource management. A Regulatory Authority and a Civil Society Watch Dog Association\* would also be established to oversee and monitor the key performance indicators of all sector stakeholders.

1.3. **BLUE GOLD** recommends 15 short-term initiatives to be implemented by 2020 in order to meet the foreseen water demand and achieve a useable 500 million m<sup>3</sup> surplus for a total cost of 5 billion USD.

**J** *BLUE GOLD Projected Surplus for 2020*



The current water deficit in Lebanon is due to the lack of sufficient infrastructural facilities and proper institutional organizations.

The population in Lebanon is quickly increasing and the escalating demand will also deepen the deficit.

The domestic demand is estimated to increase by 5% annually, as opposed to a 3% increase in agricultural demand, due to the increasing water network coverage from 70% to 90% (see Diagram B Part 1). It is therefore vital to control domestic demand and develop optimal solutions in the near future.

If no action is taken, the deficit will reach 876 million m<sup>3</sup> by 2020.

Diagram J shows how the **BLUE GOLD** initiatives will help exceed demand and fulfill the predicted deficit. Initiatives regarding management and quality control are not included since they cannot be quantified.




Some supply and demand initiatives are identified by the NWSS (2012), although they are not thoroughly analysed or quantified. **BLUE GOLD** has suggested innovative initiatives such as maximizing basins' interconnectivity, forestation\*, rainwater harvesting\* and grey water\* system to increase water supply. These supply-side and water conservation solutions need to be coupled with a series of local and national institutional reforms.

The Government Plan emphasizes supply-side actions to solve Water Sector problems by increasing surface storage\* and rehabilitating aging networks. **BLUE GOLD** proposes a complimentary approach that includes water supply, demand and quality, with a particular focus on management side initiatives.

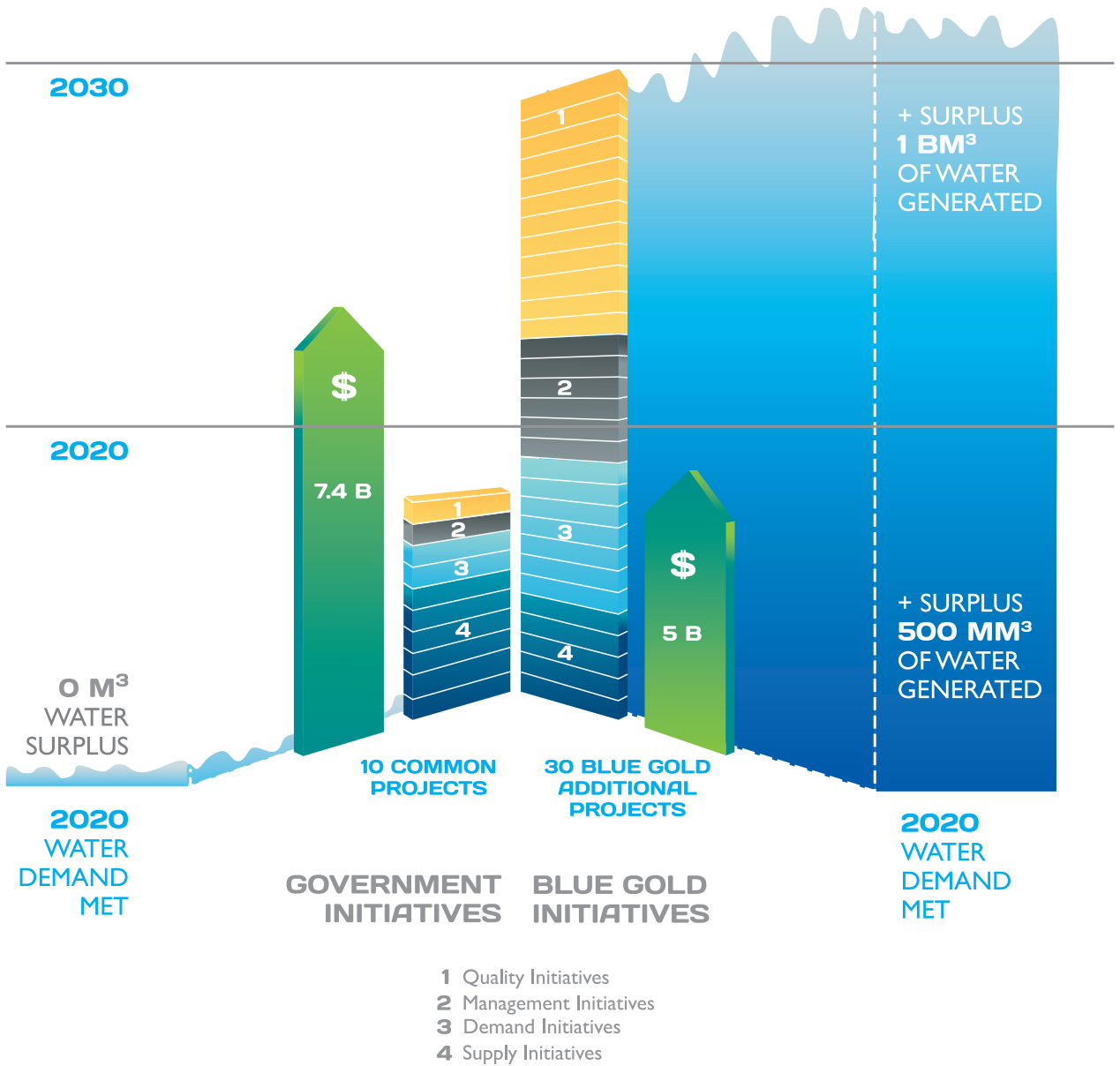
While the Government has set an objective to meet water demand by 2020 by increasing the water supply and surface storage capacity for a total cost of 7.4 billion USD, **BLUE GOLD** project will exceed demand with a surplus of 500 million m<sup>3</sup> for a total cost of 5 billion USD, as shown in Diagram K.

Project **BLUE GOLD** will be implemented over three intervals: Short term (2015-2020), Mid-term (2020-2030), Long-term (post 2030). The following sections of this book will focus on the short-term initiatives: the **BLUE GOLD** 5-Year plan.



Afqa,  
Mount  
Lebanon

**K** BLUE GOLD Project: Enhancement of the Water Strategy



**BLUE GOLD's vision is possible because it introduces a political-free vision that takes into consideration unseen paradigms. BLUE GOLD aims to constructively develop the government program by making it more efficient and profitable for all.**

## PART 3

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# PROJECTS TO WET YOUR APPETITE. OPEN SESAME

---

**BLUE GOLD** is establishing a virtuous developmental plan that will continuously yield progress. The various short and long-term initiatives that follow are based on figures published by the Lebanese government and the World Bank. The institutions that **BLUE GOLD** will help launch in the years to come will be able to offer more accurate measurements that will undoubtedly enhance the 5-Year plan and consequent future performance.

### I. *INITIATIVES SELECTION METHODOLOGY*

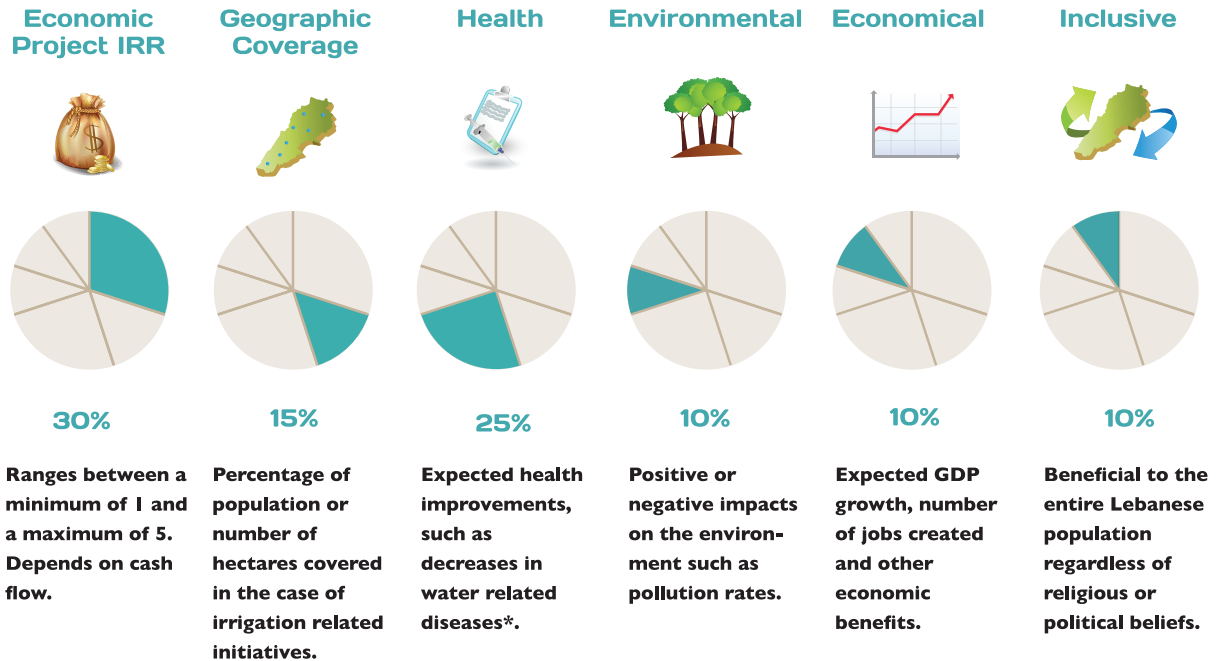
**In order to meet the set objectives by 2020, the 40 initiatives were cut down to 15 using a selection methodology.**

Several criteria were used to determine the **impact** and **feasibility** value of each selected short-term initiative, positive impact, sustainability and ease of implementation being the main conditions (Diagram L).

