بنام خداوند جان و خرد کز او برتر اندیشه بر نگذرد

Developing a Vision and the Elements of a Dynamic Roadmap for the Lake Urmia Basin

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1st International Conference on Lake Urmia, Freie Univercity, Berlin, Germany

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Our Goal: What Should it be?

To define:

A realistic vision and to identify critical elements of an integrated and coherent rehabilitation, preservation and monitoring roadmap with a clear understanding of our short-term, intermediate and Long-Term Satisfactory results and the transitions in between

for saving Lake Urmia and to define steps that should be taken to set this roadmap in motion

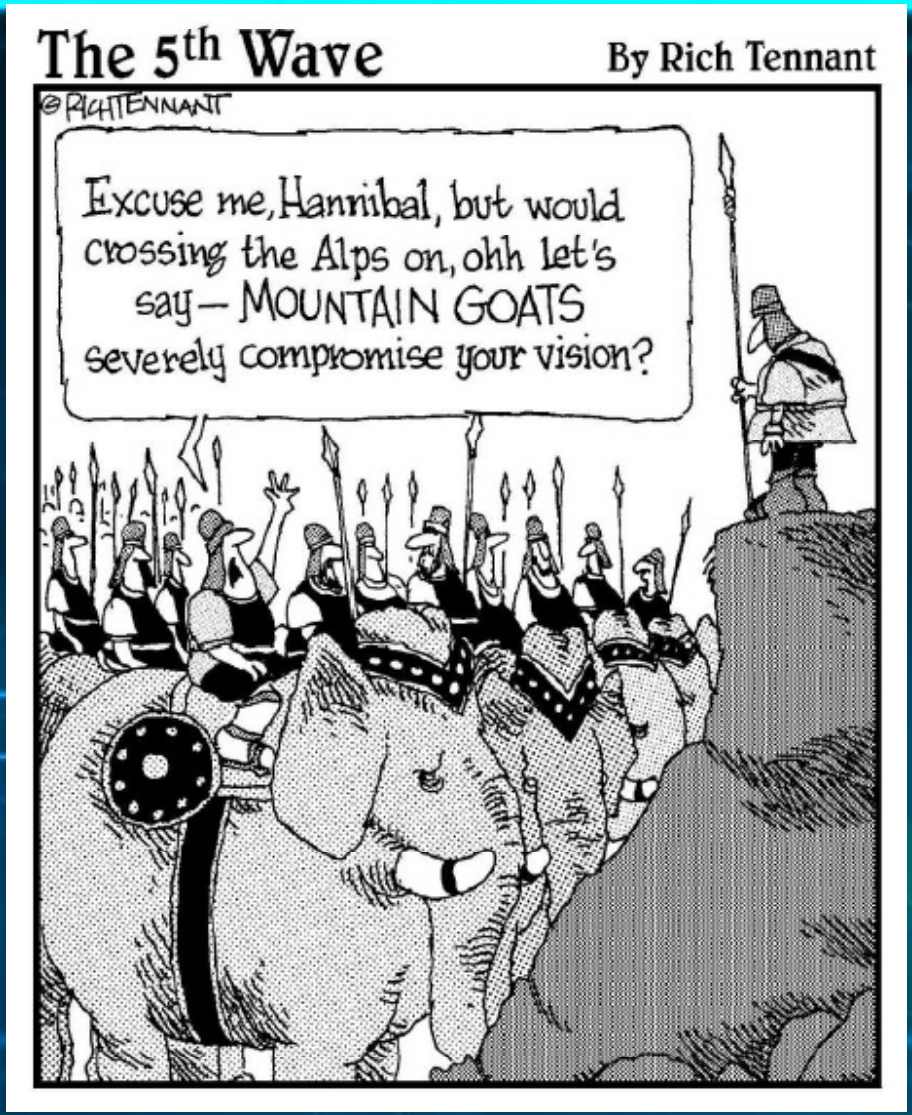
Avoid the "Yes I Know!" Syndrome

- More often than not:

"The Danger is not in what WE DON'T KNOW, it is in what WE KNOW, But IT Just Ain't."

Ernest Hemingway

Determine Your Core Envisioned Future



Our Secondary Goal

To consolidate an spectrum of solutions

(which covers the entire lake basin, its human environment, Socio-economic & Political Aspects, Ecological, Hydrological, Surface and Groundwater Hydraulics, Geological/Geotechnical Aspects, Climatology and Drought, Global Warming Concerns and Forecast Simulations, etc.) to

THOROUGHLY Develop, refine, and deliver

The Lake Watershed Revitalization Roadmap

which consistently achieves the stated objectives

through measurable and verifiable indicators

According to pre-defined measurement methodologies!

We Need

- Structured thinking:

Integrate subjects/solutions and the relevant hierarchical relationships

- Analytical skills:

Provide structural and simulation models for the revitalization of LU watershed

- GREAT communication skills:

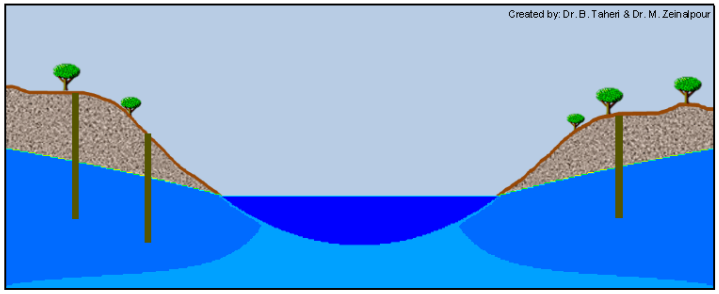
Attract the informed participation of all the stakeholders in the process of revitalization of LU Watershed

Analytical Skills?

- We should include a wide variety of skills from
  - Humanities (Social, Economical, Political, etc.)
  - Scientific (Mathematical, Physical, Bio(Chemical), etc.)
  - Statistical, Probabilistic, Stochastic, Heuristic, etc.
  - Numerical, Experimental, etc.

