NATO Science for Peace Programme

Economic and ecological benefits from sustainable use of the Aral Sea Artemia resources

CP EAP SFP 980859

Status of the project

Participants: 1. Directors

Partner country

Mirabdullayev, Iskandar

Laboratory of Ichthyology and Hydrobiology (LIH), Institute of Zoology
Uzbek Academy of Sciences, Tashkent, Uzbekistan

NATO country

Sorgeloos, Patrick

Laboratory of Aquaculture & Artemia Reference Center,
Ghent University, Belgium

Participants : 2. Co-directors

Bosteels, Thomas
Utah Strategic Alliance, Mt. Green, UT, USA

Marden, Brad
INVE Technologies, *Artemia* Task Force, Grantsville, UT, USA

Van Stappen, Gilbert
Laboratory of Aquaculture & *Artemia* Reference Center, Ghent University, Belgium

Vyverman, Wim
Laboratory of Protistology & Aquatic Ecology, Department of Biology, Ghent University, Belgium

Zholdasova, Iliya
Institute of Bioecology (IB) of the Karakalpak Branch of the Uzbek Academy of Sciences; Nukus, Uzbekistan

Participants : 3. End-users

National level

- Scientific Research Center for Development of Fisheries, Tashkent
- Laboratory of Ichthyology and Hydrobiology, Institute of Zoology, Uzbek Academy of Sciences, Tashkent

Regional level

- Ministry of Economy, Republic of Karakalpakstan, Nukus
- International Fund of Aral Rescue, Nukus
- Goskompriroda-State Committee for Nature Protection of Karakalpakstan, Nukus
- Institute of Bioecology of Karakalpak Branch of Academy of Sciences of Uzbekistan, Nukus

Local level

- Community of Moinaq, Hakimiyat of Moinaq district

Participants : 4. External NATO advisors

Bedford, Daniel
Department of Geography, Weber State University, Ogden, UT, USA (water balance and nutrient flow modelling)

Naftz, David
U.S. Geological Survey, Salt Lake City, UT, USA
Great Salt Lake nutrient cycling project (geochemistry and water flow modelling)

Bradt, Shane
University of New Hampshire, USA
Center for Freshwater Biology (remote sensing)

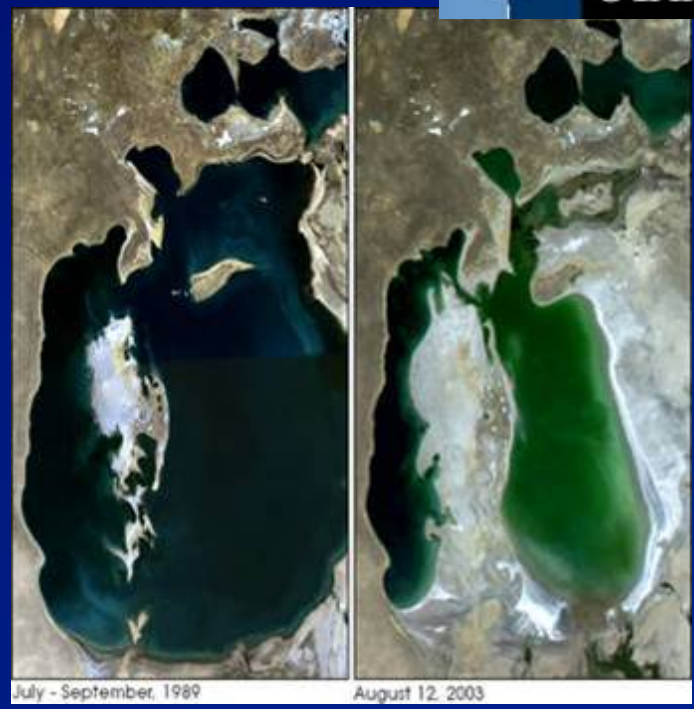
Baskin, Rob
United States Geological Survey, Salt Lake City, UT, USA (bathymetry)

NATO consultant : John Beardmore
University of Wales, Swansea, UK

Background and justification

Evolution of Aral Sea 1960-now

ecological
economical
} catastrophe



High salinity: suitable for colonization by Artemia

NATO CLG grant 980143

"Artemia colonization of the Aral Sea:
hope for a dying ecosystem" (partners: Ghent University, INVE, present Uzbek partners)

- establish team of experts
- document ecological characteristics of Aral Sea as a function of colonization by Artemia : first sampling and monitoring programme

Background and justification

Potential for Artemia colonization

Potential for employment; possible export item

But: what future for Artemia population ?

