UNDP/GEF Kura Aras Project on

Reducing Transboundary Degradation
in the Kura Aras River Basin

Demonstration Project Activities

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Presentation Outline

- Introduction
- Demonstration project Objectives
- Demonstration Project Main Activities
- Project Time table of implementation
- Issues to be Discussed in the WGs Meeting

1.1 Environmental Impact of Flow Variation

- The main environmental impacts of variation and reduction of hydrological flow can be summarized as follows:
  - **Ecosystem degradation** including: degradation of habitat, losses of species and reduced biodiversity, and increase in invasive species
  - Temporal changes in flow affecting **biological processes** such as fish migration and spawning
  - **Reduce the natural pollution assimilation capacity** of rivers, increased pollutant concentrations and reduce flux.
  - **Increased desertification** due to lowering of groundwater tables.

1.2 Definition of Ecological Flows

- **Ecological Flows** or **''Environmental flows**''' describe the quantity, quality and timing of water flows required to sustain freshwater and estuarine ecosystem, and the human livelihoods and well being that depend on these ecosystems
- Through implementation of environmental flows, water managers will be looking for achieving a flow regime, or pattern, that provides for human uses and maintains the essential processes required to support healthy river ecosystems.
- Environmental flows **do not** necessarily require restoring the **natural, pristine flow patterns** that would occur in absent of human development, use, and diversion but, instead, are intended to produce a broader set of values and benefits from rivers than from management focused strictly on water supply, energy, recreation, or flood control

1.3 Evolution of the Ecological Flows

- **Until the 1960s**, water management was focused largely on maximizing flood protection, water supplies, and hydropower generation.
- **During the 1970s**, the adverse ecological and economic effects of these development projects prompted scientists to seek ways to modify dam operations to maintain certain fish species.
- The initial focus was on the **minimum flow** necessary to preserve an **individual species** in a river.
- Environmental flows evolved from this concept of “minimum flows” and, later, “instream flows,” which emphasized the need to keep water within river channels.
- **By the 1990s**, scientists came to realize that the biological and social systems supported by rivers are too complicated to be summarized by a single minimum flow requirement.

1.3 Evolution of the Ecological Flows

- **Since the 1990s**, restoring and maintaining more comprehensive environmental flows has gained increasing support, to maintain the full spectrum of riverine species, processes and services.
- Furthermore, implementation has evolved from dam reoperation to an integration of all aspects of water management, including groundwater and surface water diversions and return flows, as well as land use and storm water management.
- **In 2007**, the Brisbane Declaration on Environmental Flows was endorsed by more than 750 practitioners from more than 50 countries. The declaration announced an official pledge to work together to protect and restore the world's rivers and lakes.
- **By 2011,** many countries throughout the world had adopted environmental flow policies, although their **implementation remains a challenge**

1.4 Aquatic biomonitoring

- Aquatic biomonitoring is the science /practice of inferring the integrated ecological condition of rivers, lakes, streams and wetlands by examining the organisms that live there.
- Artificial (and in some cases natural) changes in the physical and chemical nature of freshwaters can produce diverse biological effects ranging from the severe (such as a total fish kill) to the subtle (for example changes in enzyme levels or sub-cellular components of organisms).
- Changes like these indicate that the ecosystem and its associated organisms are under stress or that the ecosystem has become unbalanced
- The responses of biological communities, or of the individual organisms, can be monitored in a variety of ways to indicate effects on the ecosystem.
- Some approaches are suitable for field use and some have been developed specifically for use in the laboratory (particularly toxicity tests and bioassays).

1.4 Biomonitoring versus Physical and Chemical Analysis

- Although physical and chemical analyses can identify that many contaminants may be present, biological methods can integrate overall responses of the water body to combinations of all contaminants.
- Physical and chemical analyses give a measurement which is valid only for the instance in time when the sample was collected, whereas some biological methods reflect the effects of the physical and chemical conditions to which the organisms were exposed over a period of time.
- biological approaches can be cheaper than chemical methods in terms of equipment, but would normally place heavy demands on field and laboratory personnel.
- Biological monitoring should not be seen as an alternative to physical and chemical monitoring but as a useful complementary approach.
- Financial savings can sometimes be made in a monitoring programme by using biological methods to “trigger” the need for intensive and sensitive chemical analyses

1.4 Aquatic biomonitoring Main principals

- **Main Principles:**
  - Compare to defined “reference” conditions
  - Select biological group & parameters that are most susceptible to pressures, e.g. macrophytes, fish, birds, macro-invertebrates
  - Integrated assessment of impact on ecology over time
  - Approximation to EU WFD principles
- **Application in the Demo project**
  - Biomonitoring program will be developed using Macro-invertebrates (visible, widespread, easy to sample and determine, rapid response to stress increase, sufficient life time span, heterogeneous communities)
  - It will be an added value to the EU Kura-Aras project initiatives: equipment purchased, training provided, joint monitoring, etc.

