

ACESSIBILIDADE AL ÁGUA:

Prof. José Galizia Tundisi
tundisi@iie.com.br
www.iie.com.br



ACESSIBILIDADE AL ÁGUA

1. Seguridad en agua (Water Security)

The habilidad para asegurar la funcionalidad del ciclo del agua y todos los servicios a elle relacionados.

Definiciones: UNEP (2009)

UNESCO IHP (2010)

UNEP - 2009

- “[...] water security represents a unifying element supplying humanity with drinking water, hygiene and sanitation, food and fish, industrial resources, energy, transportation and natural amenities, all dependent upon maintaining ecosystem health and productivity.”

UNESCO – IHE - 2010

- “ Water security involves protection of vulnerable water systems, protection against water related hazards such as floods and and droughts, sustainable development of water resources and safeguarding access to water functions and services.

GLOBAL WATER PARTNERSHIP - 2010

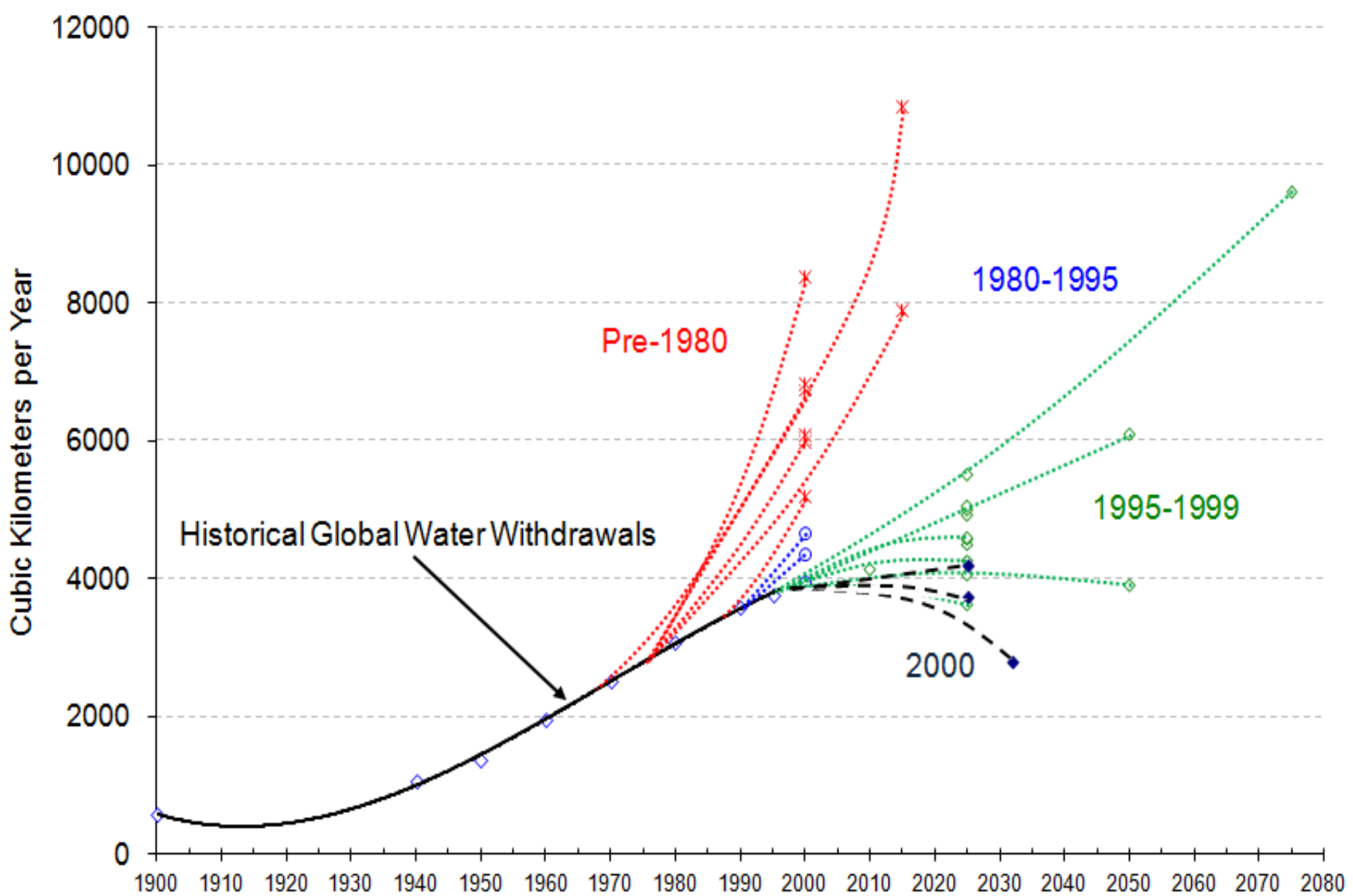
- A water secure world harnesses water's productive power and minimizes its destructive force. It is a world where every person has enough safe, affordable water to lead a clean, healthy and productive life. It is a world where communities are protected from floods, droughts, landslides, erosion and water-borne diseases. Water security also means addressing environmental protection and the negative effects of poor management.

- Seguridad del agua (y accesibilidad);
- Disponibilidad;
- Cantidad del agua;
- Governança de la água;

- Disponibilidad del agua;
- Vulnerabilidad humana a desastres;
- Necesidades humanas (atención especial a producción de alimentos;
- Sustentabilidad;

- **Conservación del agua;**
- **Equidad social;**
- **Crecimiento económico;**

WATER QUANTITY



Water balance by continent (surface water).

Continent	Precipitation (km ³ /year)	Evaporation (km ³ /year)	Drainage * (km ³ /year)
Europe	8.290	5.320	2.970
Asia	32.200	18.100	14.100
Africa	22.300	17.700	4.600
North America	18.300	10.100	8.180
South America	28.400	16.200	12.200
Australia / Oceania	7.080	4.570	2.510
Antarctica	2.310	0	2.310
Total area of the continents	118.880	71.990	46.870

SOURCE: Shiklomanov, 1993.