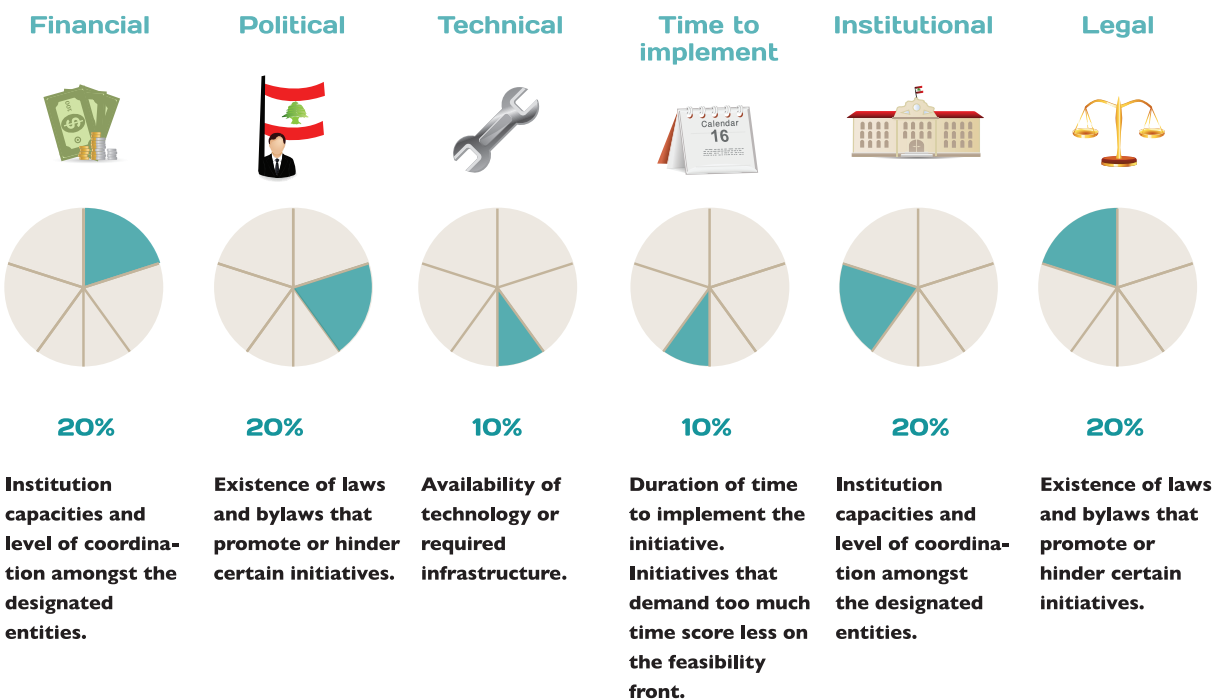


## L Initiatives Selection Methodology

### IMPACT



### FEASIBILITY

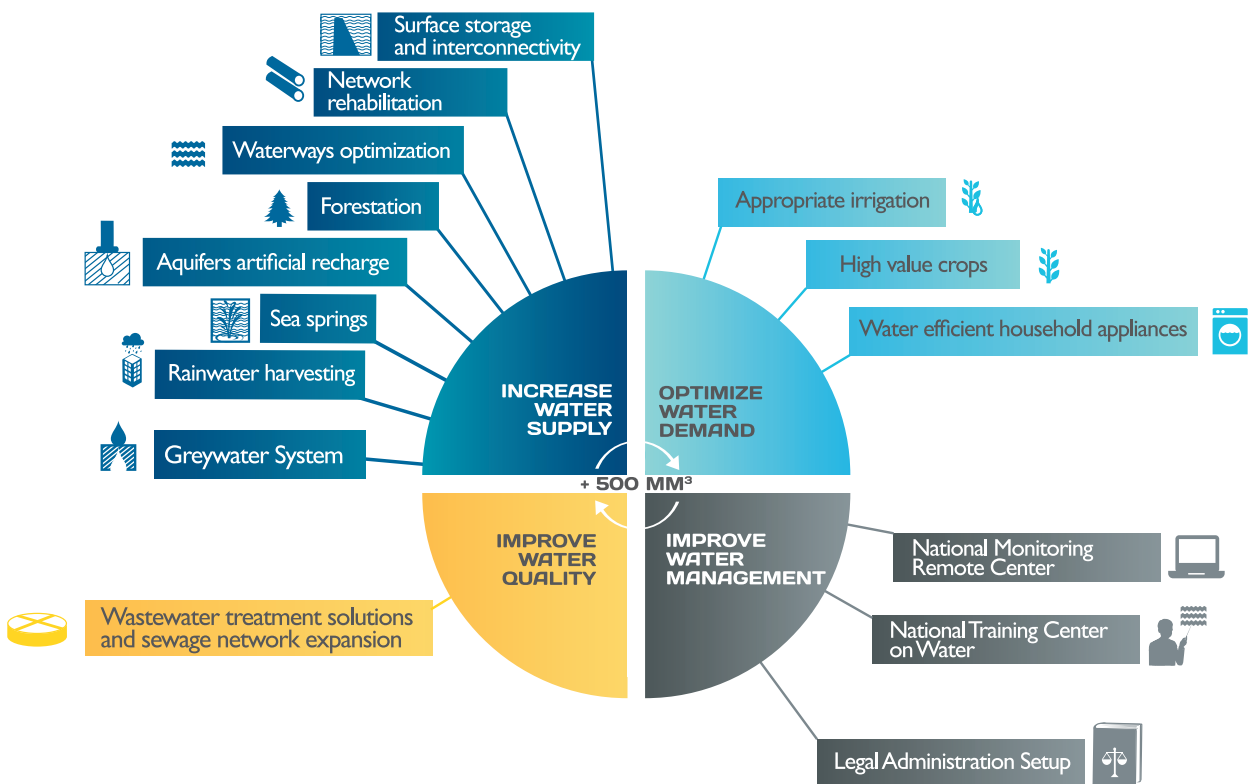


## 2. SELECTED SHORT-TERM INITIATIVES (2014 - 2020)

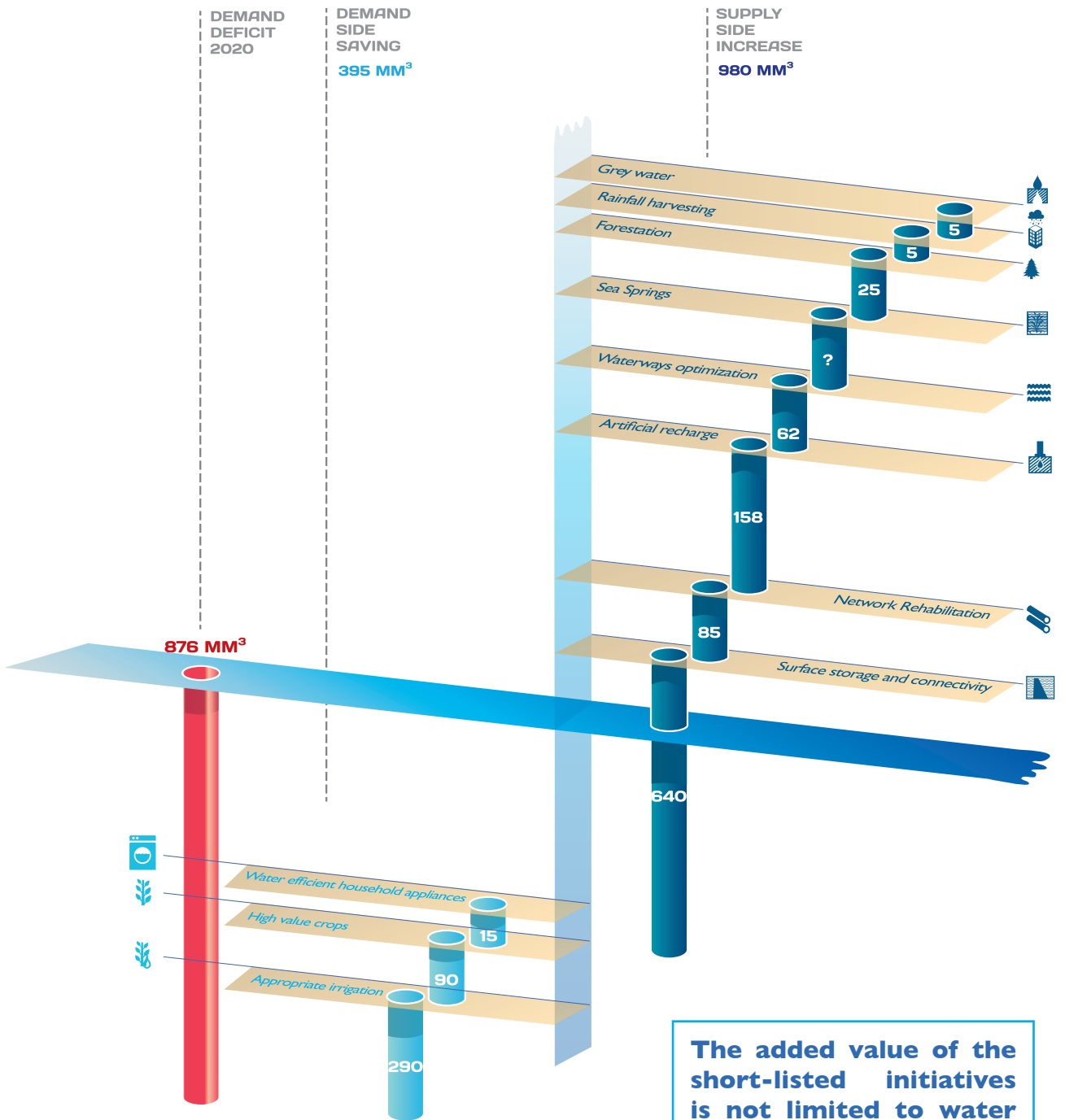
By 2020, **BLUE GOLD** will promote the implementation of 15 water initiatives to increase supply, optimize demand, improve quality and improve the institutional and managerial setup of the Lebanese water sector. Diagram M gives an overview of the proposed **BLUE GOLD** supply and demand side projects.

The 15 selected initiatives were categorized according to four specific objectives: increase water **supply**, optimize water **demand**, ensure up-to-standard water **quality**, and improve water **management** efficiency. (Diagrams M & N).

### M BLUE GOLD 5-Year Plan Initiatives



## N BLUE GOLD Initiatives in Numbers: Foreseen Results



**The added value of the short-listed initiatives is not limited to water production and saving. Positive impacts are foreseen on social, economic and environmental levels as well.**



## 2.1. BEIRUT MOUNT LEBANON MODEL FOR PROJECT BLUE GOLD

A pilot project to practice the **BLUE GOLD** target managerial approach in the Beirut Mount Lebanon (BML) area will be implemented, between the river basins\* of Nahr Ibrahim and Nahr el Awali. Another project involving the Private Sector for supply and sanitation of water will also begin in BML, similar to that in Tripoli (see [Part I. Section 5](#)).



Beirut  
Mount  
Lebanon

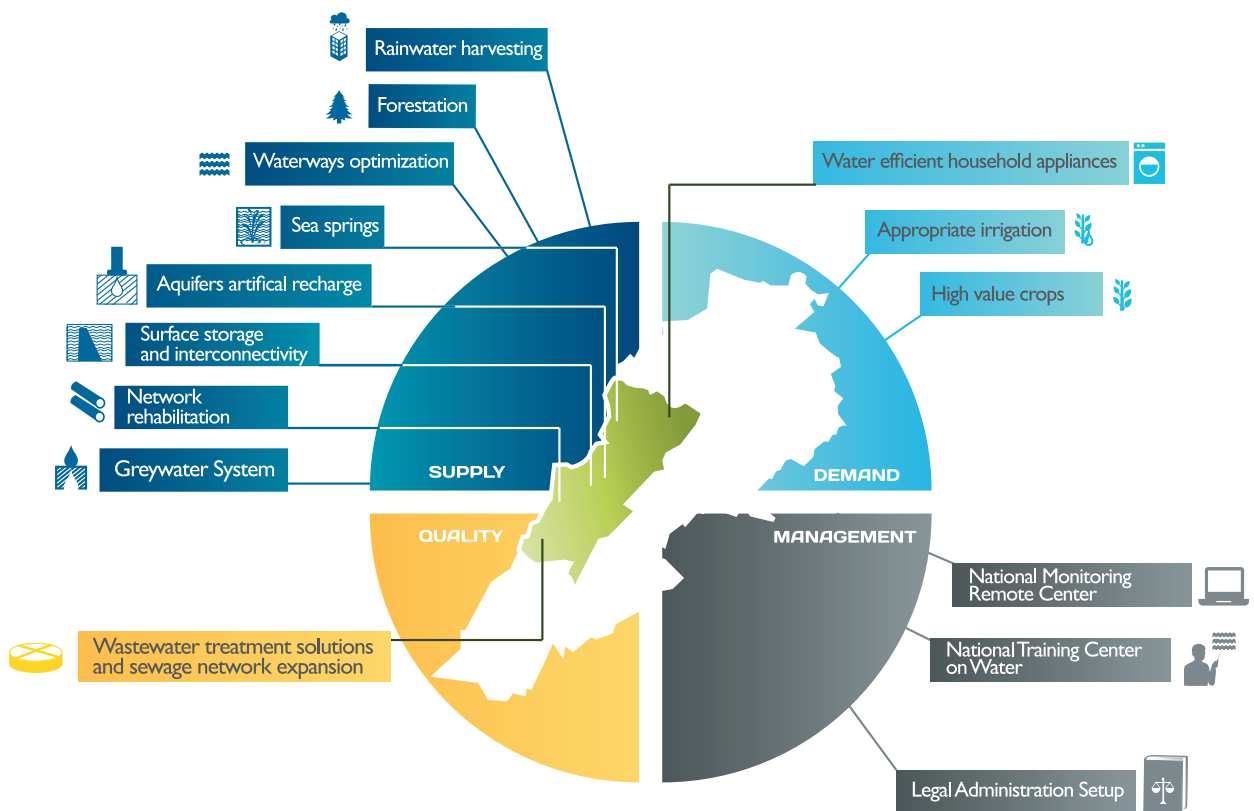
The BML area was selected to initiate the **BLUE GOLD** 5-Year Plan for the following reasons:

- Clear river boundaries
- Need for Physical and Institutional set-ups
- Basin Interconnectivity
- Good financial performance when compared to other WEs

The implementation of the short-term initiatives is not restricted to BML and will be executed nationwide (Diagram O).

**The objective of the BML BLUE GOLD project is to transfer operations and maintenance responsibility to private operators through the establishment of performance-based management contracts.**

**○ BLUE GOLD 5-Year Plan Initiatives: Beirut Mount Lebanon Model**



### 3. DIRECT AND INDIRECT BENEFITS OF INITIATIVES:

#### 3.1. **SUPPLY INITIATIVES**

The 8 initiatives proposed aim to increase water production and storage by reducing network losses, developing new sources of water supply, and increasing water storage capacity.

<b>INITIATIVE</b>	<b>BENEFITS</b>	<b>WATER PRODUCED/ MM<sup>3</sup></b>	<b>COST/ M USD</b>
<b>1</b> Increase Surface Storage and Interconnectivity between Basins	<ul style="list-style-type: none"> <li>■ Increase surface storage with minimum number of dams.</li> <li>■ Secure adequate water flow all year long.</li> <li>■ Involve the private sector.</li> </ul>	<b>640</b>	<b>920</b>
<b>2</b> Rehabilitate Irrigation and Domestic Networks	<ul style="list-style-type: none"> <li>■ Save 310 million USD annually from technical losses.</li> <li>■ Reduce leakage from 48% to 20 %.</li> </ul>	<b>85</b>	<b>1682</b>
<b>3</b> Optimize River Flows through Canalization	<ul style="list-style-type: none"> <li>■ Increase annual revenue by 77.5 million USD.</li> <li>■ Facilitate water quality and quantity measurements at the production units.</li> <li>■ Improve water quality.</li> </ul>	<b>62</b>	<b>100</b>



INITIATIVE	BENEFITS	WATER PRODUCED/ MM3	COST/ M USD
<p><b>4</b> Increase Forestation for Groundwater Recharge</p>	<ul style="list-style-type: none"> <li>Reduce the effect of climate change.</li> <li>Increase ground water absorption.</li> <li>Increase green coverage from 13% to 20% in 10 years.</li> <li>Improve water quality in watersheds.</li> <li>Extend the melting time of snow by 30-40 days.</li> <li>Increase spring water flow in Lebanon by 300 million m<sup>3</sup>.</li> </ul>	<p><b>25</b></p>	<p><b>85</b></p>
<p><b>5</b> Artificial Recharge of Underground Aquifers</p>	<ul style="list-style-type: none"> <li>Increase annual revenue by 160 million USD.</li> <li>Improve water quality.</li> </ul>	<p><b>158</b></p>	<p><b>250</b></p>
<p><b>6</b> Capture Water from Sea Springs</p>	<ul style="list-style-type: none"> <li>Provide fresh water for the northern coast of Lebanon.</li> <li>Meet the demands of current and future touristic resorts.</li> </ul>	<p>To be determined</p>	
<p><b>7</b> Harvest Rainwater from Rooftops</p>	<ul style="list-style-type: none"> <li>Reduce the stress on fresh water resources.</li> <li>Decrease the high tariff cost for water delivering by trucks.</li> </ul>	<p><b>5</b></p>	<p><b>70</b></p>
<p><b>8</b> Treat and Reuse Greywater</p>	<ul style="list-style-type: none"> <li>Increase annual revenue by 5 million USD.</li> <li>Reduce stress on fresh water resources during dry seasons.</li> </ul>	<p><b>5</b></p>	<p><b>8</b></p>

### 3.2. DEMAND INITIATIVES

At 55%, agriculture yields the highest water demand percentage. This is due to aging irrigation networks and the use of old irrigation techniques, like open canals, that consume large amounts of water.