2. Objectives of the Demonstration Project

- The overall objective of the demonstration project is:
  - to develop guidelines for establishing Ecological Flows in the Kura-Aras basin,
  - Conduct a series of rapid assessments of the river ecology throughout the basin, based on best international practices
  - Design and implement Biomonitoring program using Macro-invertebrates to compliment with the EU Kura-Aras project initiatives.

3. Project Activities

- **Task (1): Develop the Project work plan, including site selection and review and selection of appropriate methodologies:**
  - Development of a project work plan that will include final details of the approach to be adopted
  - Selection of the potential sites to be monitored by the project
  - A review of the scientific literature will be undertaken by the project experts to select appropriate methodologies for Biomonitoring and ecological flow rapid assessment.
  - National experts will collect the existing ecological data on the present conditions at each proposed site
  - Project Team will undertake field visits to each of the potential sites and prepare a Site Selection Report describing each site in full details.
  - The report will include the final selection of the proposed sites that will be monitored by the project to be endorsed by the countries individually

3. Project Activities

- **The initial assessments of the proposed sites shall include:**
  - the geographical extent
  - present environmental condition
  - summary of the socioeconomic data related to the utilization of the river (ecosystem values & functions)
  - ecological importance of the river reach in a local and regional context
  - species or features of special significance
  - other relevant aspects such as important cultural sites
  - Historical series of annual flows at the site
  - past and present problems related to water management

3. Project Activities

- **Task (2): Develop and implement a Baseline Data Collection Programme for Environmental Flow and Ecosystem Function Reviews:**
  - Design a Biophysical and Ecosystem Function Data Collection Programme based on the selected assessment methodology.
  - Basic laboratory and monitoring equipment will be provided to the countries in support of these activities
  - Design and develop GIS database for the monitoring data
  - Training on Biomonitoring and Rapid Ecological Assessment will be given to the responsible staff in each country
  - multi-disciplinary teams of experts will conduct the first monitoring campaign to describe the different functions of the ecosystem at each site.
  - The team shall also assess non-flow related impacts at each site.

3. Project Activities

- **Task (3): Undertake environmental flow and river ecology rapid assessments for selected sites at different seasons to identify flow variation impacts:**
  - The national experts will continue the field monitoring campaigns (7 campaigns) of Rapid Ecological assessment for the selected sites (seasonal variation)
  - Provide detailed description of 3 key scenarios for river flow variations and their implications on the biophysical and ecosystem function.
  - Preparation of 3 National and one Regional Summary Reports that describes the biophysical, ecological, and socio-economic impacts of the variation of the flow regime (seasonal & annual) on the selected sites
  - The summary report will include recommendations for the environmental flow to be adopted at each site and will form the basis for technical guidelines on the determination of environmental flows in the Kura-Aras basin

3. Project Activities

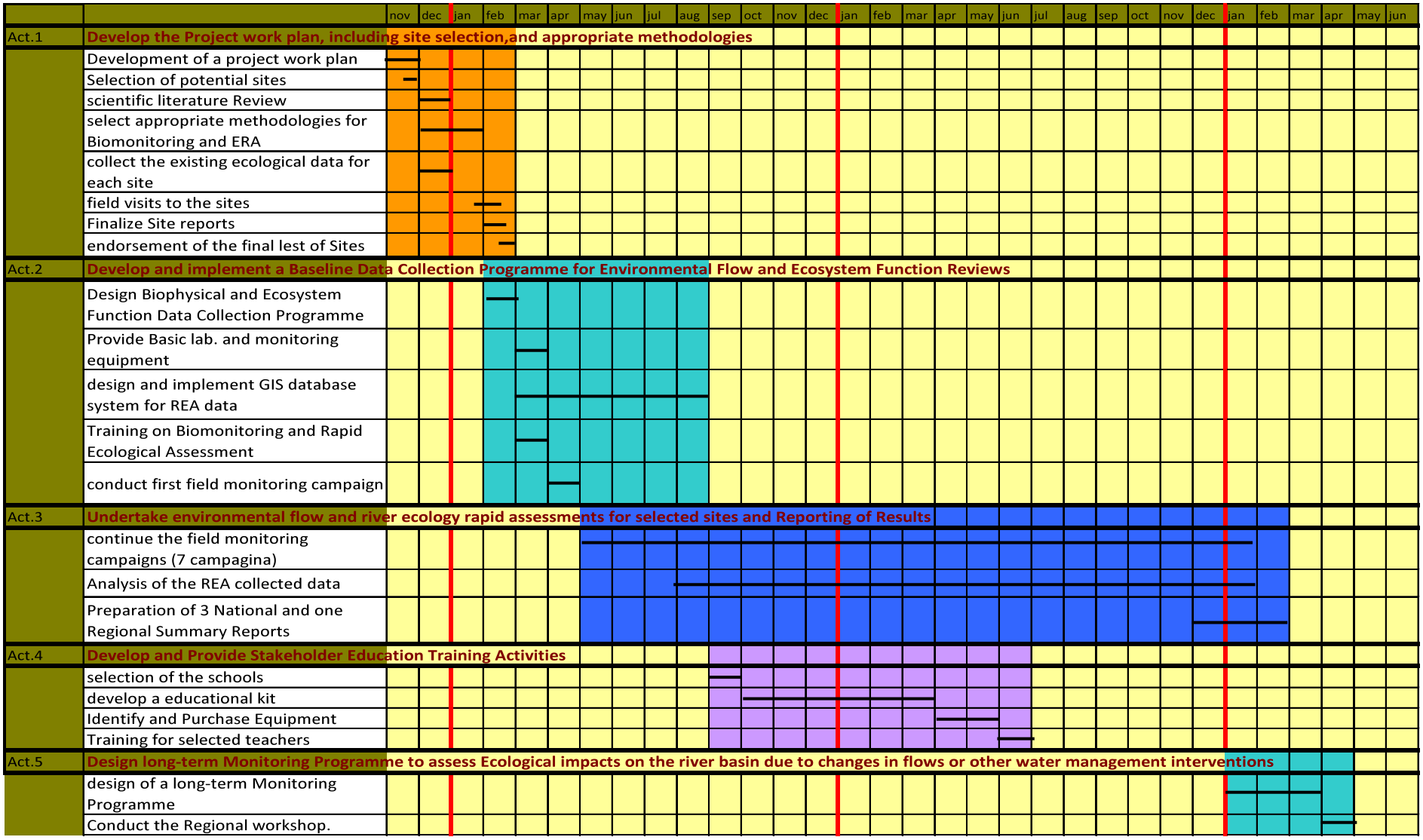
- **Task (4): Develop and Provide Stakeholder Education Training Activities on biological and ecological monitoring:**
  - Educational training activities will be conducted for the Stakeholders in the communities near the selected sites
  - Emphasis will be given on creating self contained teaching materials to focus on age appropriate biology and ecology lessons
  - National level project staff and experts will work with curriculum specialists to develop a kit to be distributed to schools near the selected sites
  - Training will be given to selected teachers on the use of this kit
  - The kits will contain materials needed for basic assessments to be conducted by the students under the supervision of the trained teacher
  - These materials will include buckets, laminated guide sheets, species measuring, flow gauges, thermometers, and other needed materials.