* Includes drainage flows into the groundwater basins and continental ice flows in Antarctica

Short or Long-rotation Woody Timber

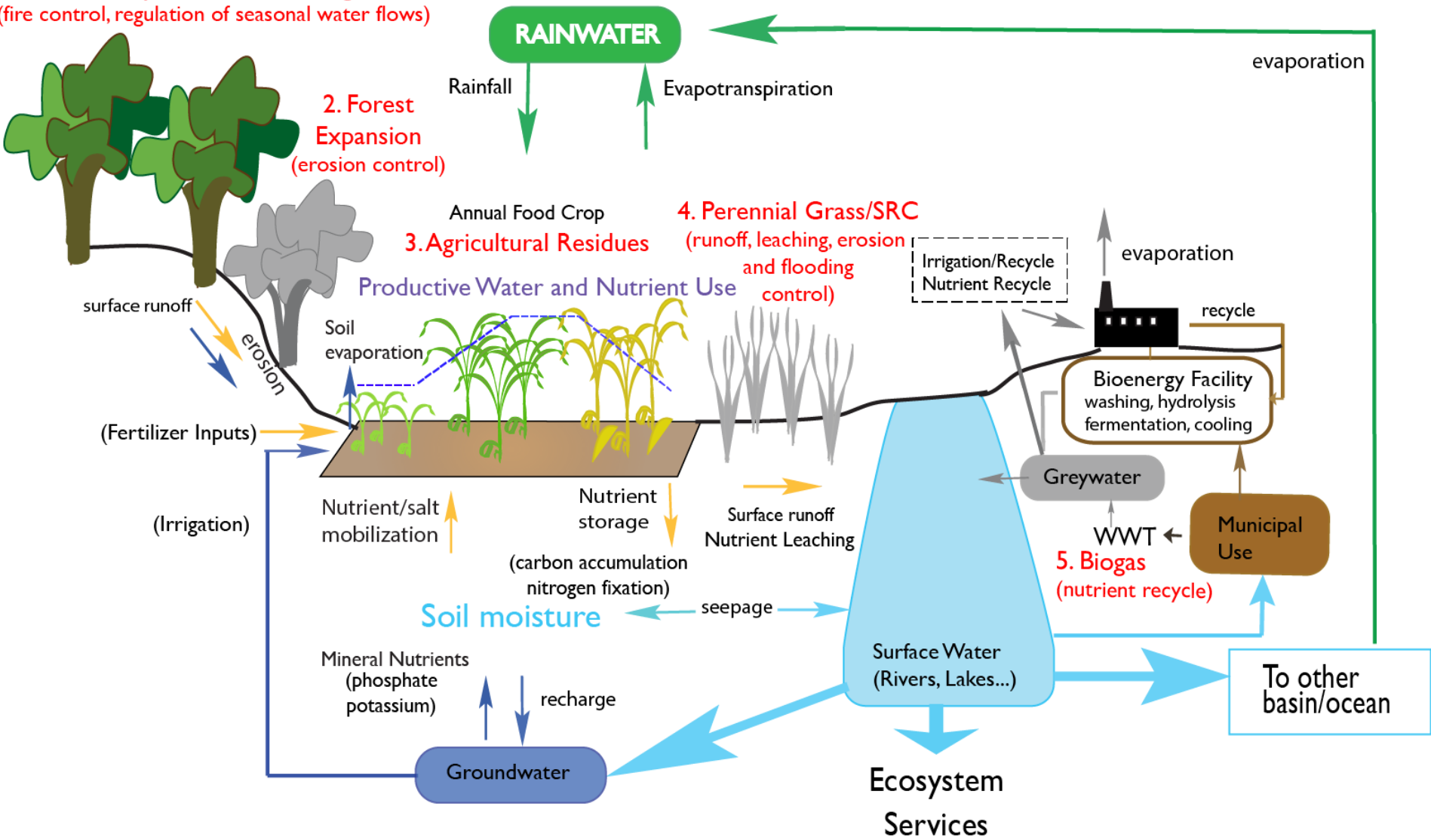
1. Woody Residues/Thinnings

(fire control, regulation of seasonal water flows)