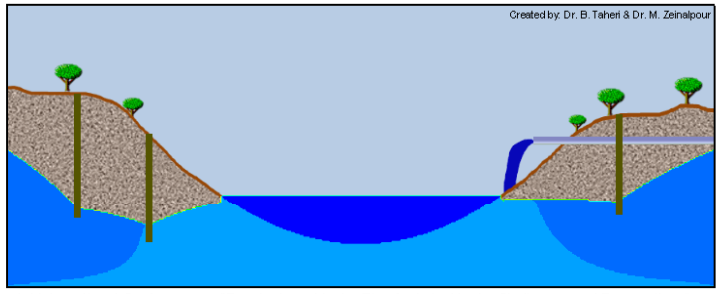
Some Good Simplified Model Examples of Numerical Fluid Dynamics Analytical Skills

"Schematic Simulation of Salt-Water Intrusion and Lake Surface and Height Reduction Due to Groundwater Depletion"



1st International Conference on "Developing a Master Plan for Lake Urmia: Challenges and Perspectives"
Freie University (FU), Berlin, Friday Nov. 22, 2013

Excessive Farming Effect on Groundwater Depletion & Saltwater Intrusion



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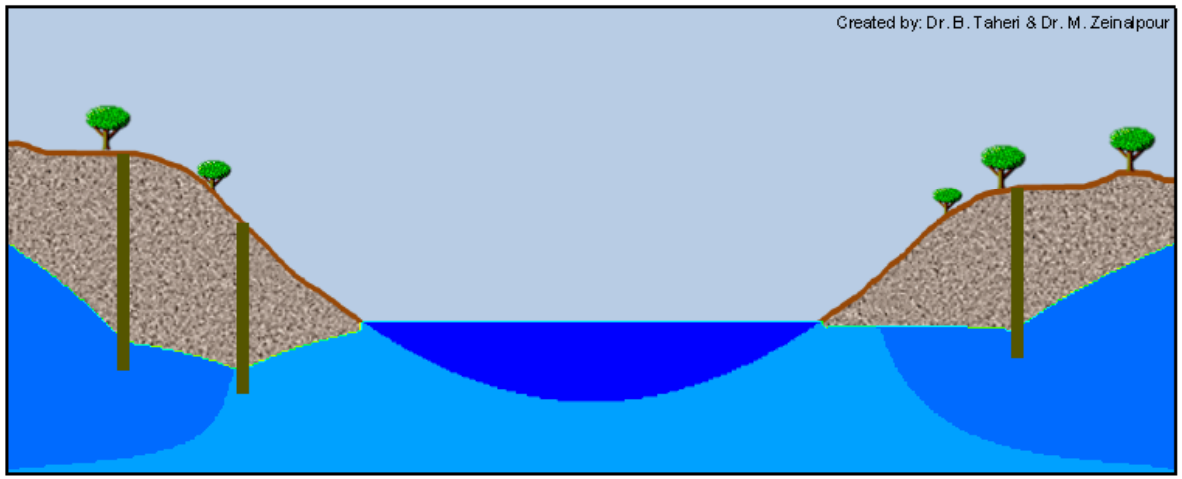
A Big No! Never Directly Charge a Salt Lake When the Surrounding GW is Depleted

Numerical Analytical Skills

An over-simplified schematic simulation of the simultaneous evaporation and groundwater recharging/replenishment effect on lake revival and saltwater push back



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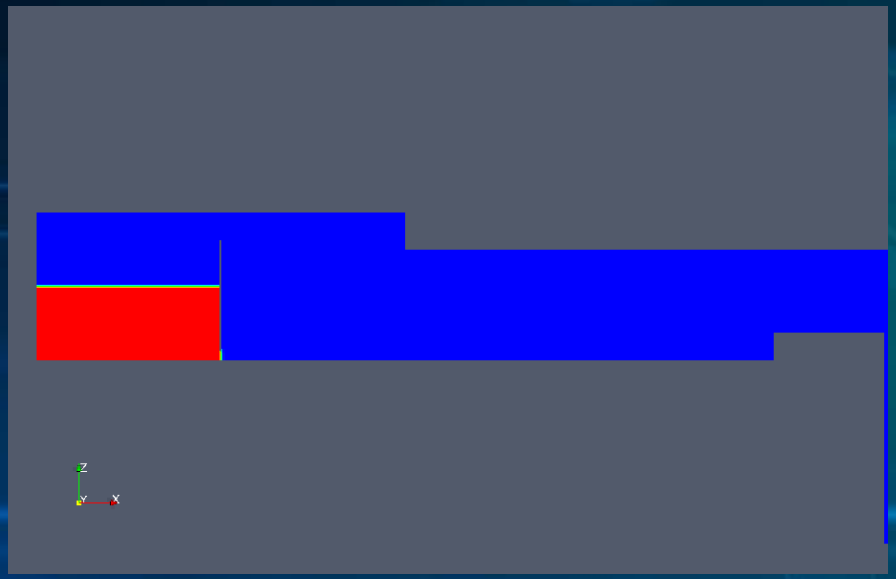
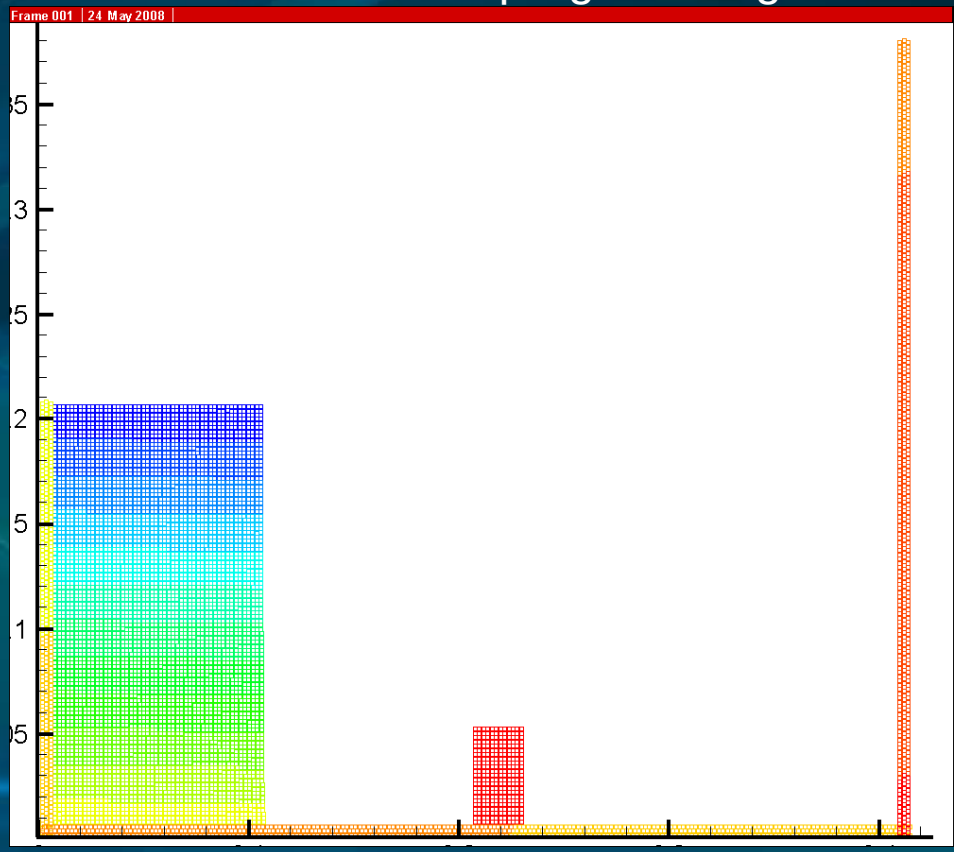
How far analytical skills can take us?