Moreover, domestic demand will increase by 5% per year. The proposed demand initiatives will focus on two main projects:

- **The introduction of new agriculture techniques**, mainly drip irrigation.
- **The promotion of quality household appliances** that reduce leakage and water use.

	INITIATIVE	BENEFITS	WATER PRODUCED/ MM <sup>3</sup>	COST/ M USD
9	Implement Drip Irrigation Schemes	<ul style="list-style-type: none"> <li>■ Increase annual revenues by 335 million USD.</li> <li>■ Reduce water demand from 10,500 m<sup>3</sup>/ha to 6,500 m<sup>3</sup>/ha.</li> <li>■ Reduce stress on fresh water resources.</li> <li>■ Reduce agro-chemicals in fresh water.</li> <li>■ Improve crops production.</li> </ul>	290	40
10	Promote High-Value Crops	<ul style="list-style-type: none"> <li>■ Increase annual revenue by 95 million USD.</li> <li>■ Reduce demand on water.</li> <li>■ Produce added value and economically viable crops.</li> </ul>	90	15
11	Install Household Efficient Appliances	<ul style="list-style-type: none"> <li>■ Increase annual revenue by 18 million USD.</li> <li>■ Reduce stress on fresh water during dry seasons.</li> </ul>	15	15

### 3.3. QUALITY INITIATIVES

The current wastewater coverage in Lebanon is 60%. Though 37 wastewater treatment facilities were established, only 2 are operational. The needed number of wastewater treatment facilities is 55. The cost to reactivate the non-operational treatment facilities and construct the additional ones is approximately 1.8 billion USD.

Additional efforts need to be made at river basins\* level by local authorities. The **BLUE GOLD** quality initiatives will optimize the usage of new and existing wastewater treatment facilities by linking big industries along the river basins\* to the sewage network.

INITIATIVE	BENEFITS	WATER PRODUCED/ MM <sup>3</sup>	COST/ M USD
<div style="display: flex; align-items: center;"> <div style="background-color: #f4a460; color: white; padding: 2px 5px; margin-right: 5px;">12</div> <div> <p>Develop Wastewater Treatment Solutions and expand sewage network</p> </div> </div>	<ul style="list-style-type: none"> <li>■ Help clean-up ground, surface and coastal waters.</li> <li>■ Decrease health costs from water-borne disease by up to 800 million USD.</li> <li>■ Protect the environment.</li> <li>■ Increase the availability of useable surface water by approximately 45%.</li> <li>■ Improve water quality at the river basin levels.</li> </ul>		<p><b>1800</b></p>



### 3.4. **MANAGEMENT INITIATIVES**

Public Water Establishments (WEs) manage a number of operations which include: maintenance, diagnostic surveys, establishing development concepts, replacing and rehabilitating infrastructure and equipment, managing client relationships and collecting bills. Sector planning and construction of new infrastructure and hydraulic works are all overseen by the Ministry of Energy and Water. Despite the strategies and plans put forth so far, the Government is not able to develop or maintain the sector, and almost all the WEs are unable to cover their operational costs.

The implementation of **BLUE GOLD** supply-side and water conservation projects need to be coupled with a series of institutional reforms. **The suggested institutional changes entail more involvement from the private sector as operators at the river basins\* level** and not just as sub-contractor for maintenance and construction services.

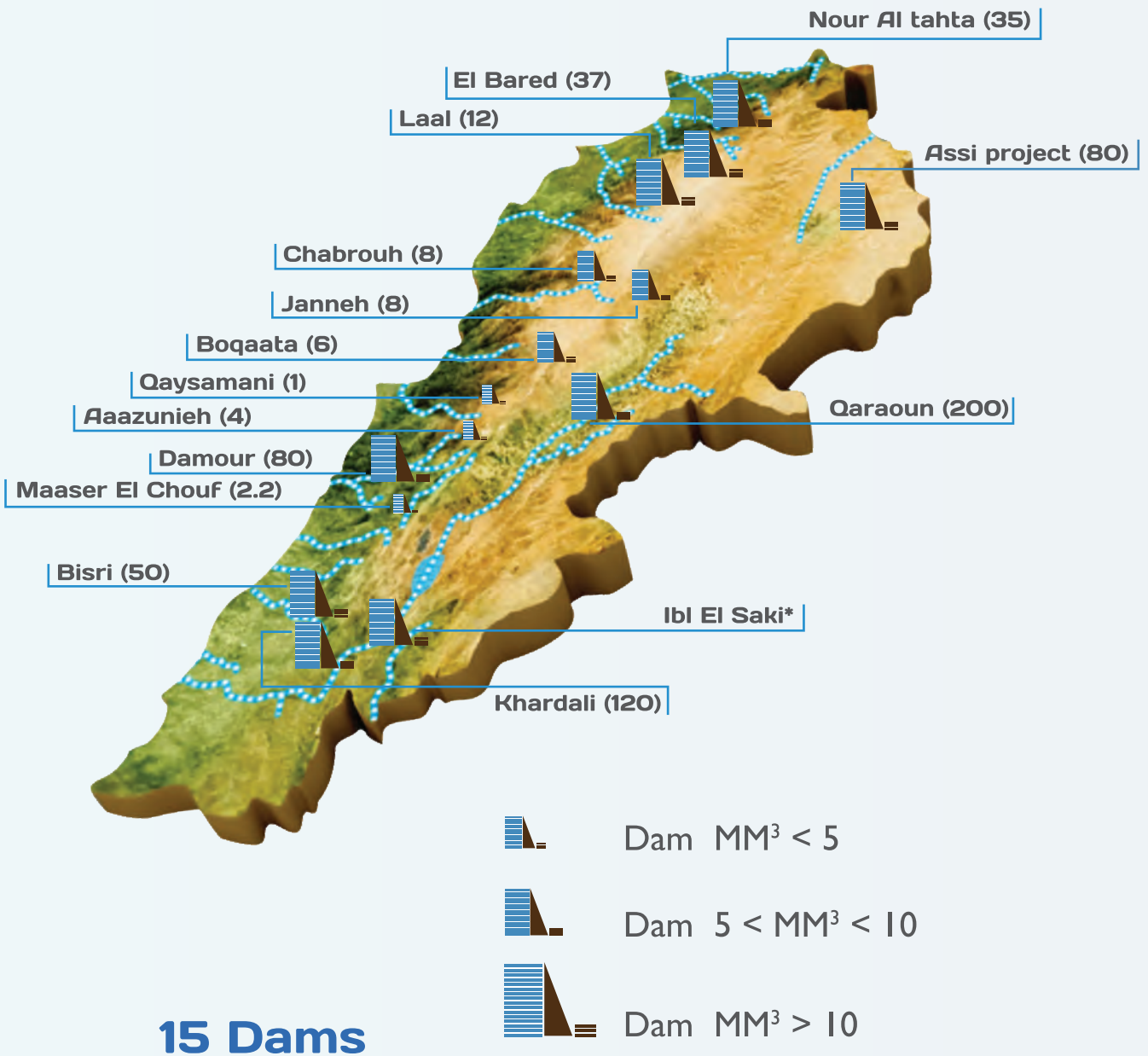
On another hand, the proper legal and institutional set is needed. **BLUE GOLD** will lobby towards the implementation of a National Water Council, a Regulatory Authority and a Watch Dog Organization. In addition, an action law that guarantees the right to access to water information will be developed and put into action.

INITIATIVE	BENEFITS	WATER PRODUCED/ MM <sup>3</sup>	COST/ M USD
13 Create Monitoring and Information Centre on Water	<ul style="list-style-type: none"> <li>■ Increase knowledge on the status of water resources and infrastructure in Lebanon.</li> <li>■ Monitor and control water supply and sanitation services.</li> <li>■ Exchange information amongst key stakeholders in the water sector</li> <li>■ Monitor water use and shares.</li> <li>■ Increase integrated water sector planning and management at both national and river basin* levels.</li> </ul>		5

	<i>INITIATIVE</i>	<i>BENEFITS</i>	<i>WATER PRODUCED/ MM<sup>3</sup></i>	<i>COST/ M USD</i>
14	Establish a National Training Centre on Water	<ul style="list-style-type: none"> <li>Build capacities of public and private stakeholders.</li> <li>Create and implement university program on Integrated Water Resources Management.</li> </ul>		10
15	Setup Legal Administration	<ul style="list-style-type: none"> <li>Increase efficiency of water management.</li> <li>Plan and follow a clear water strategy.</li> <li>Remain free of any political pressures.</li> <li>Allow citizens and private sector to participate in water management.</li> <li>Lighten the burden of government expenditures.</li> <li>Create new investment opportunities for all the citizens in the water sector.</li> <li>Access to water information for everyone.</li> <li>Control water quality.</li> </ul>		
				<i>COST</i>
		<b>TOTAL WATER PRODUCED</b>	<b>1376 MM<sup>3</sup></b>	<b>5000 M USD</b>
		<b>WATER DEFICIT</b>	<b>876 MM<sup>3</sup></b>	
		<b>WATER SURPLUS</b>	<b>500 MM<sup>3</sup></b>	



## INCREASE SURFACE STORAGE\* AND INTERCONNECTIVITY



\*To be implemented in the long term.





Chabrouh  
Dam,  
Mount  
Lebanon

## DESCRIPTION

Increasing surface storage and connecting basins will increase the water storage capacity and secure 24-hours a day water availability for households during dry seasons.

## CHALLENGES

Although surface water\* in Lebanon can supply 2.2 billion m<sup>3</sup> per year, the current storage capacity with 2 dams is only 10%. There is an urgent need to establish the infrastructure to store water and make it available. The Government proposes that 44 dams\* and hill lakes\* be established.

## TARGETS

- Reduce the number of dams and hill lakes\* from 44 to 15.
- Secure a continuous flow of water.
- Involve the private sector as services operators.
- Reduce cost.
- Reduce social and environmental impact.

## BENEFITS

- Increase water supply by 640 million m<sup>3</sup> annually.
- Increase surface storage by building a minimum number of dams.
- Decrease the stress on natural eco-systems in the identified sites to establish dams and hill lakes\*.

**COST** 920 million USD

## 2

## REHABILITATE IRRIGATION AND DOMESTIC NETWORKS



Saghbine,  
West Bekaa,  
Lebanon

### DESCRIPTION

Water network coverage will be expanded to 95% of the Lebanese territories. Existing domestic, agricultural networks will be rehabilitated to decrease water leakage and insure better water quality.

### CHALLENGES

Most transmissions and distribution systems in Lebanon have surpassed their permitted lifespans. Around 45% of transmission networks and 33% of distribution networks in Lebanon are more than 30 years old (2010).

The degradation in transmission and distribution systems has allowed for 48% leakage, exceeding the MENA average of 37% and the world average of 35%. The current potable water network coverage in Lebanon is around 79%, and is subjected to excessive leakage.

The most frequently used irrigation technique is open canals (70%). The lack of proper management coupled with the lack of maintenance has resulted in increased leakages, currently estimated to be around 15%.

### TARGETS

- Replace and rehabilitate aging irrigation transmission and distribution systems.
- Decrease leakage by installing detection sensors.
- Replace and rehabilitate aging domestic network and connect water together from more than one basin.

### BENEFITS

- Save 285 million m<sup>3</sup> or 310 million USD a year lost on technical deficiencies.
- Optimize the use of water resources and infrastructure.
- Share water amongst all Lebanese through integrated networks.
- Enhance water security by allowing users within the basin catchment\* to access water from other sources.
- Increase network efficiency by connecting additional water sources.
- Reduce water leakage from 48% to 20%.

**COST** 1682 million USD

## OPTIMIZE RIVER FLOWS THROUGH CANALIZATION

### 3



Nahr el Jawz,  
North  
Lebanon

### DESCRIPTION

Aligning river borders will prevent river floods and will increase the ability to store and use surface water.

### CHALLENGES

River alignments in Lebanon barely exist. Those that do, suffer from massive deterioration due to limited maintenance. As a result of improper canalization and inadequate river alignment, river flows are not optimized and can cause flooding.

### TARGETS

- Re-align or straighten river channels, allowing for faster flow of rivers. Large sediments are therefore removed from the riverbed, providing larger areas to hold water and minimize flood occurrences.
- Re-section, widen and deepen river channels to increase flow and mitigate floods.
- Implement riverbank protection by building artificial levees\* to prevent high-flowing water from seeping over the riverbank and causing floods.
- Plant trees and other vegetation along the river to protect banks against erosion.

### BENEFITS

- Increase water supply by 62 million m<sup>3</sup> annually.
- Generate 77.5 million USD in revenue a year.
- Facilitate the measurement of water quality and quantity at the production level.
- Improve water quality.
- Reduce river flood risks.

**COST** 100 million USD



## 4

## INCREASE FORESTATION FOR GROUNDWATER RECHARGE

Qadisha valley,  
North  
Lebanon



### DESCRIPTION

BLUE GOLD will contribute to the national reforestation strategy in order to increase Lebanon's Green Cover from 13% to 20% by planting 40 million native trees in 10 years. This initiative will help retain underground water by 35%.

### CHALLENGES

Forestation has greatly decreased from 30% to a mere 13.7% due to a number of reasons such as natural forest fires, urbanism and climate change. Healthy forest ecosystems deposit large amounts of organic matter onto the forest floor, encouraging the growth of microorganisms that enhance soil conditions. These organisms aerate soil and also create porous structures that allow water to infiltrate deep soil layers and feed underground water tables. Forests in good conditions allow 35% of water to seep into deeper soil layers.