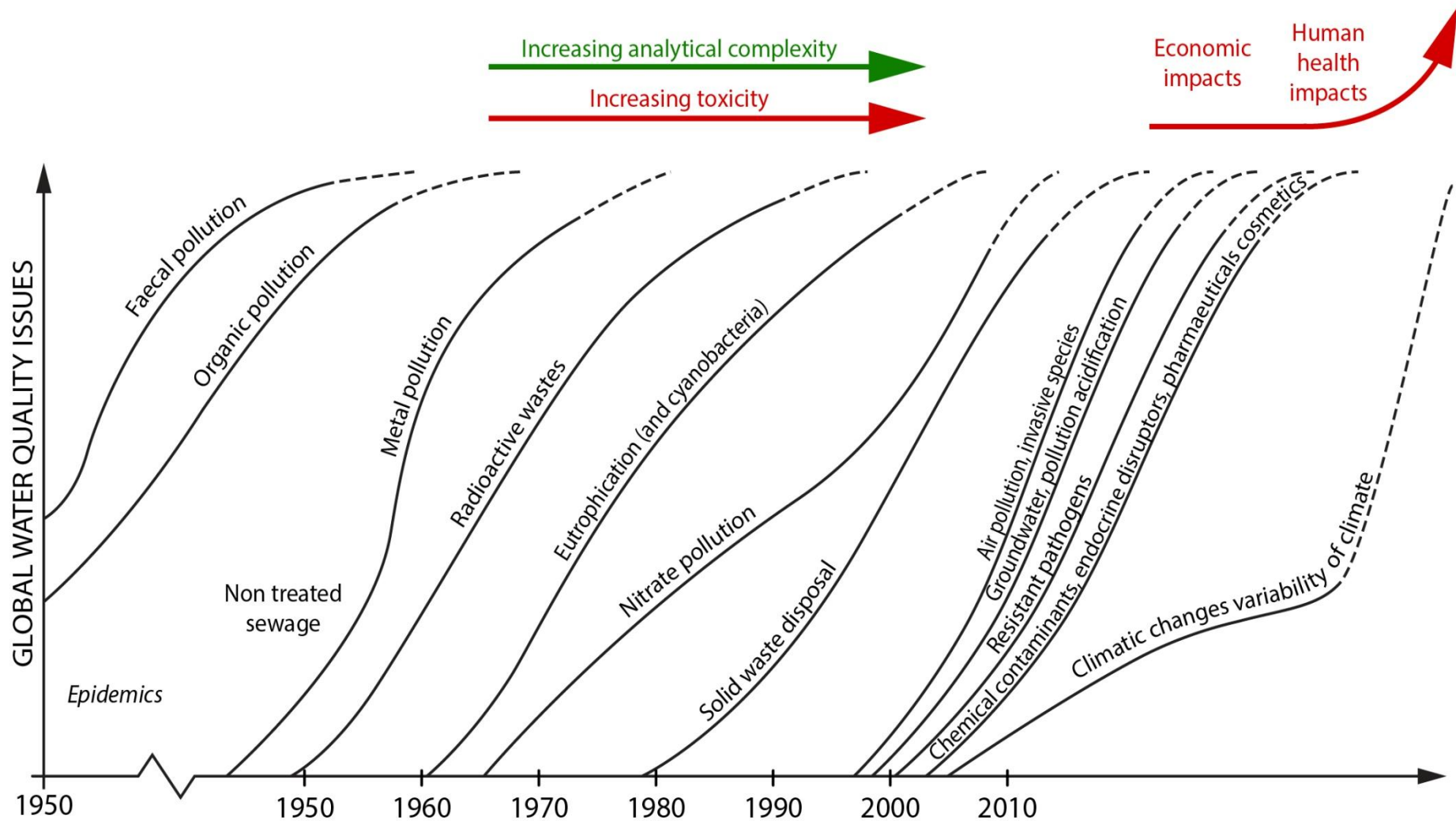
2. Forest Expansion
(erosion control)

3. Agricultural Residues
Annual Food Crop

4. Perennial Grass/SRC
(runoff, leaching, erosion and flooding control)



WATER QUALITY



Trends in water quality in the evolution of water quality problems in industrialized countries. In emerging economies the sequence is more complex. Modified from Chapman (1992) and Somlyódy and Varis (2006).