- Quite Far!
- Depending on the level of precision we need

Example of Eulerian CFD simulation of sluice gate using FVM technique and C++ object oriented programming.



Example of Lagrangian CFD simulation of dam break problem using SPH technique and object oriented C++ programming.



Step I in developing the Roadmap

- Develop a clear and unambiguous understanding of the current state
  - Data acquisition about LU based on the Revitalize the Lake Watershed (RTLW) mission
  - Organize/integrate proposals and the knowledge (current studies, solutions, models, theories, assumptions, hypothesis and so on) in an intelligent Data Bank
  - Determine the existing needs
  - Depict the current processes (in particular high impact ones)

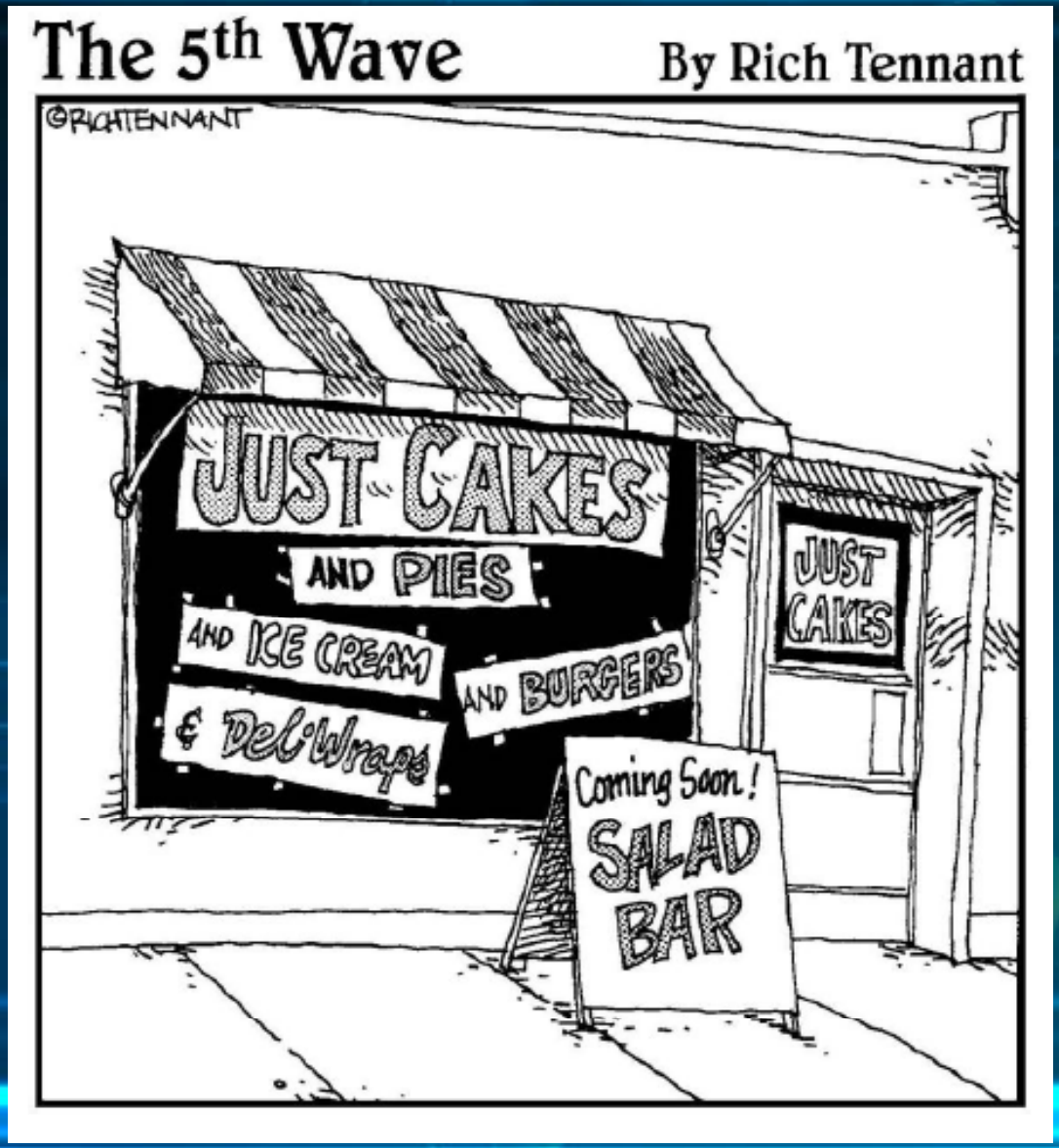
Step I Continued (Sub-steps)

- Perform comparative studies based on proper benchmarks
- Evaluate the implicit/explicit existing scenarios
- Organization (current planning/operating model)
- Cost and complexity (Linear/Non-Linear) drivers
- Business and technical assets
- Create a Data Bank of the Existing Human Resource Assets (Iranians, Iranian Ex-patriots, and Foreign Experts in many disciplines and interdisciplinary areas)
- Developing the 1st Draft of DSS

Step II in Roadmap Design

- Define the desired end state
  - Is there an existing goal-driven strategy clearly articulated into quantifiable objectives?
  - Remember: Whatever we can't measure, we can't manage!
  - Do we want to follow an annual practice of "Management by Objective"? Objectives with no real understanding, cohesion or foreseen structure?