### TARGETS

- Contribute to the increase of surplus groundwater by planting 20 million native trees all over Lebanon in the short-term, and another 20 million trees in the mid-term. Plant 70,000 ha of land with native species that are economically feasible to sustain.
- Involve the private sector through business models (e.g. Eco-tourism, wood production, carbon market, non-wood forests production, etc.).

### BENEFITS

- Produce 25 million m<sup>3</sup> of water annually.
- Increase the green cover of Lebanon from 13% to 20% in 10 years.
- Reduce the effects of climate change.
- Increase ground water absorption.
- Improve water quality in watersheds\*.
- Increase rain and counter global warming.
- Reduce CO<sup>2</sup> by 3 million tons and increasing O<sup>2</sup> by 4 million tons.
- Create 400,000 manday seasonal jobs per year by promoting profitable eco-touristic activities and encouraging communal socio-economic development.

**COST** 85 million USD

## ARTIFICIALLY RECHARGE UNDERGROUND AQUIFERS\*

5



### DESCRIPTION

Artificially recharging unused water in specific areas will decrease the current pressure on aquifers resulting from the mismanagement of underground water.

### CHALLENGES

Most coastal aquifers\* in Lebanon are depleted and are threatened by excessive seawater intrusions.

The artificial recharge of aquifers\* is important for groundwater replenishment. This procedure is not successfully conducted in Lebanon.

### TARGETS

- Increase fresh groundwater available in aquifers by implementing artificial recharge schemes that collect unused water.
- Allow the full pressurization of aquifers\* to prevent the infiltration of salt water.

### BENEFITS

- Increase water supply by 158 million m<sup>3</sup> annually.
- Increase the annual water revenues by 160 million USD.
- Increase awareness of aquifer characteristics and influences on groundwater flow and quality.
- Minimize the intrusion of seawater.
- Improve water quality.

**COST** 250 million USD

## 6

**CAPTURE WATER FROM SEA SPRINGS\*****DESCRIPTION**

The proper extraction of sea springs\* water will secure an additional source of water for use in big cities. This initiative will be implemented in the mid-term, after the completion of all needed research.

**CHALLENGES**

Sea springs\* are a vital source of water though no action is being taken to collect the available supply.

Four springs supply potable water to the Chekka region during the dry season. Applied studies have validated the ability of these submarine springs\* to supply water to the ground. The Chekka springs are considered an important supply of fresh water that can produce between 6m<sup>3</sup>/sec. during the dry season to 50m<sup>3</sup>/sec. during the wet season. This water can be used in various sectors. However, this water might have salinity during the dry season.

**TARGETS**

- Capture clean unsalted water from offshore sea springs\* in Chekka for the industrial and domestic sectors.
- Encourage private sector investment through business models.

**BENEFITS**

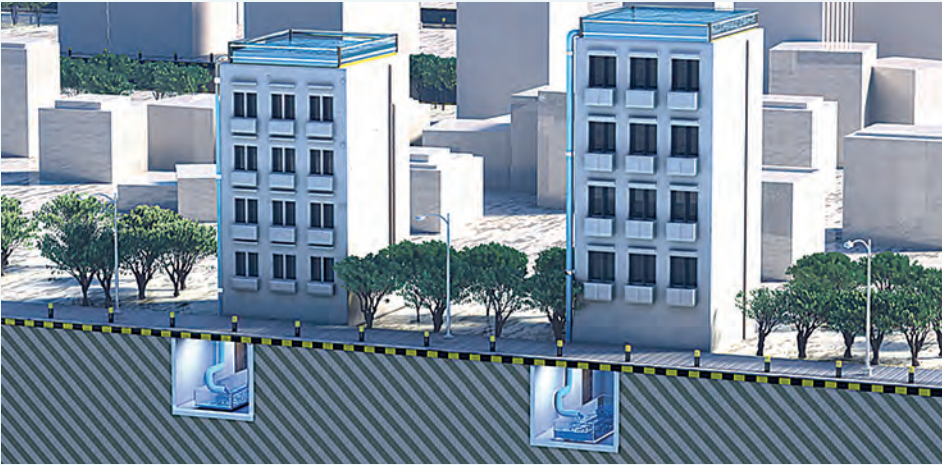
- Increase water supply by 50 million m<sup>3</sup> annually (as a first estimation, to be re-evaluated).
- Provide fresh water for the northern coast of Lebanon.
- Meet the demand of current and future resorts.

**COST** To be determined



## HARVEST RAINWATER FROM ROOFTOPS

# 7



### DESCRIPTION

Rainwater harvesting systems will be installed on the rooftops of new buildings. Collected rainwater will be stored in wells that can be reused after treatment.

### CHALLENGES

Subsurface water infiltration is gradually diminishing due to urbanization and the consequent soil degradation. When it rains in cities, water that does not infiltrate the soil into the ground streams off into the sea as surface runoff.

### TARGETS

- Collect, treat and store rainwater for reuse on rooftops, highways, wide streets, airports and other applicable areas.
- Replace expensive private water by providing additional water supply.
- Mitigate and control surface water floods.

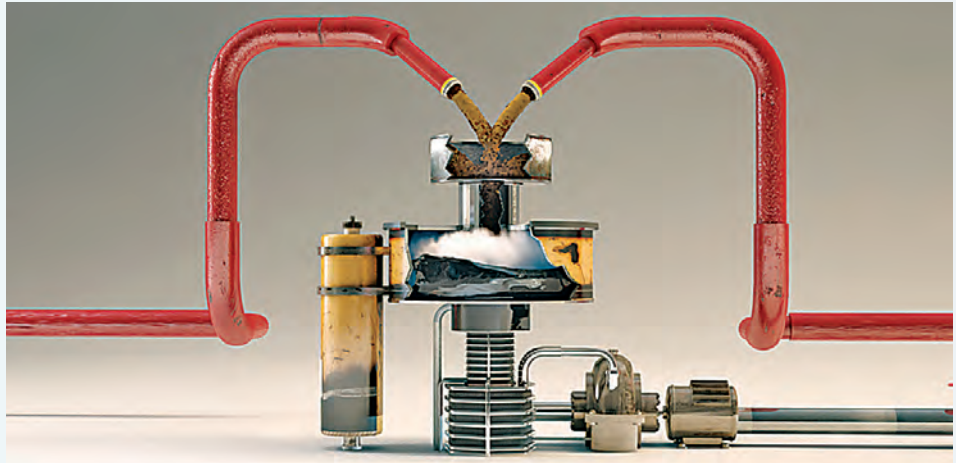
### BENEFITS

- Increase water supply by 5 million m<sup>3</sup> annually.
- Generate 5 million USD in revenues a year.
- Reduce the stress on fresh water resources.
- Decrease high tariffs for water delivery by trucks.

**COST** 70 million USD

## 8

## TREAT AND REUSE OF GREY WATER



### DESCRIPTION

Treated greywater will be re-used for different domestic and industrial purposes.

### CHALLENGES

Water from sinks, showers, bathtubs and other fixtures like the toilet, ends up in the sewer system. Such water is not being treated or re-used so as to save on water consumption.

Greywater systems are established so to reuse treated domestic water for various applications depending on the degree of treatment.

For example, greywater collected from showers and bathtubs can be treated and used for flushing. In the case of further treatment, water can be used for more direct applications such as showering.

### TARGETS

- Conduct off-network treatment of greywater so to reuse it for domestic, agricultural and industrial purposes.

### BENEFITS

- Increase water supply by 5 million m<sup>3</sup> annually.
- Reuse greywater for domestic applications depending on degree of treatment.

**COST** 8 million USD

## IMPLEMENT APPROPRIATE IRRIGATION SCHEMES

9



Bisri,  
South  
Lebanon

### DESCRIPTION

By shifting to appropriate irrigation schemes such as drip or localized irrigation, the consumption of irrigated water will be reduced, crop quality will improve and the use agrochemicals will decrease.

### CHALLENGES

The canal, or open irrigation, technique is the most frequently used in Lebanon, accounting for about 70% of irrigated land. The technique is wasteful due to high evaporation loss and low system efficiency. Additionally, the canal irrigation technique causes soil degradation and lower crop yield in the long run.

### TARGETS

- Upgrade 30,000 ha of agricultural lands in Bekaa, North and South with localized irrigation systems.
- Equip an additional 20,000 ha of agricultural lands in Bekaa, North and South with localized irrigation systems.

### BENEFITS

- Save 290 million m<sup>3</sup> of water per year.
- Reduce water demand from 10,500 m<sup>3</sup>/ha to 6,500 m<sup>3</sup>/ha.
- Increase the annual water revenues by 335 million USD.
- Increase farmers' income by at least 15%.
- Reduce the stress on fresh water resources.
- Reduce agro-chemicals in fresh water.
- Improve crop production.
- Increase irrigation efficiency by at least 40%.
- Increase the quality of fertilizer use.
- Decrease soil pollution.
- Increase knowledge regarding sustainable agricultural.
- Strengthen capacities of farmers' cooperatives and water user associations.

**COST** 40 million USD



## 10

## PROMOTE HIGH-VALUE CROPS

Qammoua,  
North  
Lebanon



### DESCRIPTION

Farmers will be encouraged to grow different kind of crops that have high economic added value and will increase water revenue.

### CHALLENGES

Agriculture in Lebanon is considered an important sector as it has the potential to contribute to the local economy by producing high quality agricultural crops that can be exported to neighboring countries. However, there are no plans to optimize crop mix in Lebanon. Crops are randomly planted with no consideration to suitable environments.

### TARGETS

- Develop a clear understanding of the characteristics of each type of crop that can be planted in Lebanon.
- Establish and implement an optimized crop mix strategy.
- Explore different possibilities of exporting crops in exchange for other commodities.

### BENEFITS

- Save 90 million m<sup>3</sup> per year by reducing the water demand.
- Generate 95 million USD in water revenues a year.
- Produce added value and economically viable crops.

■ **COST** 15 million USD

## INSTALL HOUSEHOLD EFFICIENT APPLIANCES



### DESCRIPTION

By installing quality water appliances, households will use less water therefore decreasing the stress on and the cost of water.

### CHALLENGES

Water demand forecasts indicate that domestic demand is increasing at a rate of 5% per year, surpassing that of the agricultural (3%) and industrial (3%) sectors. It is predicted that domestic demand will become the main propeller of water consumption. Domestic water will face severe deficit in the long run due to increasing demand and indifference towards water conservation, leaving a great portion of the population without sufficient water resources.

### TARGETS

- Conserve water by making use of innovative water efficient appliances such as smart washing machines, sensor-based taps, and dual flush toilets.
- Develop incentives to import and develop efficient equipment in local markets.

### BENEFITS

- Save 15 million m<sup>3</sup> in water annually.
- Generate 18 million USD in water revenues per year.
- Reduce stress on fresh water sources during dry season.

**COST** 15 million USD

12

## DEVELOP WASTEWATER\* TREATMENT SOLUTIONS AND EXPAND SEWAGE NETWORK

Moukhtara,  
Mount  
Lebanon



### DESCRIPTION

Primary wastewater treatment projects will be implemented in the Litani River Basin so to improve the quality of the river water and make 45% of it available for use.

### CHALLENGES

Water resources are exposed to sources of domestic, industrial and agricultural pollution which impacts water quality and ecologic viability. It is therefore critical that proper water quality monitoring be instated to: insure sustainable access to safe domestic water, enhance water treatment and productivity, and reclaim wastewater\* emissions to protect health and ecologic wellbeing.

The Litani River Basin is the main focus of this initiative as it is the most exposed to water contamination due to agricultural and industrial activities.

### TARGETS

- Engage Private Sector Participations (PSPs), Small and Medium Sized Enterprises (SMEs) and Water User Associations in planning.
- Develop and implement primary treatment of wastewater\* projects at the local level with the aim of improving water quality at the production level.
- Develop off-network wastewater treatment projects on Litani river.

### BENEFITS

- Bring water quality along the Litani River Basin up to standard, making sure microbiological contaminants are within acceptable range.
- Decrease health costs from water-borne diseases by up to 800 million USD.
- 350 million m<sup>3</sup> per year, around 45% of Litani River water, will be re-useable.

**COST** 1800 million USD



## CREATE MONITORING AND INFORMATION CENTRE ON WATER

**13**


### DESCRIPTION

A national center to monitor the water sector in Lebanon on all levels (production, storage, distribution, metering and billing) will be established. The center will also supervise water quality and management setups.

### CHALLENGES

Water institutions are not able to efficiently monitor water quality and quantity. The absence of reliable, standardized data and information systems makes it difficult to strategically plan and integrate water supply and sanitation services. The lack of information also prevents water operators from undertaking swift corrective measures in case of accidents like network leakages and waterway contaminations.

### TARGETS

- Consolidate all information related to water resources and systems in a comprehensive database.
- Assess the hydrological cycle, quality and quantity of raw surface and ground water.
- Assess of the effectiveness of water systems and related infrastructure including quality of water.
- Establish the necessary interfaces and data exchange protocols with key stakeholders.
- Monitor, analyse and report all information to stakeholders.

### BENEFITS

- Develop comprehensive, in-depth knowledge on the status of water resources and infrastructure.
- Monitor and control water supply and sanitation services.
- Facilitate information exchange among key stakeholders.
- Monitor water use and shares.
- Enable integrated water sector planning and management on both a basin and a national level.

**COST** 5 million USD

## 14

## ESTABLISH THE NATIONAL TRAINING CENTER ON WATER



### DESCRIPTION

A National Training Centre on Water will be established to fill the technical knowledge gap regarding issues related to water management.