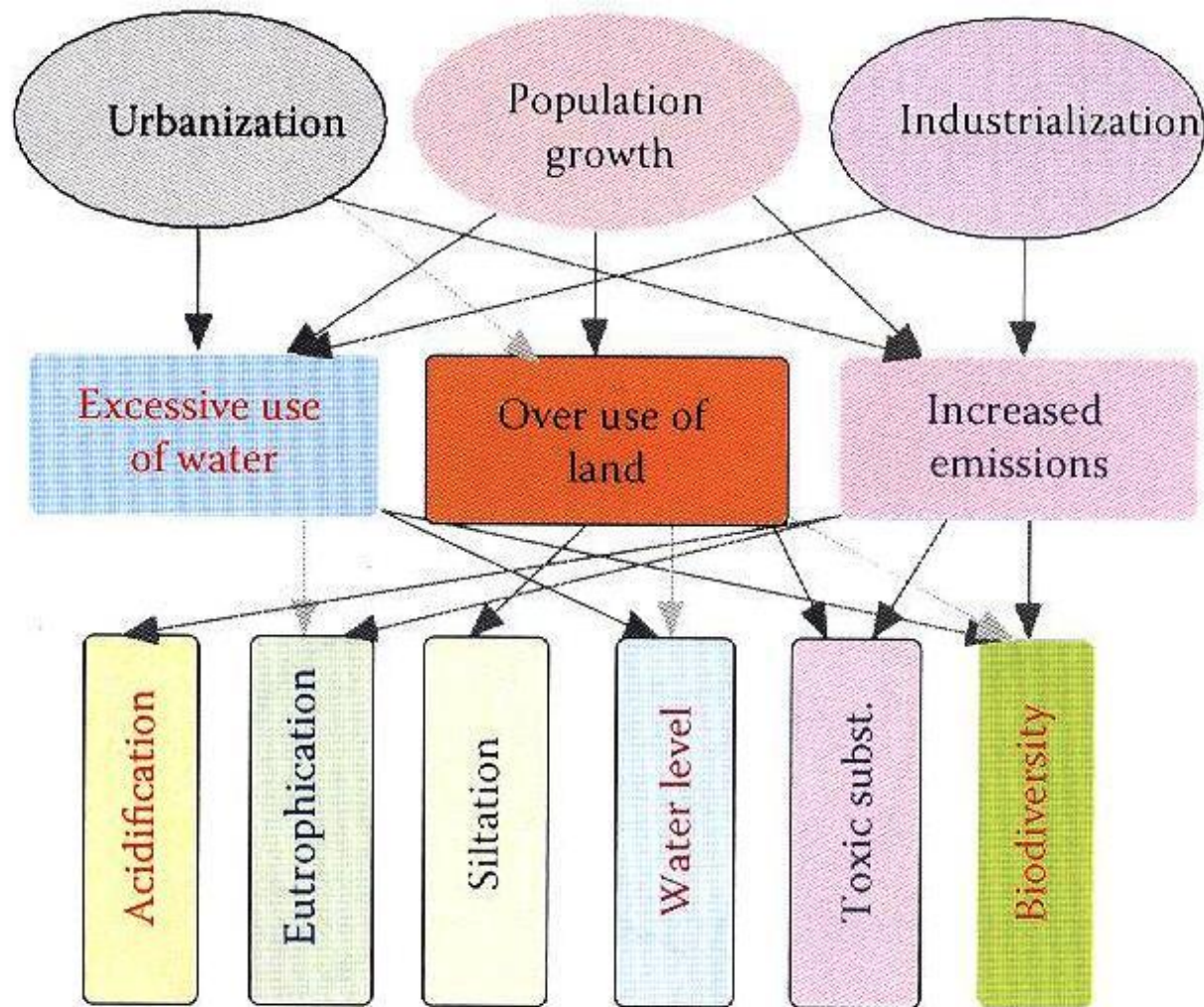


FIGURE 13.2

ILEC has formulated six problems for lakes, rivers, and reservoirs, which are due to an excessive water use, overuse of land, and increased emissions. The problems are as shown in the figure rooted in the increased urbanization, population growth, and industrialization.

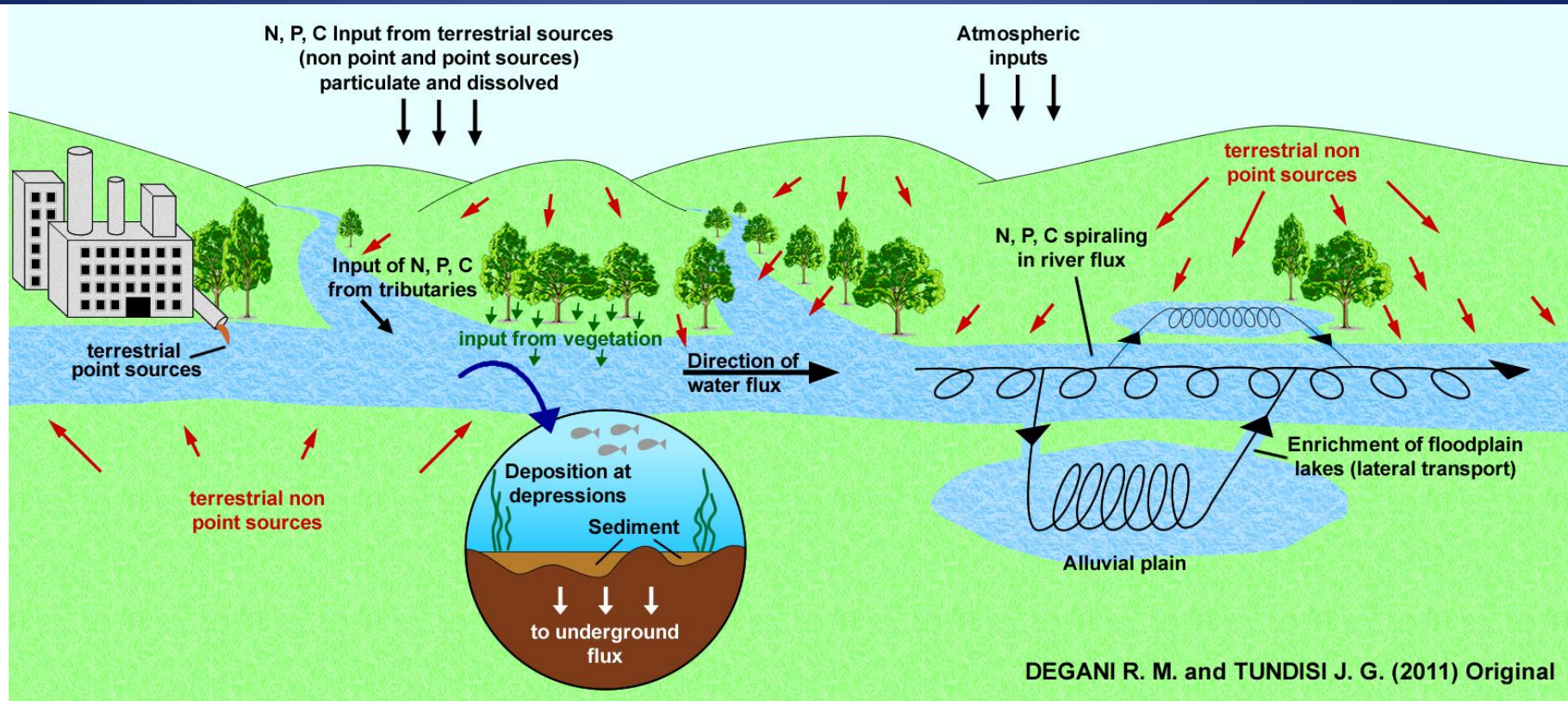


FIGURE 4.2

Sources of point and nonpoint inputs of nutrients and organic matter to the river; N, P, C spirals in river and floodplain lakes. (Credit to Degani and Tundisi, 2011.)