3. Project Activities

- **Task (5): Develop Guidelines for designing a long-term Monitoring Programme to assess the impacts of changes in flows or other water management interventions on the river basin ecology:**
  - This Guideline will be based on evaluation of the key biophysical, ecological and social parameters in the region,
  - It will take into consideration the current national monitoring programs in each country, and
  - The availability of equipment and expertise in each country will be taken into consideration
  - The monitoring program will provide a set of indicators of agreed site specific Environmental Quality Objectives (EQOs) to achieve good ecological status for the river basin
  - This guideline will follow the EU WFD

The project will organize a regional workshop at the end of the Demo project to present the whole Demo project results

4. Proposed Time table for Project Activities



5. Issues to be Discussed at the Working Groups Meeting

Demonstration Project Pilot sites

Guiding principles for selection

- Importance for transboundary water management
  - Upstream/downstream aspects
  - Flow impact (dams & hydropower, climate change) vs. non-flow related human disturbances (water consumption, urban waste water, non-point pollution from agriculture, land degradation & erosion)
- Create interpretive framework – clean natural conditions vs. degraded
- Ecological importance of the aquatic & riparian zones, provision of ecosystem services to humans
- National importance for the project countries
- Practicability for regular monitoring / visits
- Usefulness of monitoring data towards supporting (future) water management decision taking
- Kura-Aras river basin
- Budget!

Current Status of Ecological Monitoring

- Are any ecological monitoring activities being done in the river basin:
  - Birds
  - Flood plain vegetation
  - Fish
  - Endangered species
  - Hunting Species
  - River Flows
  - Water Quality (chemical, hydromorphological, biological)
- If yes, then:
  - Who is running the monitoring?, where?, time series available? Human resources and equipment available?

Current Status of Ecological Monitoring

- Locations of current protected areas related to the river and the on-going monitoring for these protected areas
- Maps for hot spots (pollution sources – Biodiversity- flooding& erosion risks)
- If there are Future policies and plan for ecological monitoring?
- If yes, please elaborate on these policies or plans
- Any international projects covering ecological monitoring

Envisioned implementation arrangements

Type of contracts	
- Actual information on biodiversity on selected pilot sites	Individual National Experts
- Armenia - field monitoring & reporting	Company contract
- Georgia - field monitoring & reporting	Company contract
- Azerbaijan - field monitoring & reporting	Company contract
- Training - biomonitoring	international expert(s), in-country training
- Training - rapid ecological assessment	international expert(s), in-country training
- Awareness raising - school monitoring	Individual National Experts
- Long-term monitoring report	Individual National Experts

Equipment	
- Field monitoring – AM	field monitoring
- Field monitoring – AZ	field monitoring
- Field monitoring – GE	field monitoring
- School monitoring	field kits for basic learning monitoring


Thank you