Living and Breathing our Management By Objectives



Step II Continued

- Performance targets in terms of well thought measurable KPIs (Lead and Lag), some examples:
- Stopping the shrinking,
- Sustainability,
- Water table replenishment,
- Economic Growth/shrinking (sector by sector)
- Reduction of Water Consumption (sector by sector)
- Operating Model Improvements
- State income pattern change
- Agricultural irrigation change rate
- Regional participation

KPIs

- International participation/partnership
- Source water management
- Water sink management
- Local/regional capacity building
- Water use efficiency improvement sector by sector
- Number of illegal well closures
- Number of legal well re-assignment
- Rate of agricultural pattern change product by product
- Public participation

KPIs

- Resources actualized/planned
- Ecological indicators rebound (all indices)
- Education delivered (Total hours, # of people)
- Resources spent on R&D
- Increase/reduction in water level
- Increase/reduction in lake surface area
- Increase/reduction in lake water volume
- Changes in hydrologic indices
- Reduction in agricultural export
- Increase in tourism income
- Increase in non-agricultural employment
- Many more

KPI prioritization & categorization

- Develop a consensus on the relative importance, weight and impact of each performance factor
- Use the highest impact performance indicator of each category as the KPI
- Use the remaining indicators in each category as weighted sub-indicators

Step II Continued

- -Understanding Strategic sets of objectives and goals of all the collaborating entities, which more than often does not align with the Roadmap objectives
- Developing a tactical interpretation of desired state (Do we want a quick superficial approval or a thoroughly thought structured, success-bound guaranteed approval and cooperation.

Step II Continued

- Tactical realization of the strategy (and objectives) should be understandably delegated to the executive manager with almost absolute powers to enact the approved vision and roadmap with dynamic adaptations through control and coordination mechanisms (Delegation of powers of the Article 127 of the I.R.I. constitution). The real challenge is
  - eliciting,
  - compiling, and
  - gaining agreement

  on what this desired end state means to each of the stakeholders.
- true mastery of communication and facilitation skills many are not comfortable with or haven't exercised on a regular basis.

Step II Continued: Linear VS Non-Linear, Complexity

- clear understanding of the complex very nonlinear interactions of any organization (and their unintended consequences) is critical to a clear understanding of the desired end state and its realization.

Step III in Roadmap Design

- Conduct Gap Analysis ➔ Actionable Activities ➔ Gap Closures
  - Gap analysis based on the current state evaluation and benchmarking
    - Organizational
    - Functional
    - Ecological, Technological,
    - Processes
    - Resources and economic incentives

  Etc.

  Extraction of Actionable Items for Gap Closure

Identification of Participating Entities

- Department of the Environment
- Ministry of Energy
- Ministry of the Interior
- Ministry of Agriculture
- Ministry of Education
- Ministry of Health
- Ministry of Industry, Mining and Commerce
- Ministry of Higher Education
- Ministry of Foreign Affairs
- Ministry of Higher Education
- Ministry of Education
- Ministry of Housing, Roads and Urban Development
- Tourism Organization

Other Stakeholders

- Parliament
- NGOs
- The Media
- General Public

International Organizations

- UN
  - UNESCO
  - UNFCCC
  - UNEP
  - UNDP
  - UNIDO
- Financial Organizations
  - WB (GEF)
  - IMF
  - IDB

Other International Involvement

- EU
- USAID
- Japan (JICA)
- Individual European Countries, e.g. German D.A.D.

Step IV, In Roadmap Design

- Prioritize
  - In essence we want to find out what is FEASIBLE and what has the HIGHEST VALUE
  - We have to find out the DRIVING FACTORS to identify both, in particular identifying the highest value.
    - So, we will need to develop a List of drivers

-Now it is obvious that we need PUBLIC and STAKEHOLDER PARTICIPATION

  - Stakeholders should be keenly aware of the point system and what they are scoring

Step V in Roadmap Design

- Discover the Optimum Sequence (Predecessor-Successor Relationships)
  - Initiatives are known now
  - Prioritization is accomplished
  - Decide on an efficient sequence (Not Optimal!)
  - This will require assignment of responsibilities to different people, institutions, organizations etc. In step I we should have understood the capacities of each person/entity. Here some changes to organizations may be required. Are they ready for that? Have we thought about management of that change?

Step VI in Roadmap Design

- Develop the Roadmap
  - Now we know the current state
  - Have an understanding of the gaps
  - Have prioritized
  - Have developed the desired efficient sequence
  - So, we are ready to put together a
    - sensible,
    - defensible,
    - efficient and
    - reliable
    - Roadmap, i.e., what to do, when & where, in what order and How?

Roadmap Design

- Design LU Watershed Revival Initiative (LUWRI)
  - Determine vision/mission
  - Develop policies/strategies
  - Develop scenarios to actualize vision/mission based on policies/strategies
  - Note: Scenarios encompass the sequence of processes for LUWRI
  - Evaluate/prioritize scenarios based on FEASIBILITY and ADDED VALUE
  - Articulate the most preferred scenario (with special attention on failure watch/analysis)

Roadmap Design

- Design LUWRI (continued)
  - Develop plans, programs, projects and the relevant hierarchical goals/objectives/targets
  - In parallel, develop the process structure of LUWRI
  - Develop action plans
  - Design the hierarchical organizational structure with proper central command and distributed decision making/operation direction peripheries
  - Determine the driving insentives to attract STAKEHOLDERS

Continued

- Communicate the Roadmap
- Try to explain it as simple as possible for each stakeholder

Example of an Indicator, Need for SWP

- Identification of all surface waters in the basin
- Identification of all the GW bodies within the lake's basin
- Identification of atmospheric water precipitation and its local and regional patterns
- Planning SWP for SW
- Planning SWP for GW
- Planning SWP for AW