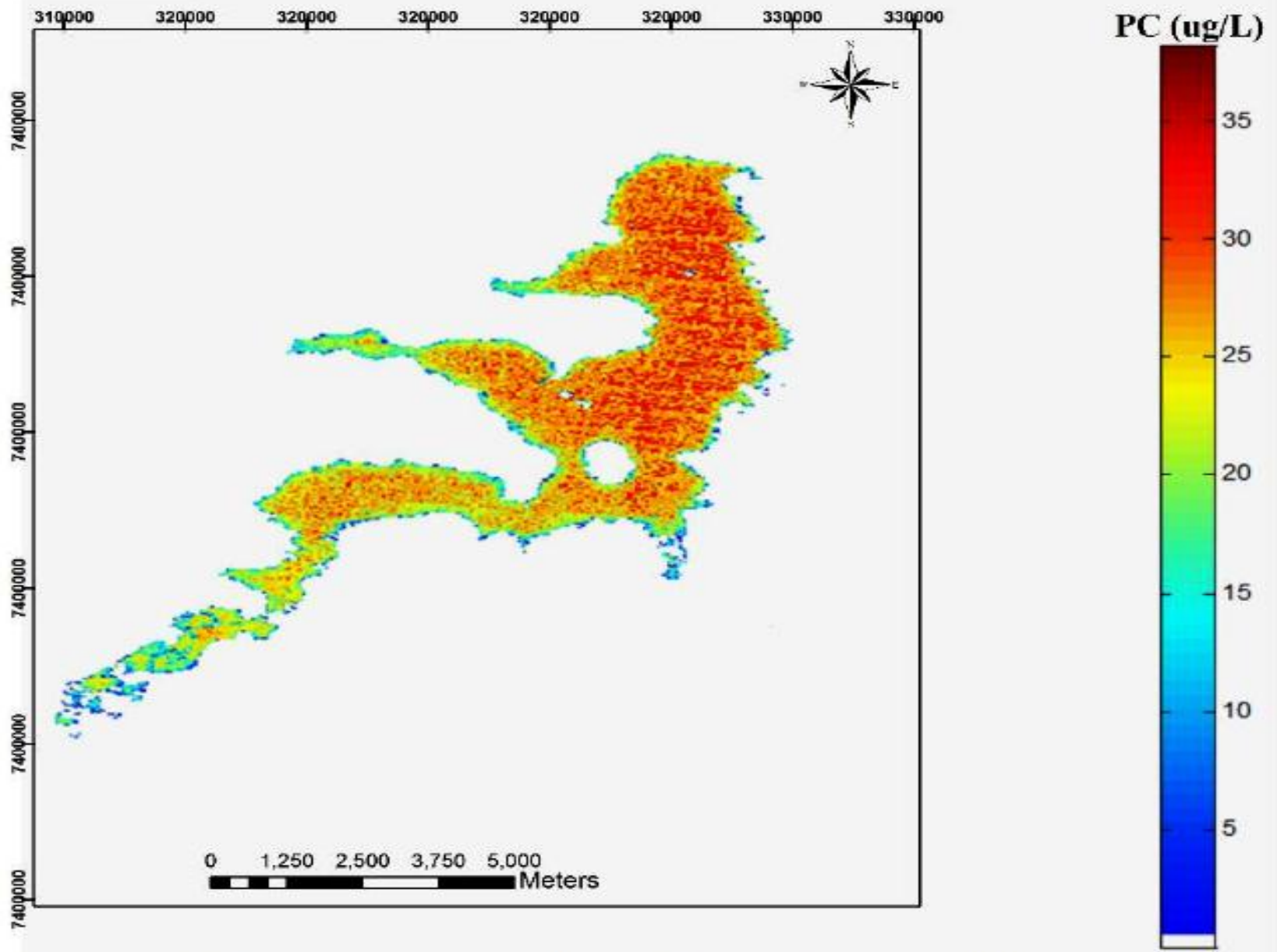


Figure 4. PC quantification from the application of the empirical algorithm in the remote sensing data.