This step will help to increase the professionalism of all stakeholders.

### CHALLENGES

Most water institutions in Lebanon are understaffed and lack technical and managerial abilities. As a result, public utilities are not able to maintain water quality or efficiently plan, develop and repair water systems. The lack of managerial capacities prevents public institutions from delegating some of their responsibilities to private water operators.

### TARGETS

- Develop an organization that provides both technical and managerial insight and training.
- Setup labs and small-scale water systems and facilities.
- Train professionals working in all water related sectors and disciplines. Target 500 to 1000 trainings per year.
- Create a think-tank to conduct research and develop efficient practices and technical solutions.

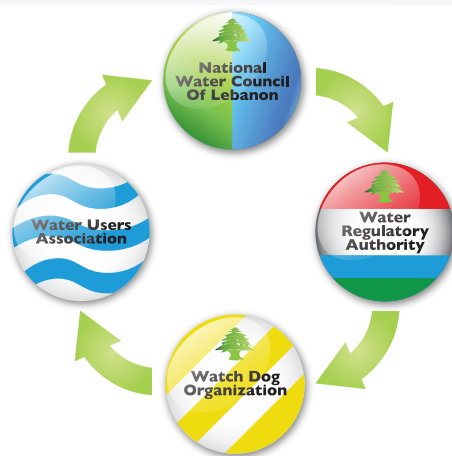
### BENEFITS

- Solve imminent infrastructural problems such as leakages in distribution networks.
- Rationalize water consumption.
- Improve water quality.
- Enable the public utility to delegate responsibilities to private operators and ensure that services provided are to standard.
- Facilitate knowledge exchange among multidisciplinary experts.
- Position Lebanon as a leading regional water training and research center.

**COST** 10 million USD

## SETUP LEGAL ADMINISTRATION\*

# 15



### DESCRIPTION

This initiative tackles the legal and institutional reform required to improve the water sector in Lebanon through the initiation of a National Council for Water, the Water Regulatory Authority, the Water Users Associations and a Watch Dog Association from the civic society.

### CHALLENGES

Water is a common good that needs to be regulated, protected and at the same time be available for everybody equally. In Lebanon, the development of the water regulations exhibits major discontinuities. Moreover, most of the existing water laws are either outdated or uncompleted or not yet implemented.

### TARGETS

- To establish the proper institutional and legal framework in order to optimize the management of the water sector and enable the participation of all the concerned stakeholder according to the Integrated Water Resource Management approach.

\* Refer to Part 4.

### BENEFITS

- A national water strategy is developed and implemented with the participation of all concerned stakeholders, within an integrated management of the water sector.
- The water strategy is free from any political or individual influence.
- Private Sector is involved as a partner and service provider in the water sector, enabling more efficiency and service quality.
- The burden of government expenditures for water projects is lightened by the participation of the private sector.
- New investment opportunities are created for all citizens in the water sector.
- New laws and regulations are developed to meet the changing needs in the water sector.
- Access to water information is available for everyone.
- Water tariffs are regulated.
- Water quality is controlled.

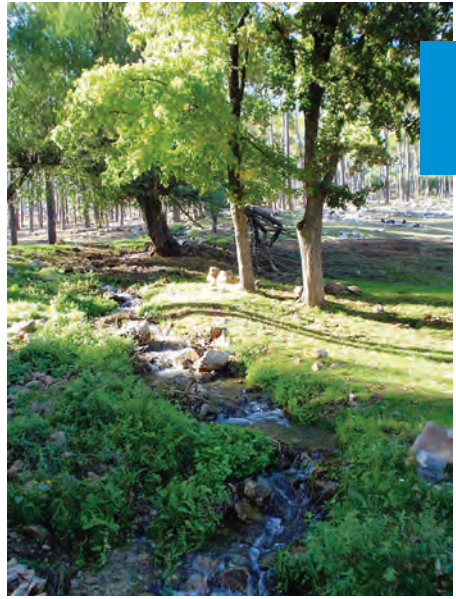
**COST** To be determined



Marj Bisri, South Lebanon



Ammiq, West Bekaa, Lebanon



Nahr Barouk, Mount Lebanon



Barouk Cedars, Mount Lebanon



Afqa, Mount Lebanon



Qammanine, North Lebanon



Baaqlin, Mount Lebanon





Jabal  
Moussa,  
Mount  
Lebanon



Hermel,  
Bekaa,  
Lebanon



Qammanine,  
North  
Lebanon



Kammoua,  
Akkar,  
North  
Lebanon



Ain Zhalta  
Cedars,  
Mount  
Lebanon



**More is yet to come. Today's figures estimate a potential water surplus of 1 billion m<sup>3</sup> in 2030. Once the process begins, the yields are endless. Technological advances in geology, storage, underground recharge and recycling, to name a few, can help increase this valuation. Despite an increase in consumption, Lebanon's surplus could easily reach 2 billion m<sup>3</sup> if on the long run, all the program is implemented, and 50% of available water is used. The future is promising.**

## PART 4

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# THE BLUE GOLD 5-YEAR PLAN EXECUTION REVOLUTION

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The **BLUE GOLD** approach is integrated. The plan promises that only one entity, the **National Water Council of Lebanon**, plans water strategy and that this entity is free from political interferences.

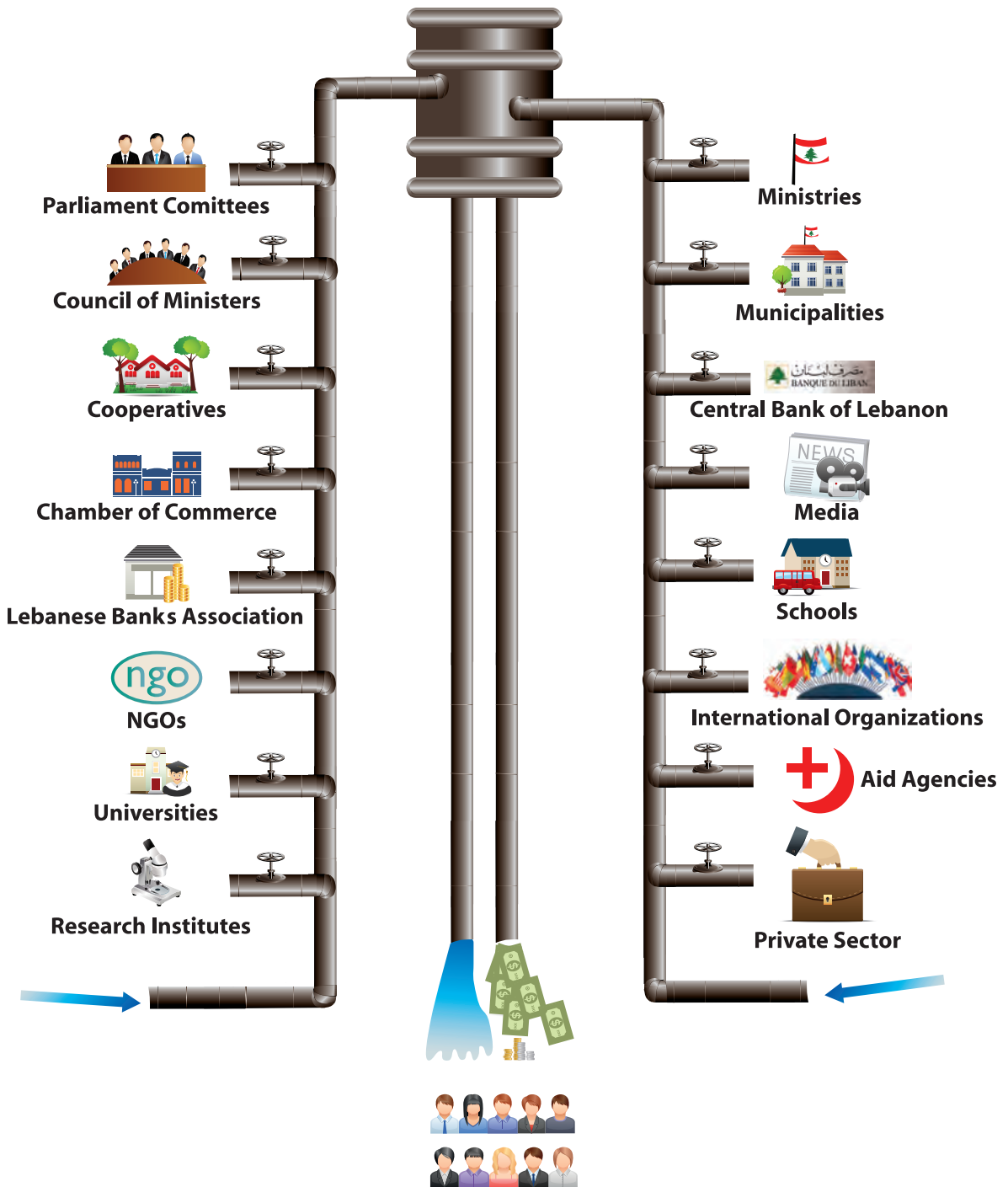


The **government, civil society and private sector** should work together to develop **national water policies and strategies**, and oversee the sector's development based on the **Integrated Water Resources Management** approach.



**BLUE GOLD**'s vision and objectives will be actualized into countrywide projects that involve extensive participation from various sectors (Diagram P).

**P** *BLUE GOLD Integrated Approach*



- I. **BLUE GOLD** offers holistic, sustainable solutions to solving the water problem as seen in the previous sections. The implementation of an Integrated Water Resources Management approach will achieve the following concrete results by 2020:

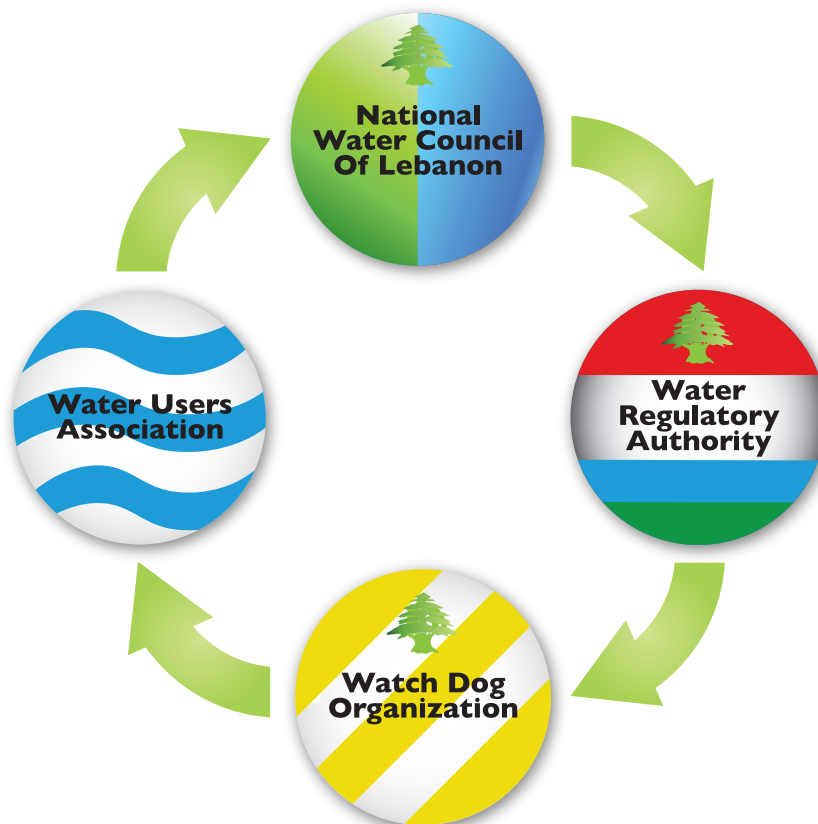


### 1.1. A Series of Reforms

Water is a common good that needs to be regulated, protected and made available for all. As mentioned in Part I Diagram E, the development of the water regulations in Lebanon is discontinuous. Though there are a number of laws that organize the water sector management in Lebanon, many are either outdated, incomplete or have not yet been implemented.