- Can current ecological status support stable Artemia population ?
- What about population dynamics, cyst quality… of Aral population ?
- How to organize optimal harvesting, storage, processing in local conditions ?

ecological monitoring programme: evaluate feasibility and potential benefits of sustainable Artemia exploitation

Objectives

- Description and characterization of Aral Sea Artemia population
- Development of population model for Artemia resource
- Recommendations for resource management
- Transfer of technology & know-how
- Recommendations towards end-users on optimal utilisation of resource

1 February 2005: official starting date
3 years project

Methodology: 1. Overview

a) Field research

- hydrobiology - hydrochemistry Aral Sea
- water flow and nutrient input Amu Darya
- Artemia: population dynamics : description and modeling

b) Laboratory studies

- Phytoplankton
- Artemia

c) Determine commercial viability; optimal means of exploitation

d) Define sustainable management plan

e) Training program

Methodology: 2. Field research

Study area

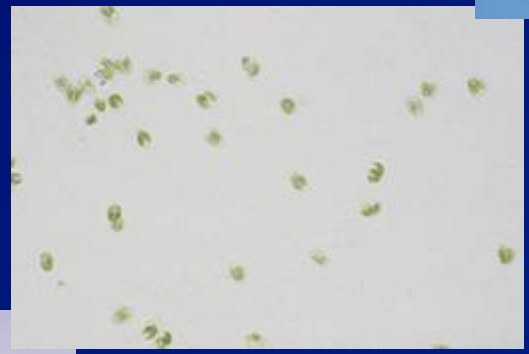
- Uzbek territory
- East & West Aral: 12 sampling sites each
- 12 sampling expeditions yearly

Artemia
Phytoplankton
Micronutrients
Other abiotic factors

Methodology: 3. Laboratory experiments

Phytoplankton

isolation & culture of Aral Sea algal species at different abiotic conditions (temperature, light, nutrients); suitable food for Artemia ?



Artemia

- strain characteristics and quality control
- life history and reproductive characteristics

Methodology: 4. Commercial viability & sustainable management

- year 2 and 3 experimental harvests provide information on:
  * harvesting & processing yields
  * logistical aspects (transport)
  * cyst quality and optimal handling, storage, processing

- market information
  (pricing, global supply & demand, alternative sources….)

Outline sustainable management plan and population model, based on Great Salt Lake management template

Training programme :
1. NATO countries ➡ partner country

➡ Aral Sea

- sample collection, analysis, data processing
- experimental harvests
- population modeling

Realized: Brad Marden: July 2005 ➡ Belgium, Uzbekistan

- meetings with project co-directors and with Project Consultant John Beardmore
- accompany scientific team on expedition; scientific planning
- update finances

Training programme :
2. Partner country ➡ NATO countries

Algae culture, isolation, identification

Hydrochemistry

Artemia

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- commercial cyst harvesting and processing
- resources management and modeling

INVE U.S.A.

Training programme :
2. Partner country ➡ NATO countries : realized

Zuri Mustafaeva (LIH)
Lola Abullayeva (LIH)
Sveta Lyubimova (IB)
Ablatdyin Musaev (IB)

➡

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Artemia
Phytoplankton
February-March 2005

Budget: Equipment list

Field sampling equipment
Laboratory equipment (hydrochemistry; phytoplankton studies, Artemia analyses):

→ Purchases ongoing

Implementation of results – input from end-users

- Support commercial development of Artemia resources
- Explore possibilities of application in local aquaculture
- Stimulate local aquaculture practices
- Integrate Artemia resource in water management and conservation issues
- Development of local and regional employment
- Facilitation of further fund-raising

Dissemination of results

Concluding workshop in Tashkent

Project website:
http://www.aquaculture.ugent.be//rend/projects.htm