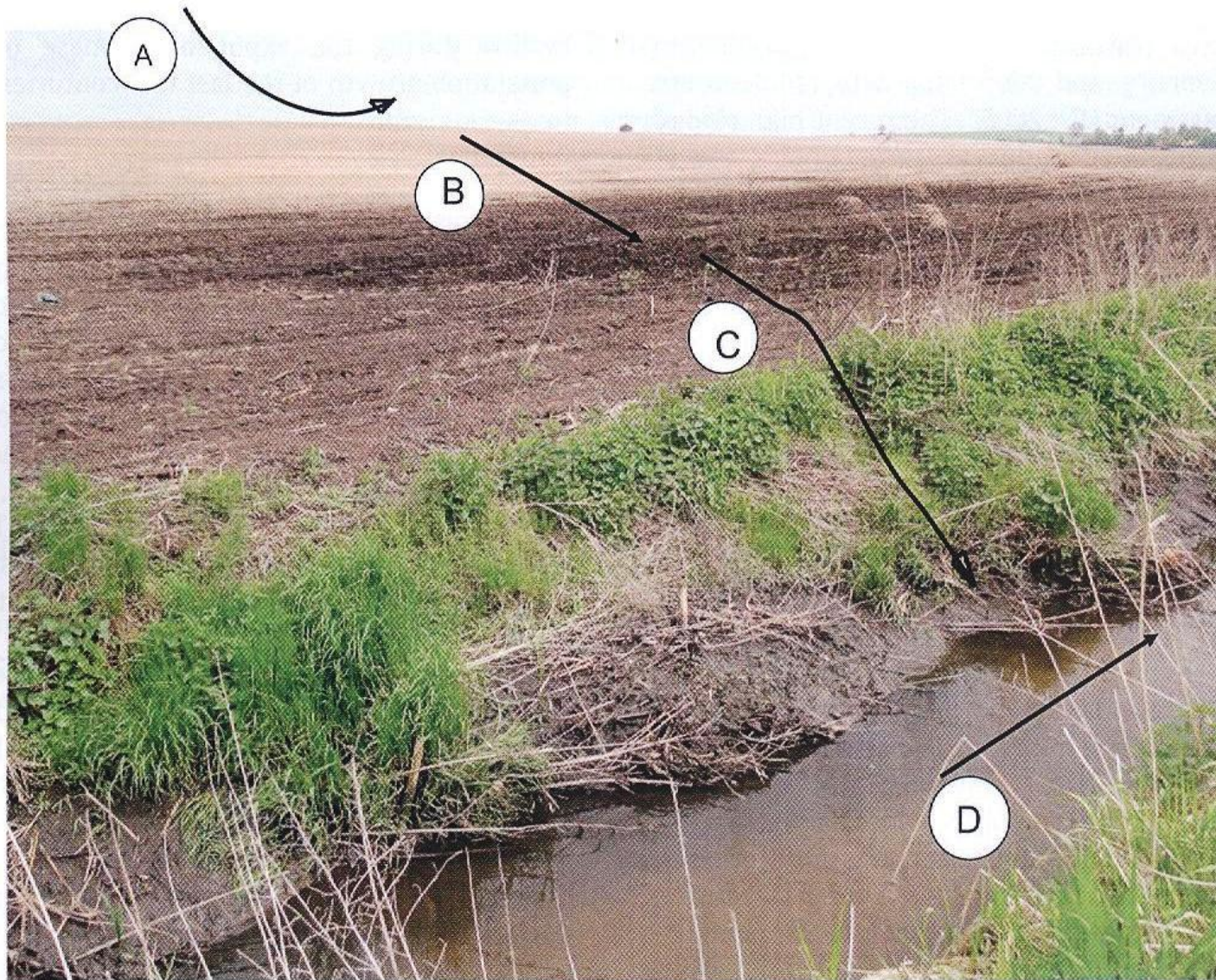
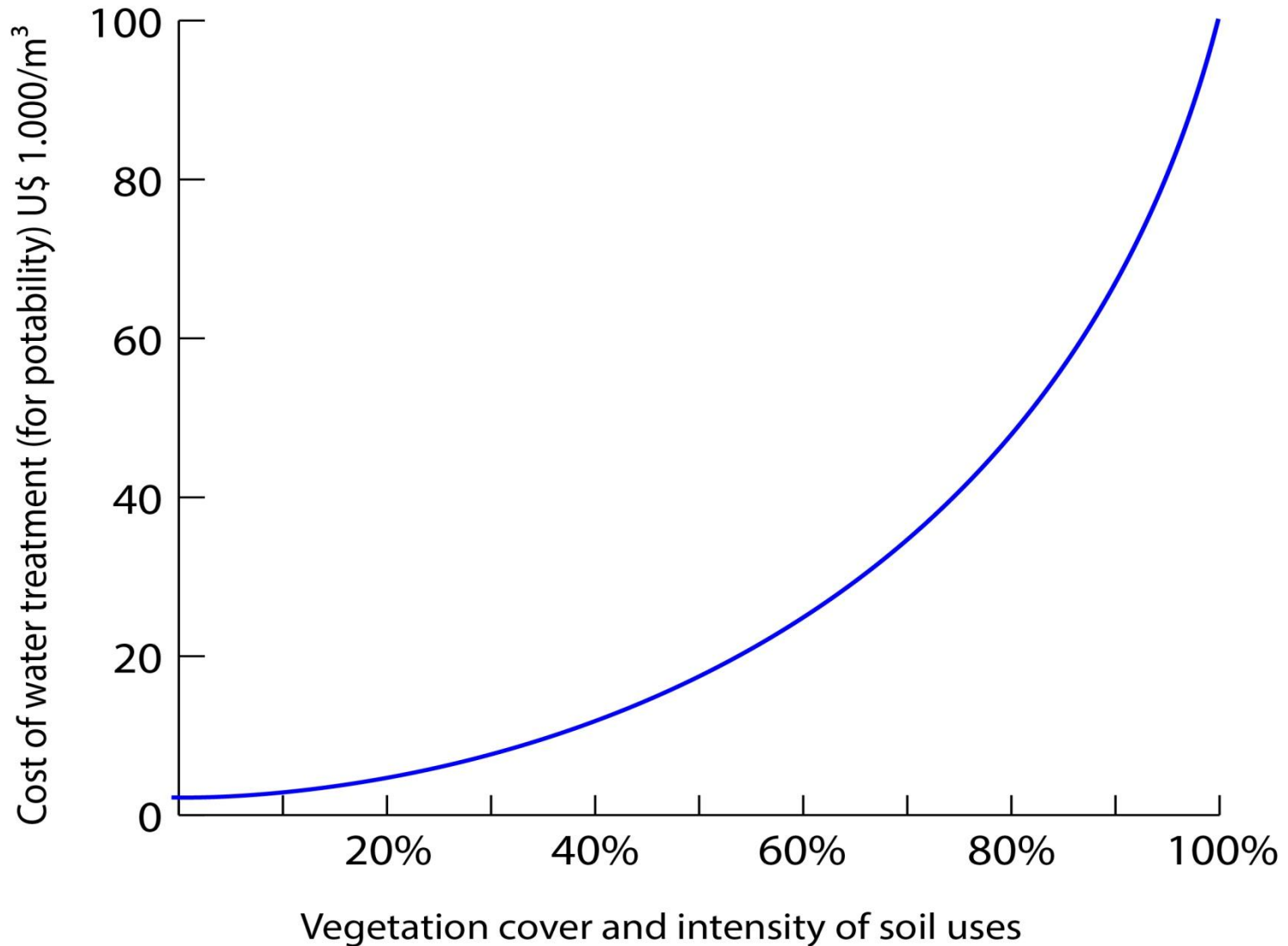


Fig. 1. The loss of organic matter and nutrients from a completely agricultural landscape, with degraded land-water ecotones (Central Poland – Pilica River Catchment). (A) Loss of organic/mineral matter and fertilizers (OMMF) owing to wind erosion; (B) transfer of OMMF down the slope due to uniformity of the landscape; (C) transfer of OMMF through the degraded land-water ecotone into the river; (D) transfer of OMMF along the river continuum to reservoirs, marine coastal zones and deep sea sediments.