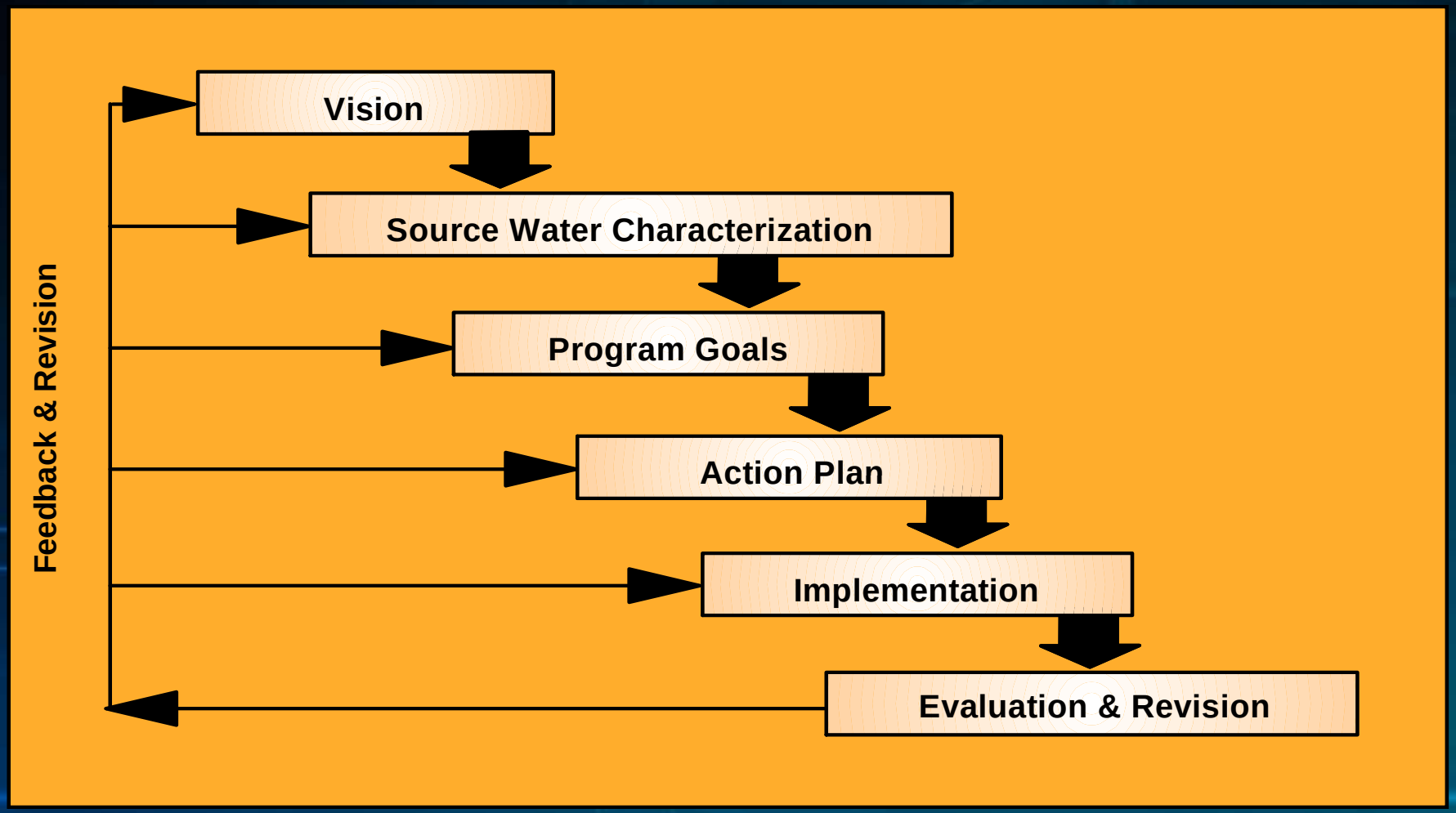
Water management/governance in Roadmap

- Water Management consideration in LUWRI

In all stages, main focus and special attention are paid to:

- **Water resource management,**
- **Stopping the LU shrinking,**
- **Sustainability,**
- **Water table replenishment,**
- **Reduction and Optimization of Water Consumption in all sectors,**
- **Economic Growth,**

Components of a Successful Source Water Protection Program as a part of the roadmap



From AWWA Standard G300

Recommendations for How to Proceed

Top-down Approach

At national level,

At provincial level

Recommendations for How to Proceed

Bottom-up Approach

At local level,

At individual level

Be Careful to Avoid Reactive Planning

Characteristics of Reactive Planning:

- **Case Dependent**, As They Occur
- **Temporary**, Limited in Time
- **Accidental**, In Reaction to Accidents or Incidents
- **Scope Limited**, Both at Present and for the Future
- **Without Methodology**, in Planning and Decision Making
- **Not Based on Actual Data** or Based on Limited Data
- **Without the Needed Supporting Chain of Tools**:

  Analysis, Planning, Executing (Doing), Getting Feedback For Continual Improvement

Use a Systemic Approach Which is:

- **Extensive**, Every Decision is Made in an Integral/Interconnected Understanding of Other Relevant Issues in Present and in the Future
- **Long Term**, For a Defined Extent of Time and Geography
- **Structured**, Shaping the Conditions Rather than Being Shaped by Conditions
- **Methodological**, Having a Logical Algorithm in Making Decisions and in Planning
- **Based on Data**, Correct, Precise, Relevant, Up-to-date
- **With Supporting Tools,** for Analysis, Planning, Acting, Continually Improving
- **Futuristic**: Innovative, Proactive (Predicting the Unfavorable Situations and Preventing Them and Shaping the Future Based on the Desired Goals)

A Cybernetic Model for LUWRI

- The model is:

Process-oriented

Articulated hierarchically

Comprehensive

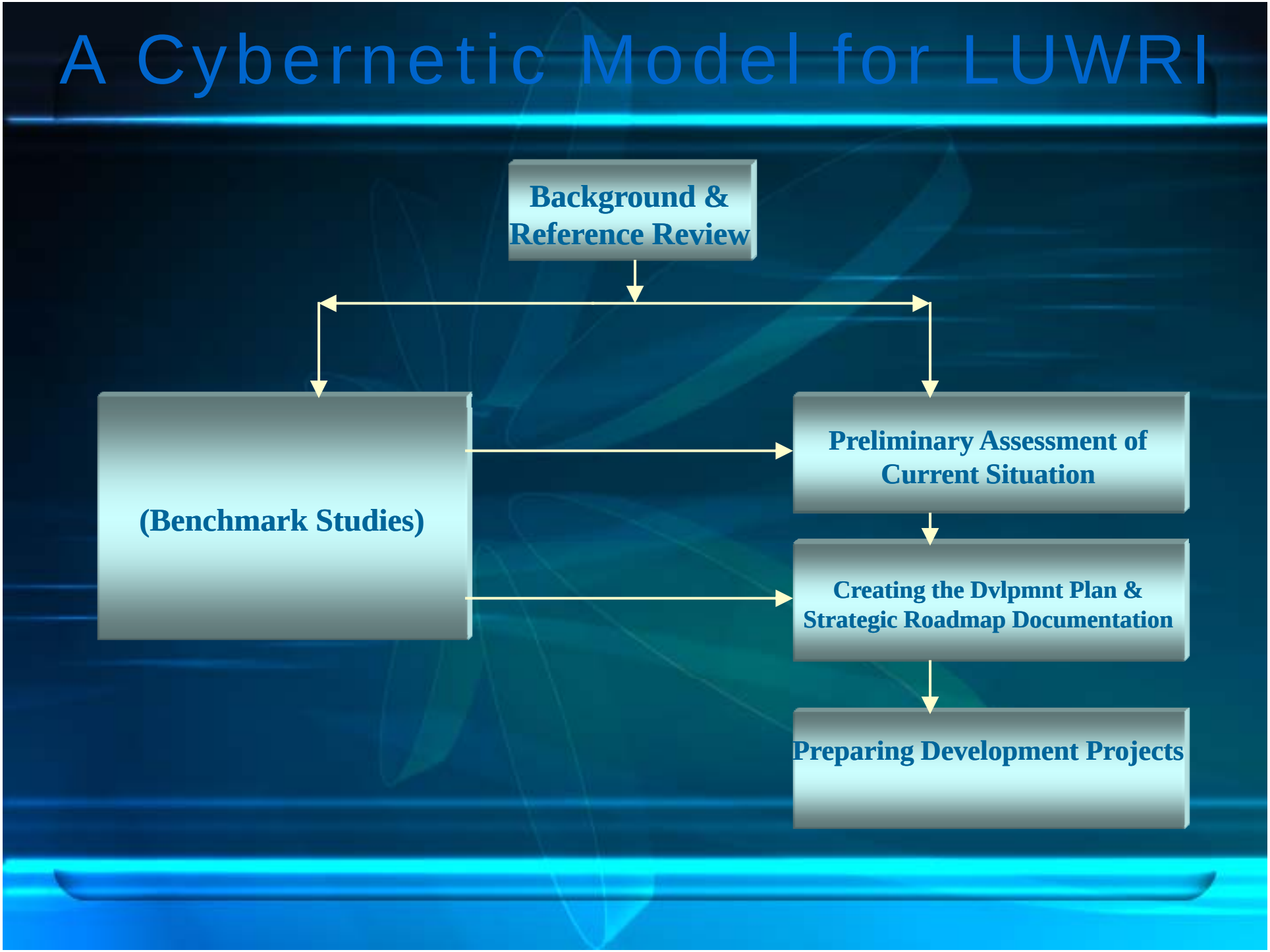
Graphical

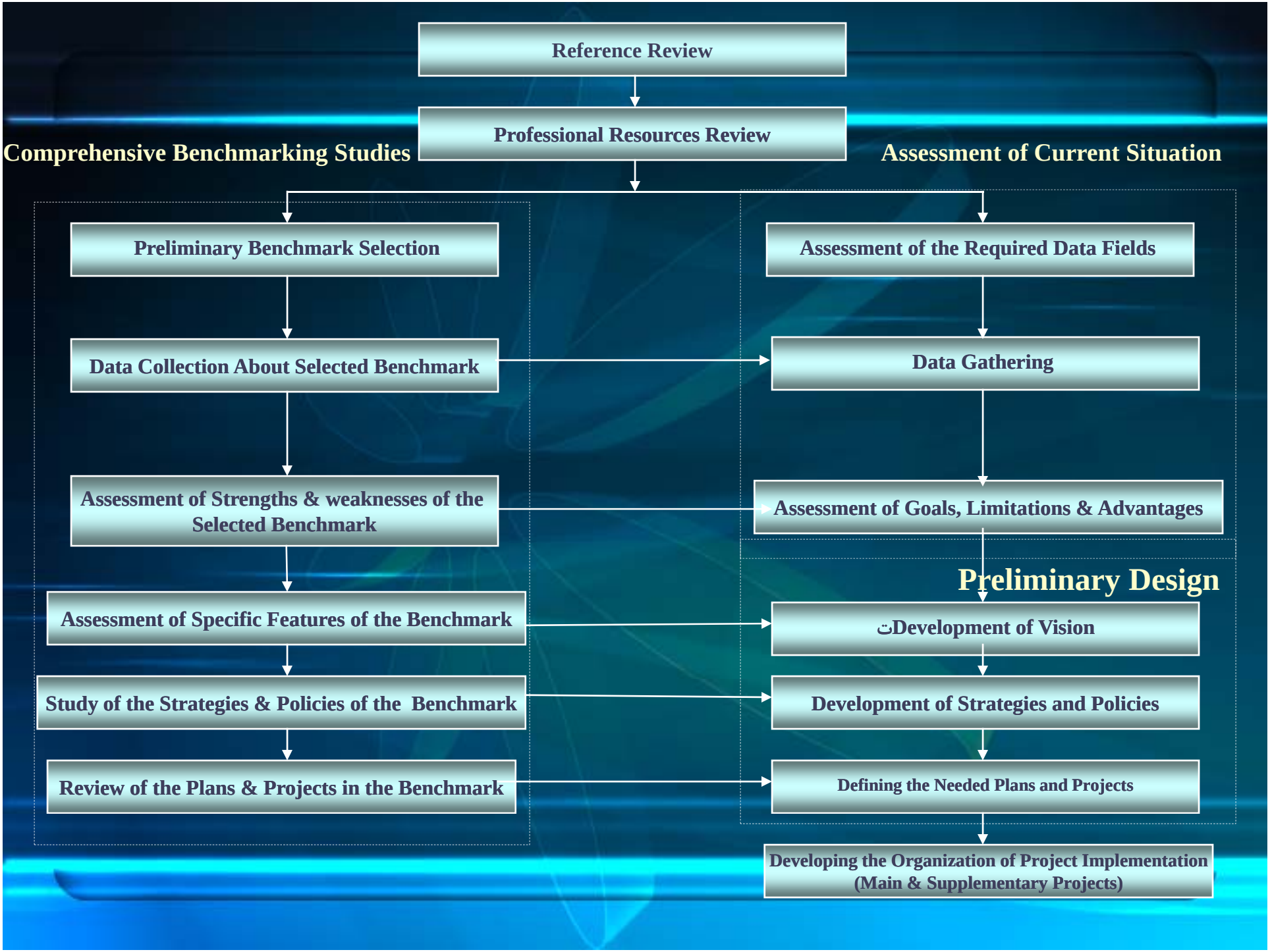
Easy-to-understand

Apt to include organizational structure

Proper for water governance and watershed management system

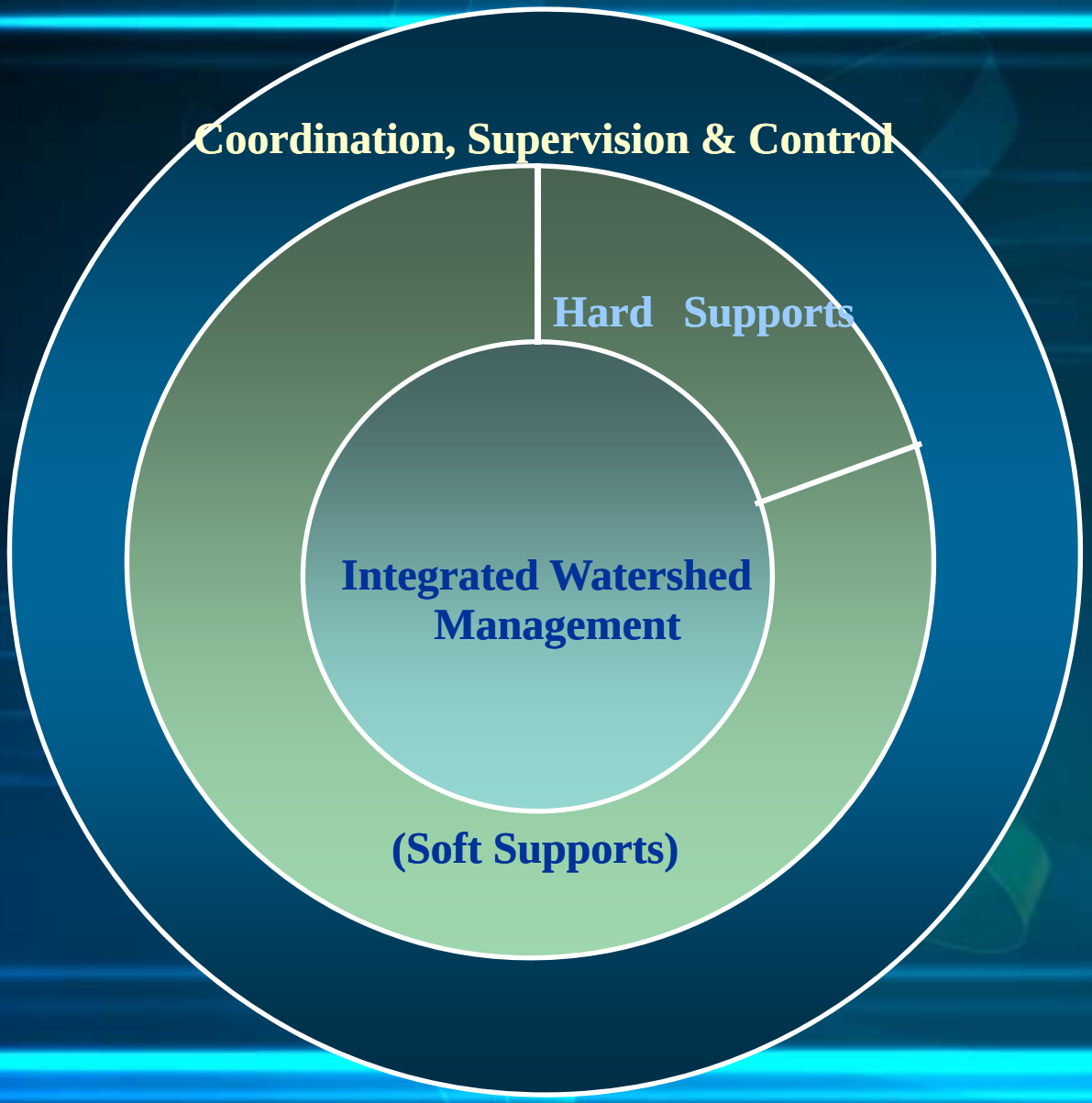
A Cybernetic Model for LUWRI




Reference Review
Professional Resources Review
Comprehensive Benchmarking Studies
Assessment of Current Situation
Preliminary Benchmark Selection
Assessment of the Required Data Fields
Data Collection About Selected Benchmark
Data Gathering
Assessment of Strengths & weaknesses of the Selected Benchmark
Assessment of Goals, Limitations & Advantages
Preliminary Design
Assessment of Specific Features of the Benchmark
تDevelopment of Vision
Study of the Strategies & Policies of the Benchmark
Development of Strategies and Policies
Review of the Plans & Projects in the Benchmark
Defining the Needed Plans and Projects
Developing the Organization of Project Implementation (Main & Supplementary Projects)