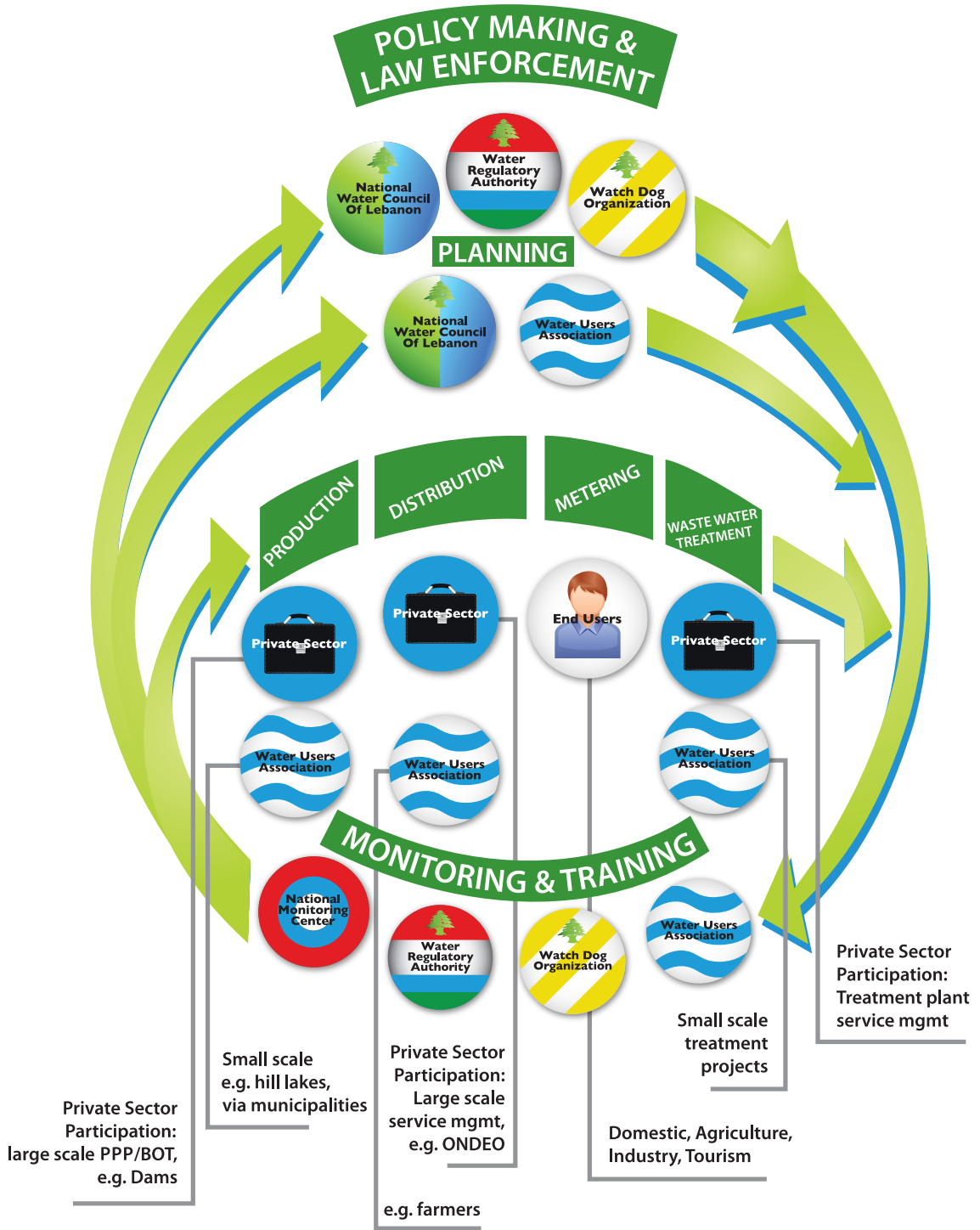
In this context, the implementation of **BLUE GOLD** requires a set of legal and regulatory reforms to ensure proper strategic planning for the Water Sector, to achieve legal reform and to monitor strategy implementation. These reforms include first and foremost the establishment of a National Water Council of Lebanon, a Water Regulatory Authority, a Watch Dog Organization and a Water Users Association.

#### Water Sector Target Organizational Set-up

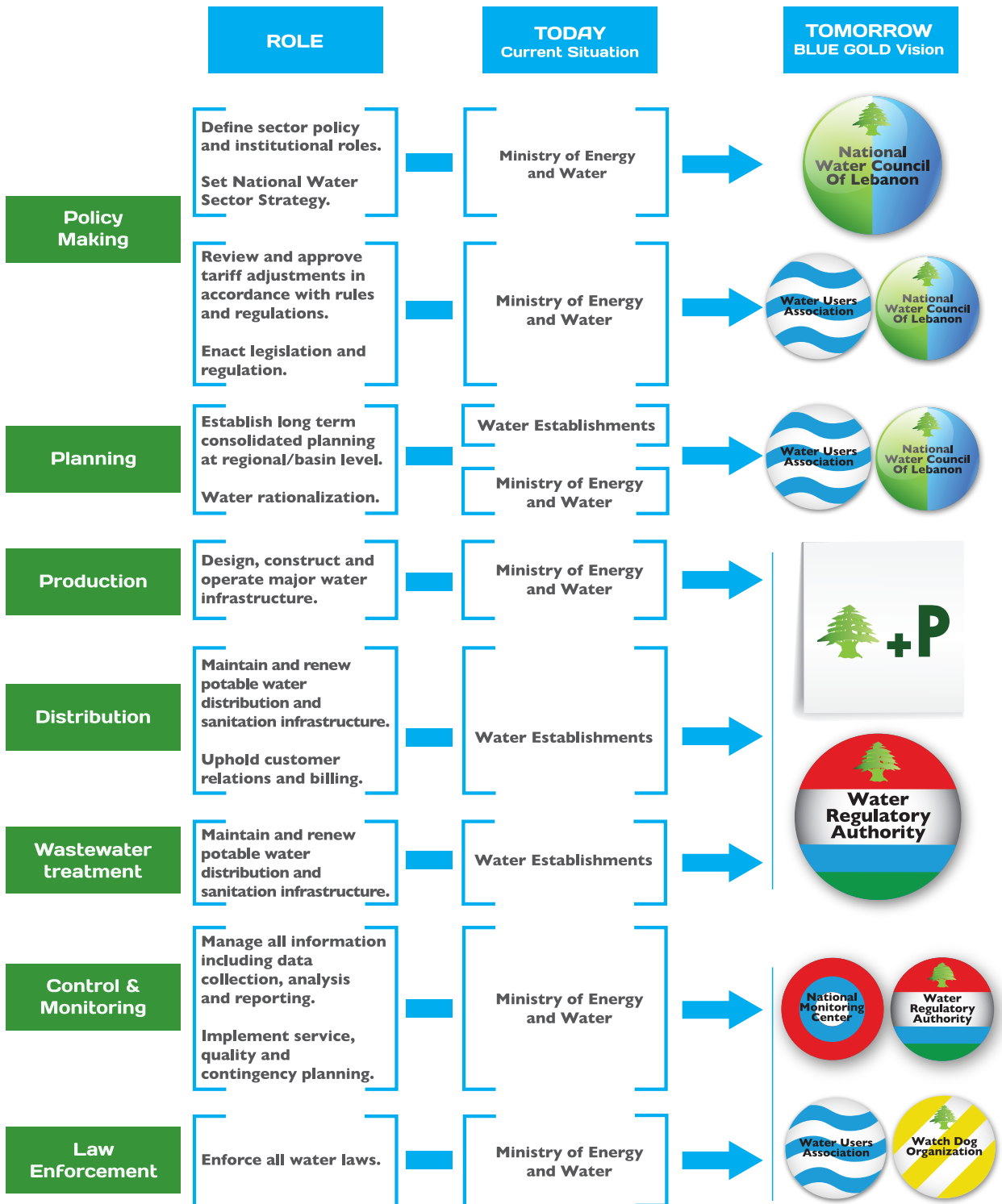




**R** Target Water Management Process and Key Players



## S BLUE GOLD Vision for Roles and Responsibilities



## 2. National Reforms

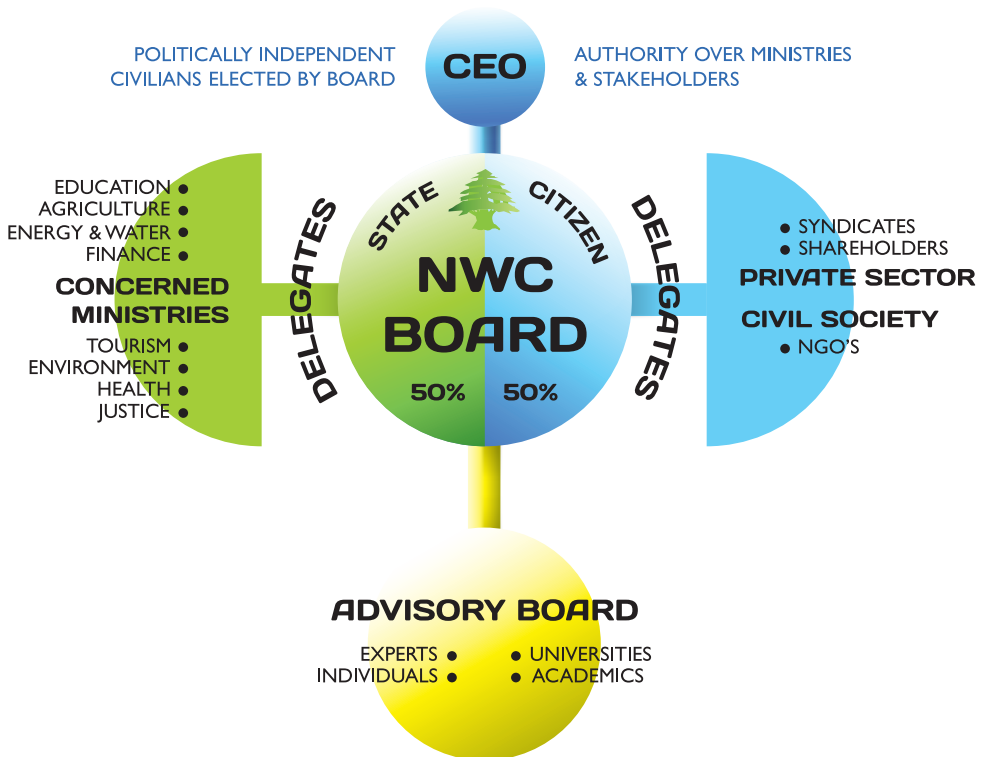
**The National Water Council and institutions built around it must be politically independent, a driving value behind the BLUE GOLD project.**

The **National Water Council of Lebanon** must be founded as a supervising authority whose roles are to:

- Prioritize the general objectives in the water sector.
- Approve the general master plan.
- Agree on all national and regional projects related to organizing and distributing water.
- Follow-up on the implementation of relative conventions and protocols.
- Coordinate between different ministries.



### **T** National Water Council Chart





2.1. A **Regulatory Authority** must be established to supervise water management processes. Its main responsibilities are to:

- Ensure the continuous and reliable delivery of water and wastewater services.
- Regulate and supervise public and private companies that provide water and wastewater services.
- Improve and maintain water standards.
- Participate in law enforcement and the establishment of rules and regulations.
- Contribute to the review and approval of water tariffs.



2.2. A non-governmental **Watch Dog Organization\*** from the civil society must be founded to monitor the performance of the various stakeholders. The organization must:

- Monitor and follow-up all projects and actions undertaken by the water sector in Lebanon.
- Access all types of information to monitor and maintain transparency.
- Propose laws, rules and regulation.



2.3. A **National Monitoring Centre** must be established to assess water quality and management. Its roles are to:

- Consolidate all information related to water resources and systems in a comprehensive database.
- Conduct all technical assessments related to the quality and quantity of water.
- Monitor, analyse and report all information to stakeholders.



2.4. A **capacity building training centre** must be established for stakeholders working in the water sector.



### 3. Local Reforms

Interconnectivity between basins\* must be introduced as a potential model to increase water availability and improve water quality. (Refer to Part 3. Initiative 1)



#### 3.1. Introduce **Private Participation Schemes** in order to finance water projects and increase efficiency and service quality.

- ◀ Private operators must participate in the downstream provision of water services through management contracts that focus on billing services, and operations and maintenance of distribution networks.
- ◀ The investment, construction, operation and maintenance of water systems must be transferred to private companies through different forms of Private Sector Participations. Participation would entail financing, constructing, operating and maintaining dams and other related equipment.
- ◀ The private sector must participate as a production, distribution, metering and billing operator.



#### 3.2. **All Lebanese** should be able to financially contribute to the water sector through antitrust\* funds.



#### 3.3. **Municipalities** must be involved in small-scale projects during the production stage, such as the development of hill lakes\*.



3.4. The creation of **Water Users Associations**, a form of private sector participation, must incorporate farmers and enable them to takeover the control and maintenance of irrigation networks. The main roles are to:

- Establish long-term consolidated planning at regional basin levels according to the water policy.
- Achieve, maintain and execute reparation works beneficial for the Water Plan.
- Equally distribute irrigated water amongst members.
- Propose tariffs according to consumption and maintenance costs.
- Collect fees.
- Referee conflicts between members or between members and non-members.
- Maintain water quality.



3.5. **To ensure the development of the Water Sector without increasing the government debt, new laws will be introduced that enable the Private Sector to partner with the Government and operate within the Water Sector. More importantly, Lebanese citizens will be able to invest in water through the development of an Anti-Trust Fund Law.**



**Voting for BLUE GOLD means voting for the law that will establish a politically independent National Water Council. Realistically, the 5-Year Plan can only become a reality if this condition is met. Your support and contribution is critical as further discussed in the pages to come.**



## PART 5

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# LEBANON WILL NEVER BE THE SAME AGAIN

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**Why should Lebanese citizens and the Lebanese State support Project BLUE GOLD?**

Investors, heads of families, farmers, hotel owners, entrepreneurs, job seekers, Members of the Parliament, Members of the Government and fellow citizens,

by now you have gone through the thorough description of **BLUE GOLD** and undoubtedly discovered how much water surplus we can achieve if we come together and actualize the water 5-Year Plan. The available figures on water availability from the Government and the World Bank are conservative. The bountiful promise of **BLUE GOLD** could be even bigger if we harness the 8 billion m<sup>3</sup> that are generated by rain and snow every year, save the greater amount that we loose to the sea, and demonstrate how innovative initiatives such as basins' interconnectivity, submarine springs, harvesting and forestation can generate more water than expected.



Tannourine  
Cedars,  
North  
Lebanon

**A lot can be achieved with the surplus of 500 million m<sup>3</sup> foreseen in the next 5 years:**

◀ **Improve and develop numerous sectors.**



Marj Bisri,  
South  
Lebanon



Lhassa,  
Mount  
Lebanon

◀ **Improve the agricultural economy.**



Mar Shim Plain,  
Hermel,  
Bekaa,  
Lebanon

◀ **Develop the water bottling industry into a regional economic powerhouse.**



## 1. **BLUE GOLD Positive Impact on Lebanon and Lebanese**

The increase in water surplus coupled with the administrative and legal reforms are in line with the sustainable development approach. Thus, **BLUE GOLD** will positively impact the economy, society and environment as summarized below.