RIPARIAN FORESTS IN RURAL AREAS





The cost of water treatment is dependent of the water quality at the source. This related to soil uses and vegetation cover

RIPARIAN FORESTS



RIPARIAN VEGETATION IN THE MOGI GUAÇU RIVER



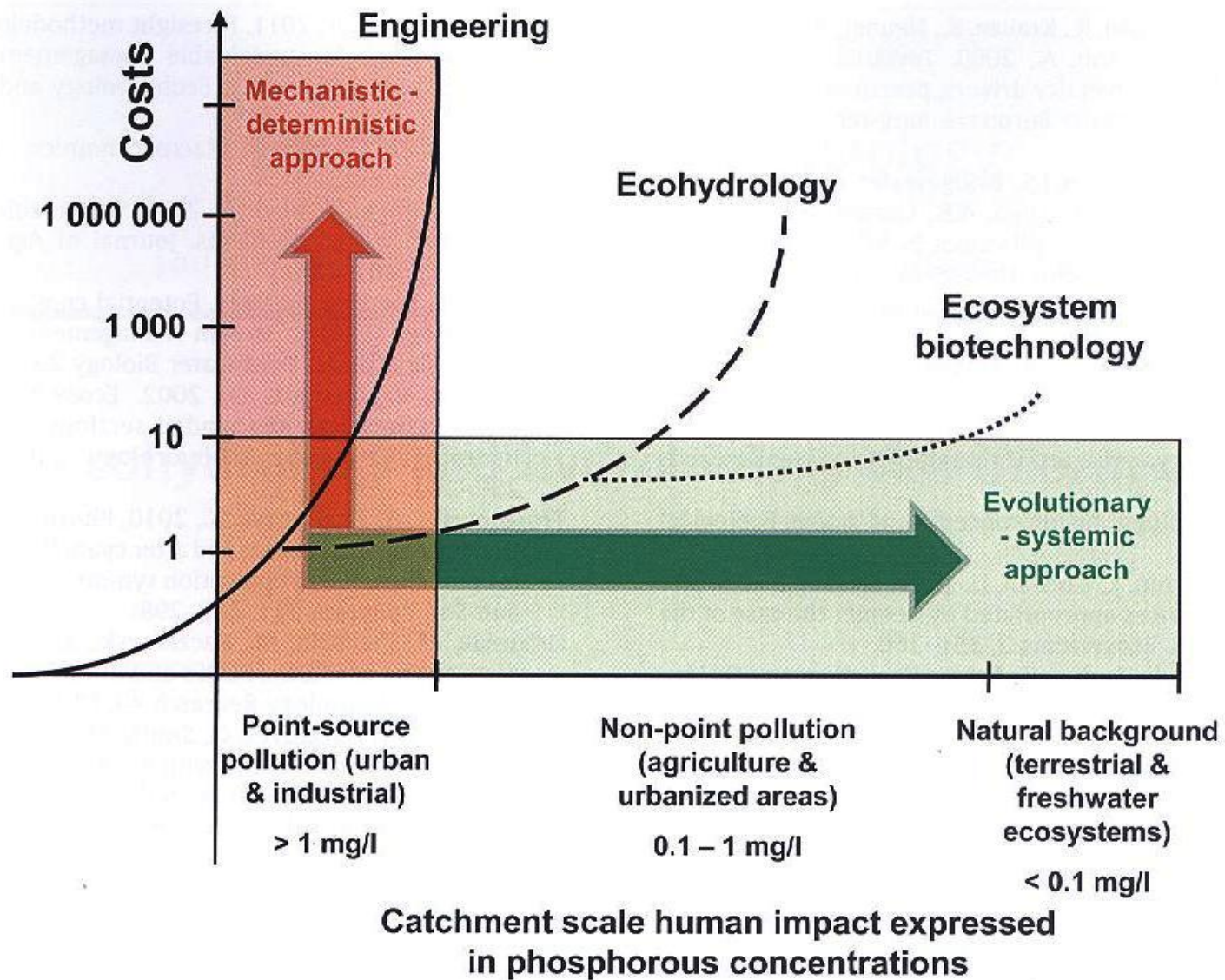


Fig. 3. Increase of efficiency and reduction of costs (IWRM) by integration of engineering, ecohydrology and ecosystem biotechnology.