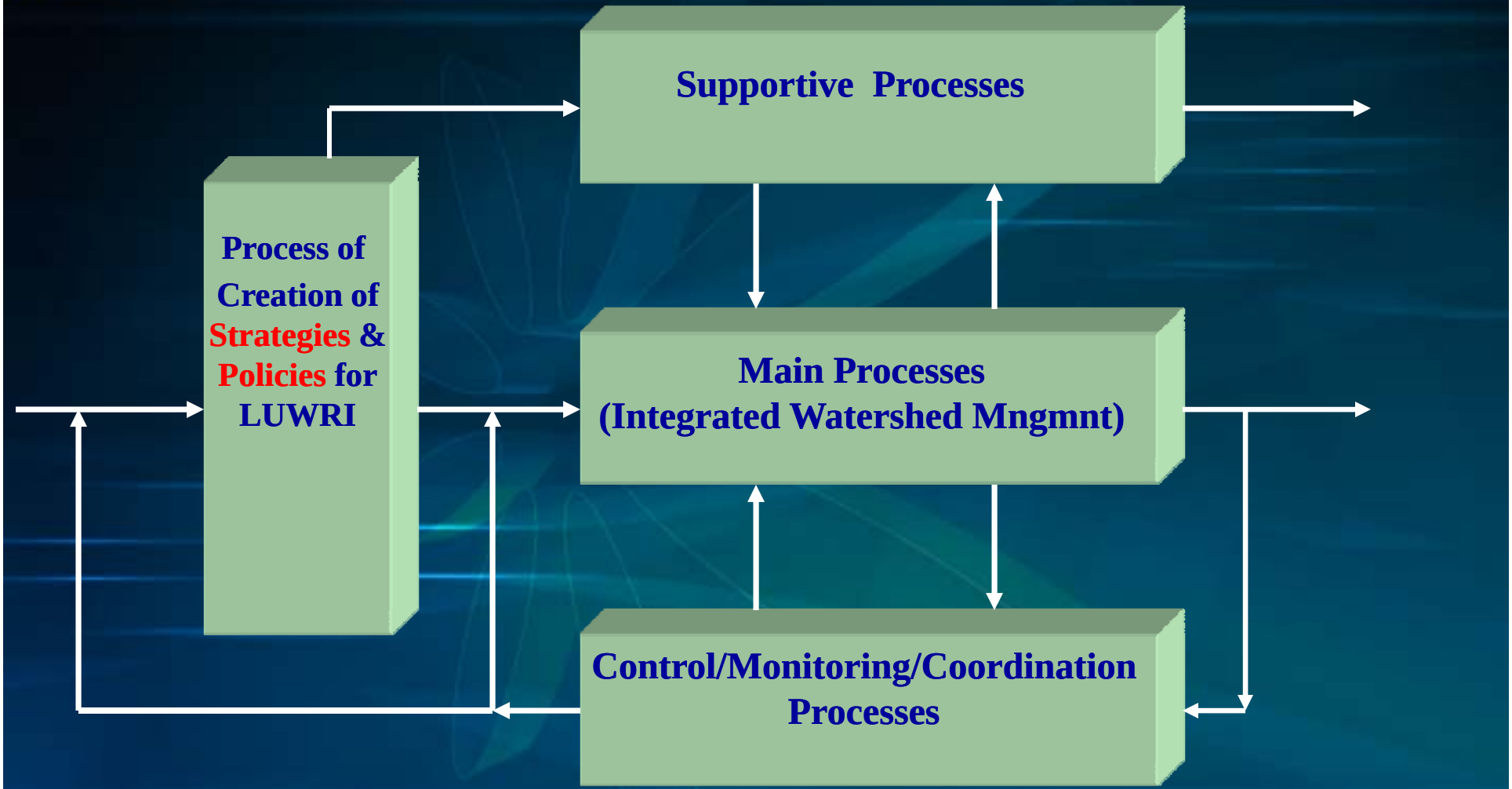
Static Structure, Cybernetic Model

1st Layer

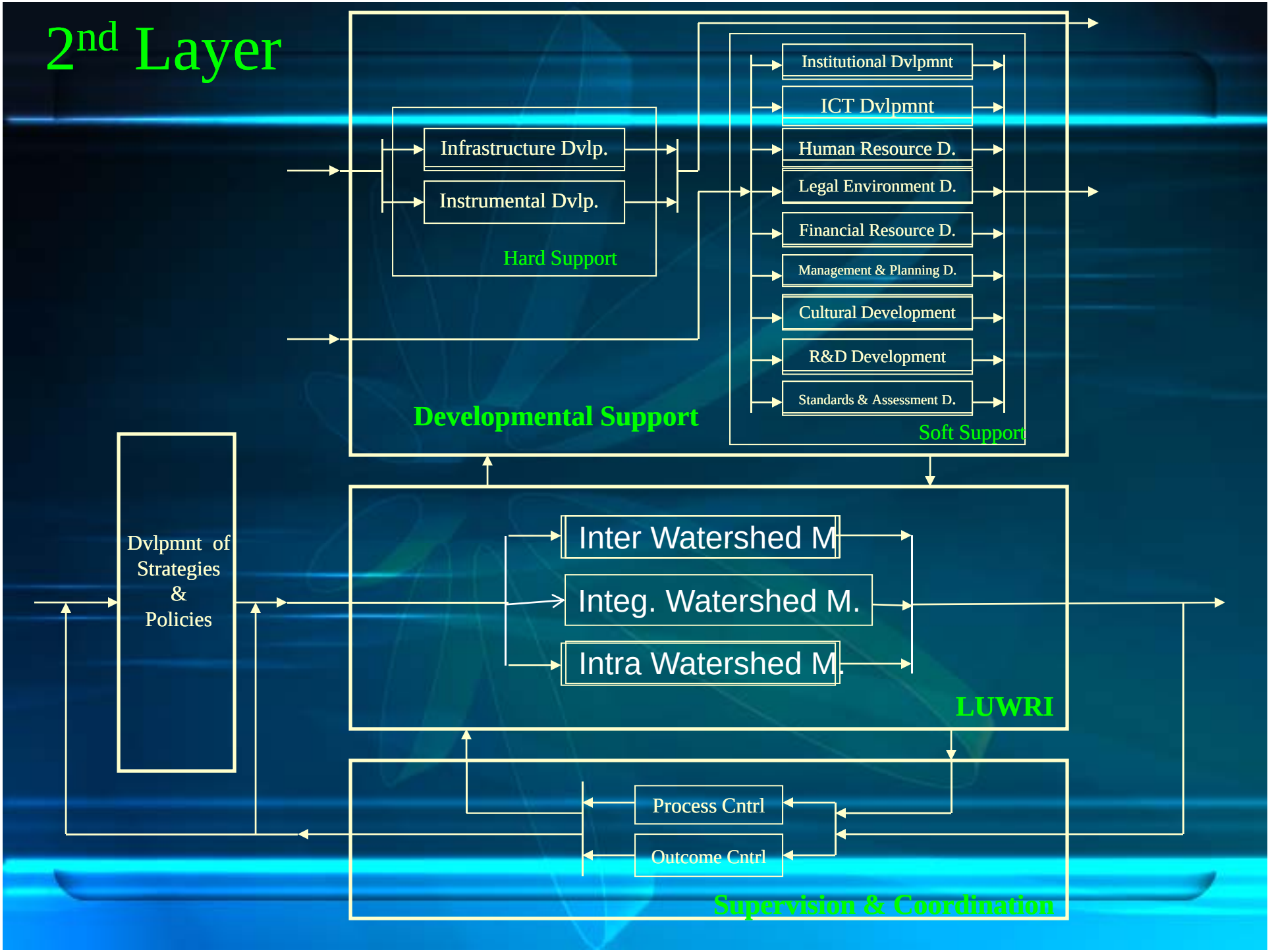


LUWRI Static Structure
2nd Layer

A Cybernetic Model for LUWRI



Strategic Plannir


2nd Layer
Infrastructure Dvlp.
Instrumental Dvlp.
Hard Support
Institutional Dvlpmnt
ICT Dvlpmnt
Human Resource D.
Legal Environment D.
Financial Resource D.
Management & Planning D.
Cultural Development
R&D Development
Standards & Assessment D.
Soft Support
Developmental Support
Dvlpmnt of Strategies & Policies
Inter Watershed M
Integ. Watershed M.
Intra Watershed M.
LUWRI
Process Cntrl
Outcome Cntrl
Supervision & Coordination

Thank you for Listening!

Any Qs?