### 1.1. *ECONOMIC IMPACT*

#### 1.1.1. **Increase Water Availability and Quality**

- ◀ Provide clean water to all Lebanese 24-hours a day, even during dry seasons.



#### 1.1.2. **Save Money**



- ◀ Decrease the average water bill per household from 700 USD currently to 380 USD per year for domestic consumption, and 500 USD per year adding water treatment fees.
- ◀ Reduce touristic organizations (Hotel as a case study) water bills from 50,000 USD to 35,000 USD annually.

#### 1.1.3. **Increase Revenues**

- ◀ The private sector will be able to earn 12% of annual profits from Service Providers Contracts (production, distribution, metering and billing).
- ◀ The government will generate profits from Public-Private Partnerships (PPP) projects.
- ◀ Lebanese citizens will be able to invest in the water sector through crowd funding, receiving a minimum annual benefit of 12% after tax.

# 12%

#### 1.1.4. **Contribute to National Wealth**

- ◀ The surplus of 500 million m<sup>3</sup> will contribute to the national wealth by more than 600 million USD every year.



## 1.2. SOCIAL IMPACT

### 1.2.1. Create New Job Opportunities

- Create 3,000 man-day permanent jobs and 400,000 man-day seasonal jobs within local communities.
- Encourage people to settle in and build their local communities rather than migrate to cities.



Rachaya  
Village  
South  
Lebanon

### 1.2.2. Improve Health

- Reduce the number of health risks from water-borne diseases.
- Improve the quality of water and save an annual 800 million USD on national health expenditures.



### 1.2.3. Improve The Quality of Life

- Lebanese citizens will share common values and common wealth around the national water project.



### 1.3. ENVIRONMENTAL IMPACT

- 1.3.1. Support the national reforestation initiative to plant 40 million native trees, which will contribute to mitigating the effects of climate change by: reducing CO<sup>2</sup> emissions by 3 million tons a year; increasing O<sup>2</sup> by 4 million tons a year; and increasing underground water through infiltration of rainwater, producing 25 million m<sup>3</sup> of water annually.



Bekassine,  
South  
Lebanon



Nahr  
Ibrahim,  
Mount  
Lebanon

- 1.3.2. Reduce the percentages of agro-chemicals in ground water by implementing appropriate irrigation schemes.



Assi river,  
Bekaa,  
Lebanon

- 1.3.3. Decrease the stress on rivers and watersheds by limiting the pollution resulting from wastewaters.

- 1.3.4. Limit the number of dams to 15, instead of 44 as proposed by the government, to save many natural sites in Lebanon from deterioration and degradation.

## 2. The 5-Year Water Plan for Lebanon: The “New Deal”

**A new, ambitious national economic project where all voices are heard is possible! Unprecedented in Lebanon’s history, BLUE GOLD is a development plan applied uniformly across all of Lebanon with no exception. BLUE GOLD is a plan that mobilizes all Lebanon’s citizens by creating equitable returns across the whole Lebanese territory.**

***Mobilization, federative influence, and stimulation of the national economy*** are key concepts. Based on these parameters and by the nature of its design, the Blue Gold 5-Year Plan will ensure the optimization and proliferation of the nation’s most important resource. The plan will also guarantee a steady and permanent rate of earnings. New sources of wealth will be created ensuring quick and fair distribution of return on investment and will ultimately lead to a better quality of life.



Laqlouq Hill  
Lakes,  
Mount  
Lebanon



**BLUE GOLD will maximize its chances of success by sticking to fundamental principles:**

2.1. **BLUE GOLD will simultaneously be applied to all Lebanese regions.**

- Driven by balance and harmony, the goal is to develop all Lebanese regions.



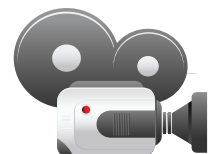
2.2. **BLUE GOLD is realistic, affordable and makes economic sense.**

- When proposing the construction of any water project, the design should offer realistic opportunities that are beneficial to all. You must voice your agreement for the project to work. There should be no room for indecisiveness or economic demagoguery in such a national project.



2.3. **BLUE GOLD will be heavily mediatized.**

- For **BLUE GOLD** to succeed, it must be heavily mediatized from its conception. The plan will be communicated based on its ability to immediately affect positive response for the entire nation. It will be formulated in such a way that people from all walks of life can effortlessly connect to it. The communication process will take effect on many levels and by different means, with the intention of building endorsement and mobilizing everyone into action. Permanent creative campaigns providing information accompanied by a platform for citizens to provide constructive criticism will help build transparency and trust. This implies a clear vision, financial transparency, flawless execution processes, professional supervision and, of course, permanent audit.



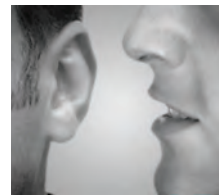
## 2.4. **BLUE GOLD** will encourage Lebanese citizens to invest and reap benefits.

- Direct participation in the project is an innovative formula that creates citizen-partners, a true national “we” born of a collective conscience of common interests. Moreover, sound management of **BLUE GOLD** projects will positively reflect on the economy because it will favor an enhanced circulation of the monetary reserves of the individuals, thereby accelerating economical flux and growth.



## 2.5. **BLUE GOLD** will be endorsed by a wide range of influential figures.

- The Civic Influence Hub will enhance the impact of media campaigns and influence decision makers to act with mutual benefit. This influence can express itself in a way that can be amicable, encouraging, pressing, and eventually, (with the tonality of urging), becoming the Nation’s true calling. Imagine more than one million people from different communities and political groups unanimously calling for the adoption of the water 5-Year Plan, like an uprising purely based on the transparency of the commitment and the integrity of the water federative cause.



## 2.6. **BLUE GOLD** emanates from the lebanese civil scientists society.

- The autonomy of the civil society from the government is essential. Having already described the passive role of Lebanon’s civil society, it becomes clear that the only solution available is that the everyday citizen takes charge. Even within the contradictions of the current political system, such a viable economical project will undoubtedly be encouraged.



ملتقى التأثير المدني  
civic influence hub





Hill Lakes,  
Tannourine,  
North  
Lebanon

*Clement Tannouri*  
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CHASSE D'INSTANTS  
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## CONCLUSION

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### **THE AWAKENING OF A NATIONAL CONSCIENCE AROUND WATER AND ITS IMPLICATIONS FOR THE FUTURE**

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Since the end of the Second World War, Arab oil has flooded the world market, generating an unimaginable amount of regional wealth rarely seen in a global geo-economic context.

An emphasis on the abundance of oil in the Middle-East has diverted attention away from real productivity, resulting in serious questions concerning the future of the region's economy.



Nahr  
Barouk,  
Mount  
Lebanon

**The Middle-East in fact offers a perfect counter-example to the saying “no pain, no gain.” The effortless revenues generated by the Arab oil has drowned the people of the region in a stupor of opulence. It therefore comes as no surprise that the local economic mentality remains hostage to the influence of revenues generated by oil. Our young graduates hold such business in high-esteem and pursue careers that allow them to tap into this easy wealth. Are they so wrong in believing so? Can we blame them?**

Experts estimate that oil will continue to flow at the current rate for another 50 years before reserves are exhausted. The region’s economies need to develop alternative models and switch to more sustainable industries in time for future generations, so they need not to deal with our lack of foresight.

On another note, the revolutions in the region are a clear indication that the current governing systems are instable and weak. Aside from the regional powers’ inability to govern their own people, it must be mentioned that oil revenues no longer guarantee sustainable sources of employment and wealth. As a result, income disparities are increasing as the economy becomes ever more volatile.



In Lebanon, revenues generated from regional activities are not being reinvested in the creation of a sustainable economic model, resulting in serious revenue discrepancies. Such serious social imbalances add pressure to an already explosive political situation that has been endured for far too long.

Why has the path towards a stable national economy been shut down? Why do we not realize that channeling our efforts towards establishing a solid economy guarantees a more productive future in the long run?



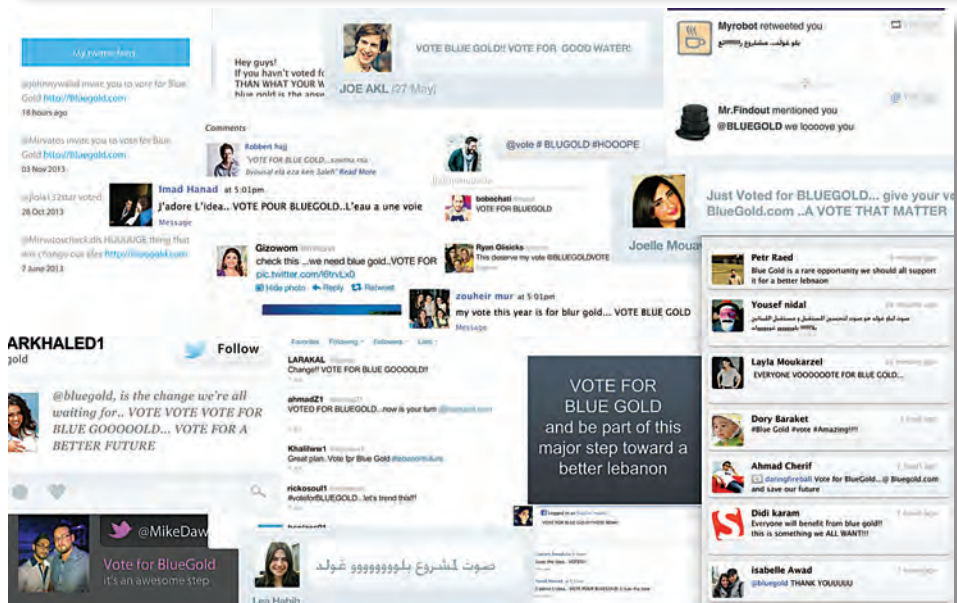
**Project BLUE GOLD's 5-Year Plan is a step towards awakening national conscience and achieving economic preeminence and equilibrium for Lebanon. If BLUE GOLD succeeds, Lebanon will emerge as a model for economic growth, social conviviality and inspiration for all Arab youth seeking viable solutions for their future.**



**The main impact of such revolutions will change the balance of power by giving preeminence to the economy over politics. The economy becomes the highest ranked subject on every politician's item list and a motivational engine for policy creation.**

The new management model for the lebanese water sector can also pave the way to a new economic revolution in the Arab world. The creation of a national conscience around water can inspire Arab citizens towards a conciliatory revolution beyond the shortcomings of ideology, demagoguery and confessionalism.

What better cause than a “Liquid Revolution,” by its nature transparent, neutral and free of ideology?



By harnessing our fears and mobilizing around **BLUE GOLD**'s 5-Year Plan, we will lay the ground work for a strategic regional and positive victory!

For the first time, Lebanon will find a socio-economical equilibrium. People will see a reason for building a modern State and will set an example for neighboring countries also destabilized by demagoguery, sectarianism and confessionalism.

Lebanon can inspire genuine change and influence the region for the better. By shifting into economic overdrive, Lebanon will push the Middle East into a transformational whirlpool in which new markets will be created. Singapore and Switzerland were able to achieve changes through federative economies as will Lebanon in the Twenty-First Century.



Lebanon



Switzerland



Singapore

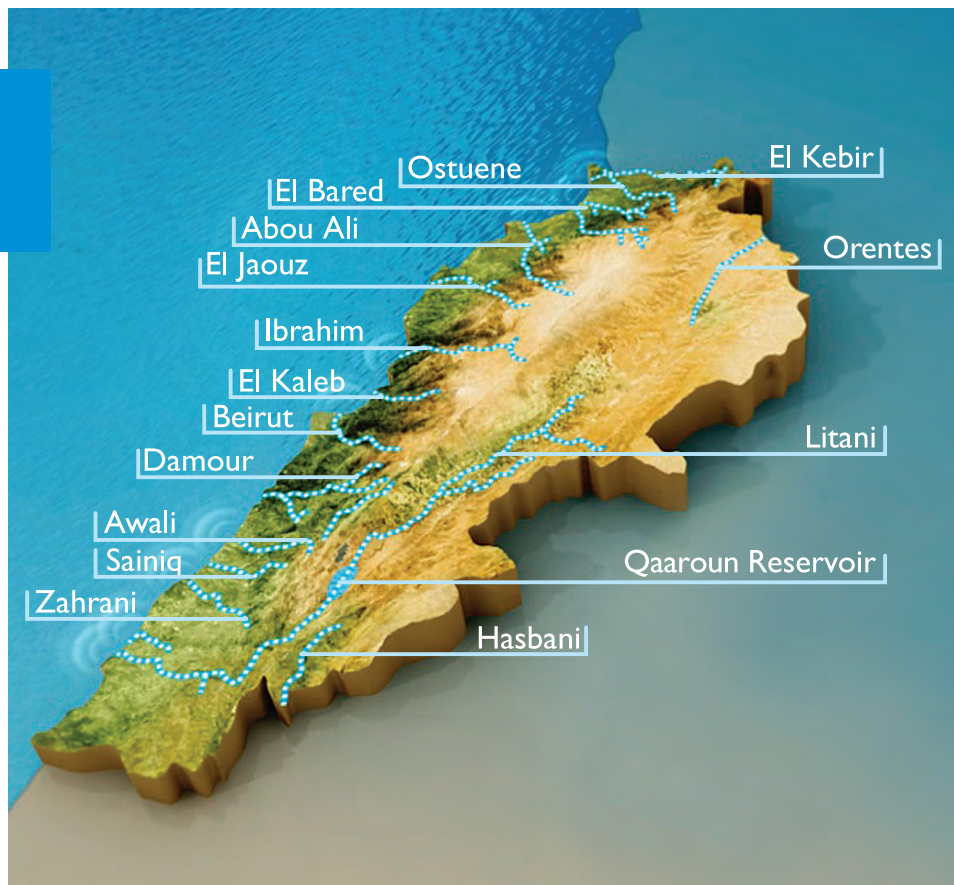
One of the most anticipated and sought-after federative projects on **BLUE GOLD**'s agenda is the nationwide introduction of digital tools that will enable the National Water Council and all its affiliated bodies to be more efficient and responsive. In other words, the management will always be in contact with stakeholders, partners, investors, customers and citizens. The implementation of such a system will also secure better financial management and faster, more equitable distribution of water revenues. Regional development will be accelerated, inspiring more investments and healthier competition between regions. The water plan will become a powerhouse for regional development and will encourage industries like tourism, agriculture, real estate and healthcare to grow in places that have seldom benefited from outside investment.



**Another extraordinary constructive aspect to this national project also exists. The geographic distribution of Lebanon's rivers systematically covers zones influenced by political parties and religious communities.**

The national water 5-Year Plan is thus a great way to mobilize and unite Lebanon's political forces. Not only would each party advance its own fiefdom, but the nation would also reap rewards from such an all encompassing "new deal".

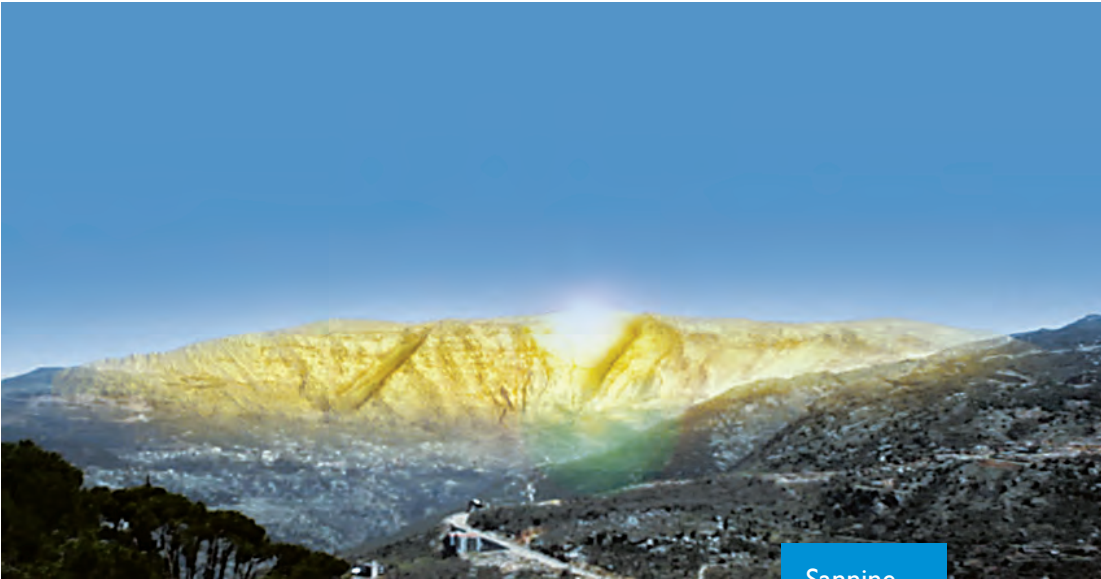
Rivers  
of Lebanon,  
a unifying factor  
for the nation



**BLUE GOLD** will trigger a constructive process unseen in Lebanon.

**A collective and participative consciousness among citizens will be created.** A comprehensible and transparent financial plan is being drafted offering everyone participatory access to the project. The proposal will call on all Lebanese citizens to contribute to the funding process helping rid the project of any potential monopolies. The open shareholding plan will also offer a wide range of direct benefits for all its subscribers. A similar proposal helped execute the Suez Canal in Egypt over a century ago. Project **BLUE GOLD** promises to be just as, if not more, strategic and beneficial for all of Lebanon.





Sannine,  
Mount  
Lebanon

**Let us join our voices and together achieve the BLUE GOLD 5-Year Plan! Your vote is the key to turning our water into gold.**

**The victor is Lebanon**

**The big winner is you**

**For our past, for our present,  
for our future.**


**Long live Lebanon !**





Qaraoun  
Lake,  
Bekaa,  
Lebanon





*“There are no inaccessible dreams,  
only people who do not know how  
to dream.”*

*Clement Tannouri*

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# LEXICON

**Antitrust:** Refers to federal laws disallowing companies from monopolizing markets, engaging in price discrimination or price fixing, or otherwise restraining free trade.

**Aquifer:** An underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well.

**Basin:** A natural depression on the earth surface, typically containing water. The tract of country that is drained by a river and its tributaries or drains into a lake or sea.

**Cadmium:** A metal used primarily for metal plating and coating operations, including transportation equipment, machinery and baking enamels, photography, television phosphors, batteries and pigments. The major sources of Cadmium in drinking water are corrosion of galvanized pipes, erosion of natural deposits, discharge from metal refineries, runoff from waste batteries and paints. Cadmium causes the following health effects when people are exposed to it at above the maximum contaminate level in the: **Short term:** nausea, vomiting, diarrhea, muscle cramps, salivation, sensory disturbances, liver injury, convulsions, shock and renal failure. **Long-term:** kidney, liver, bone and blood damage.

**Catchment:** The action of collecting water, esp. the collection of rainfall over a natural drainage area.

**Dams:** A barrier that impounds water or underground streams. Dams generally serve the primary purpose of retaining water, while other structures such as floodgates or levees (also known as dikes) are used to manage or prevent water flow into specific land regions. Hydropower and pumped-storage hydroelectricity are often used in conjunction with dams to generate electricity. A dam can also be used to collect water or for storage of water which can be evenly distributed between locations.

**Desertification:** The process by which fertile land becomes desert; typically as a result of drought, deforestation, or inappropriate agriculture.

**Forestation:** The planting of forests; the planting of trees over a wide area.

**Greywater:** Wastewater generated from domestic activities such as laundry, dishwashing, and bathing, which can be recycled on-site for uses such as landscape irrigation and constructed wetlands. Greywater differs from water from the toilets, which is designated sewage or blackwater to indicate it contains human waste.

**Groundwater:** Water located beneath the earth surface in soil pore spaces and in the fractures of rock formations.

**Hectare (ha):** A metric unit of area defined as 10,000 square metres (100 m by 100 m), and primarily used in the measurement of land.

**Levees, also a dike (dyke), embankment, floodbank or stopbank:** *An elongated naturally occurring ridge or artificially constructed fill or wall, which regulates water levels. It is usually earthen and often parallel to the course of a river in its floodplain or along low-lying coastlines.*

**Outfall:** *The discharge point of a waste stream into a body of water; alternatively it may be the outlet of a river, drain or a sewer where it discharges into the sea, a lake or the like.*

**Perennial River:** *A river that has continuous flow in parts of its streambed all year round during years of normal rainfall.*

**Rainwater harvesting:** *The accumulation and deposition of rainwater for reuse before it reaches the aquifer. Uses include water for garden, water for livestock, water for irrigation, etc. In many places the water collected is just redirected to a deep pit with percolation. The harvested water can be used for drinking water as well if the storage is a tank that can be accessed and cleaned when needed.*

**Submarine Springs or Sea Springs:** *A spring of water issuing from the bottom of the sea.*

**Surface Freshwater Source:** *Water collecting on the ground or in a stream, river, lake or wetland; it is related to water collecting as groundwater or atmospheric water.*

**Transparency:** *As used in science, engineering, business, the humanities and in a social context more generally, implies openness, communication, and accountability. Transparency is operating in such a way that it is easy for others to see what actions are performed. For example, a cashier making change at a point of sale by segregating a customer's large bills, counting up from the sale amount, and placing the change on the counter in such a way as to invite the customer to verify the amount of change demonstrates transparency.*

**Wastewater:** *Any water that has been adversely affected in quality by human influence. Municipal wastewater is usually treated in a combined sewer, sanitary sewer, effluent sewer or septic tank. Sewage is the subset of wastewater that is contaminated with feces or urine, but is often used to mean any wastewater. Sewage includes domestic, municipal, or industrial liquid waste products disposed of, usually via a pipe or sewer (sanitary or combined).*

**Watchdog:** *An independent person or organization whose task is to police a particular industry, ensuring that member companies do not act illegally.*

**Watershed:** *The area of land where all of the water that is under it or drains off of it goes into the same place.*



# ABBREVIATIONS

<b>BML</b>	<i>Beirut Mount Lebanon.</i>
<b>CDR</b>	<i>Council for Development and Reconstruction.</i>
<b>CFoD</b>	<i>Central Fund of Displaced.</i>
<b>CIH</b>	<i>Civic Influence Hub.</i>
<b>CoS</b>	<i>Council of the South.</i>
<b>GDP</b>	<i>Gross Domestic Product.</i>
<b>ha</b>	<i>hectare 10,000 m<sup>2</sup>.</i>
<b>IRBM</b>	<i>Integrated River Basin Management</i>
<b>IRR</b>	<i>Internal Rate of Return</i>
<b>IWRM</b>	<i>Integrated Water Resources Management.</i>
<b>LRA</b>	<i>Litani River Authority.</i>
<b>M<sup>3</sup>/m<sup>3</sup></b>	<i>Cubic Meters.</i>
<b>MoA</b>	<i>Ministry of Agriculture.</i>
<b>MoEW</b>	<i>Ministry of Energy and Water.</i>
<b>NGO</b>	<i>Non-Governmental Organization.</i>
<b>NWSS</b>	<i>National Water Sector Strategy.</i>
<b>PPP</b>	<i>Public Private Partnership.</i>
<b>PSP</b>	<i>Private Sector Participation.</i>
<b>RBOs</b>	<i>River Basin Organizations.</i>
<b>SMEs</b>	<i>Small and Medium size Enterprises.</i>
<b>UNDP</b>	<i>United Nations Development Program.</i>
<b>WEs</b>	<i>Water Establishments.</i>
<b>NWC</b>	<i>National Water Council</i>
<b>WS</b>	<i>Water Sector</i>
<b>WUAs</b>	<i>Water User Associations.</i>

## *Clément Tannouri:*

- 4 - 5 Manaitra, Mount Lebanon.
- 90 Hill Lakes, Tannourine, North Lebanon.
- 98 - 99 Qaraoun Lake, Bekaa, Lebanon.

## *Lila Kasparian:*

- 14 Afqa, Mount Lebanon.
- 15 Barouk Cedars, Mount Lebanon.
- 16 Nahr Ibrahim, Mount Lebanon.
- 17 Springs West Bekaa Highlands, Lebanon.
- 18 Qaraoun Lake, Bekaa, Lebanon.
- 19 Ain Zhalta Cedars, Mount Lebanon.
- 20 Laqlouq Hill Lakes, Mount Lebanon.
- 22 Chouwane Lake, Nahr Ibrahim, Mount Lebanon.
- 40 Afqa, Mount Lebanon.
- 46 Beirut Mount Lebanon.
- 55 Chabrouh Dam, Mount Lebanon.
- 56 Saghbine, West Bekaa, Lebanon.
- 57 Nahr el Jawz, North Lebanon.
- 58 Qadisha Valley, North Lebanon.
- 63 Bisri, South Lebanon.
- 64 Qammoua, North Lebanon.
- 66 Moukhtara, Mount Lebanon.
- 70 Marj Bisri, South Lebanon. Ammiq, West Bekaa, Lebanon.  
Nahr Barouk, Mount Lebanon. Barouk Cedars, Mount  
Lebanon. Afqa, Mount Lebanon. Qammarine, North  
Lebanon. Baaqlin, Mount Lebanon.
- 71 Jabal Moussa, Mount Lebanon. Hermel, Bekaa, Lebanon.  
Qammarine, North Lebanon. Kammoua, Akkar, North  
Lebanon. Ain Zhalta Cedars, Mount Lebanon.
- 82 Tannourine Cedars, North Lebanon.
- 83 Marj Bisri, South Lebanon. Lhassa, Mount Lebanon.  
Mar Shim plain, Hermel Bekaa, Lebanon.
- 85 Rachaya Village, South Lebanon.
- 86 Bekassine, South Lebanon. Nahr Ibrahim, Mount Lebanon.  
Assi River, Bekaa, Lebanon.
- 87 Laqlouq Hill Lakes, Mount Lebanon.
- 91 Nahr Barouk, Mount Lebanon.

## *Independent Productions:*

- 97 Sannine, Mount Lebanon.









We, Lebanese citizens, feel helpless in controlling our destiny.  
We contemplate our nation being depleted, acknowledge its depletion,  
and nevertheless, let go.  
Selfish enough to grant our children a heritage and a country  
where life will become an everlasting challenge.  
Is it right? Is it fair? Is there a way out?  
With its first project "Blue Gold", the Civic Influence Hub believes that there is  
a way out and more precisely, there is a strategic non-political solution that  
could be the answer. **It starts with Water.**

### **THE WATER OF LEBANON**

Bountiful enough and geographically spread all over our beloved country  
to become the true pure and generous blood that nurtures  
and unites the nation.

**The reading of Blue Gold 5-year Plan is a must.**

You will discover that what we all consider as a commodity is indeed our  
most precious wealth, more valuable than oil and gas,  
with the virtue of being endlessly sustainable.  
You will also discover how water not only will bring wealth and growth to the  
Lebanese economy and the citizen, but could engage the nation  
on the road of National Conscience.

**[www.bluegoldlebanon.com](http://www.bluegoldlebanon.com)**  
**[www.cihlebanon.org](http://www.cihlebanon.org)**