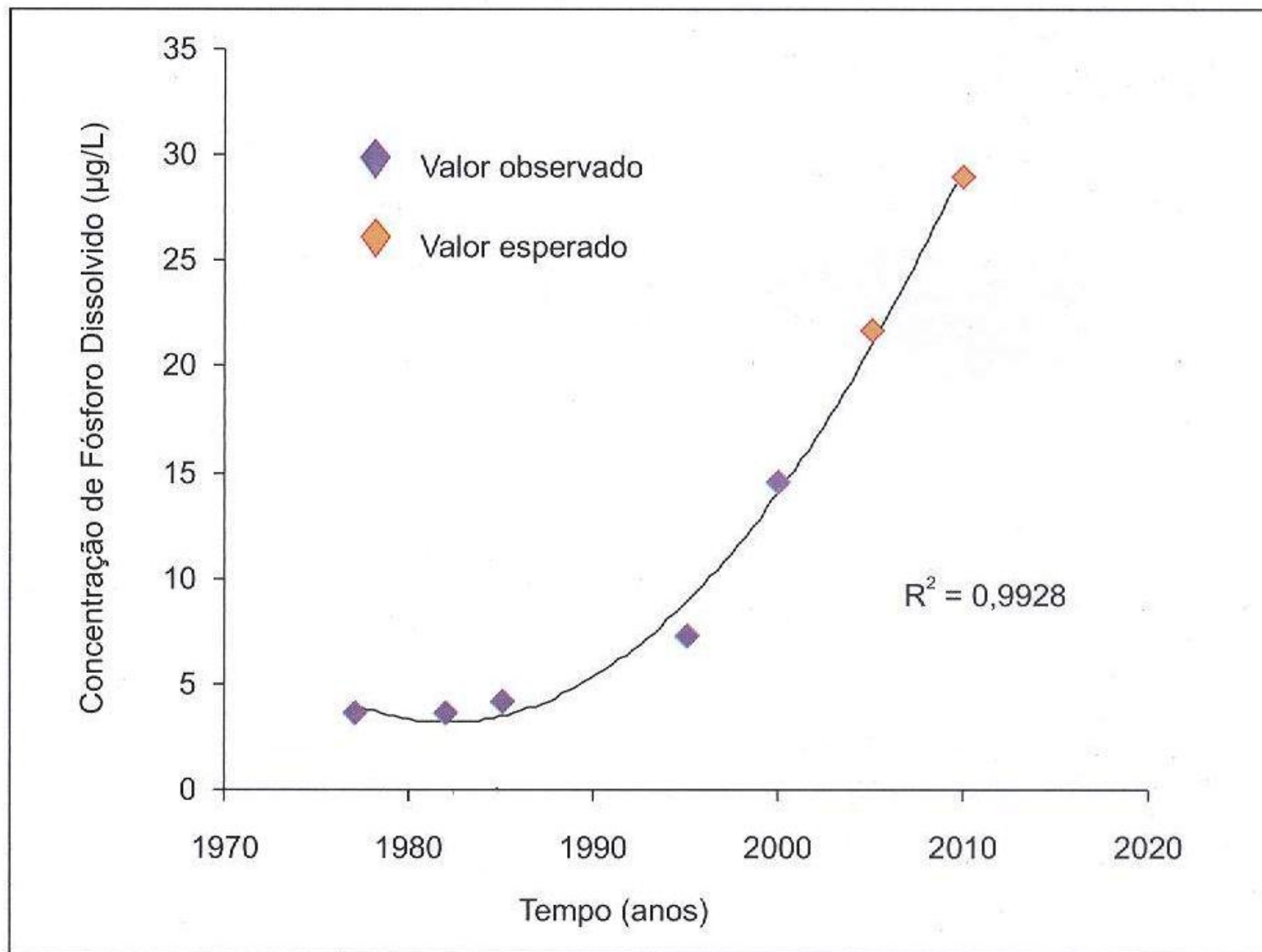
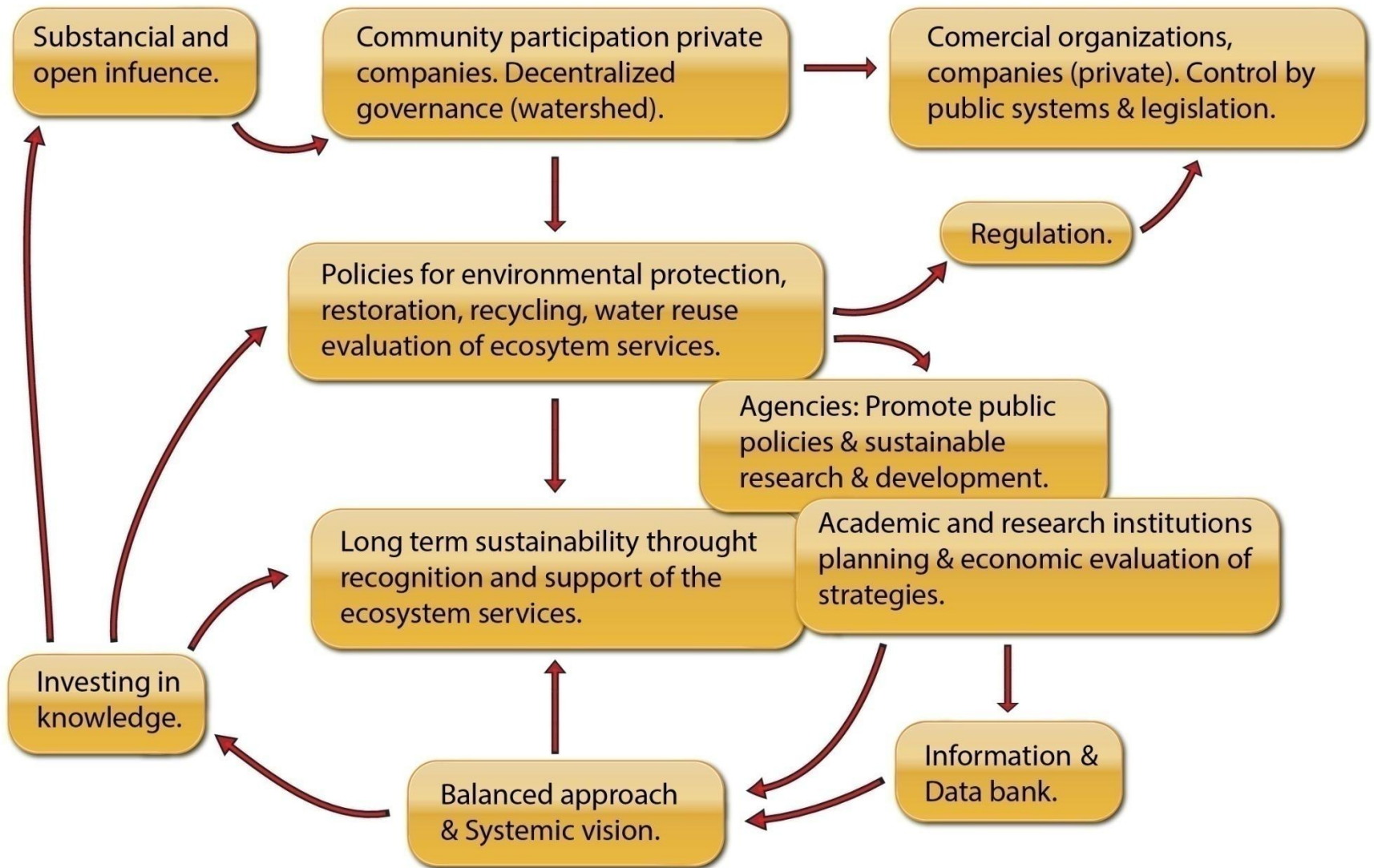


Figura 23 Evolução da concentração de fósforo dissolvido desde a década de 1970 até 2020, caracterizando o processo acelerado de eutrofização na represa Carlos Botelho (Lobo-Broa), mantidas as tendências atuais sem tratamento de esgoto. (Fonte: Abe et al., 2000.)

WATER GOVERNANCE



A possible water governance process based on a watershed approach.

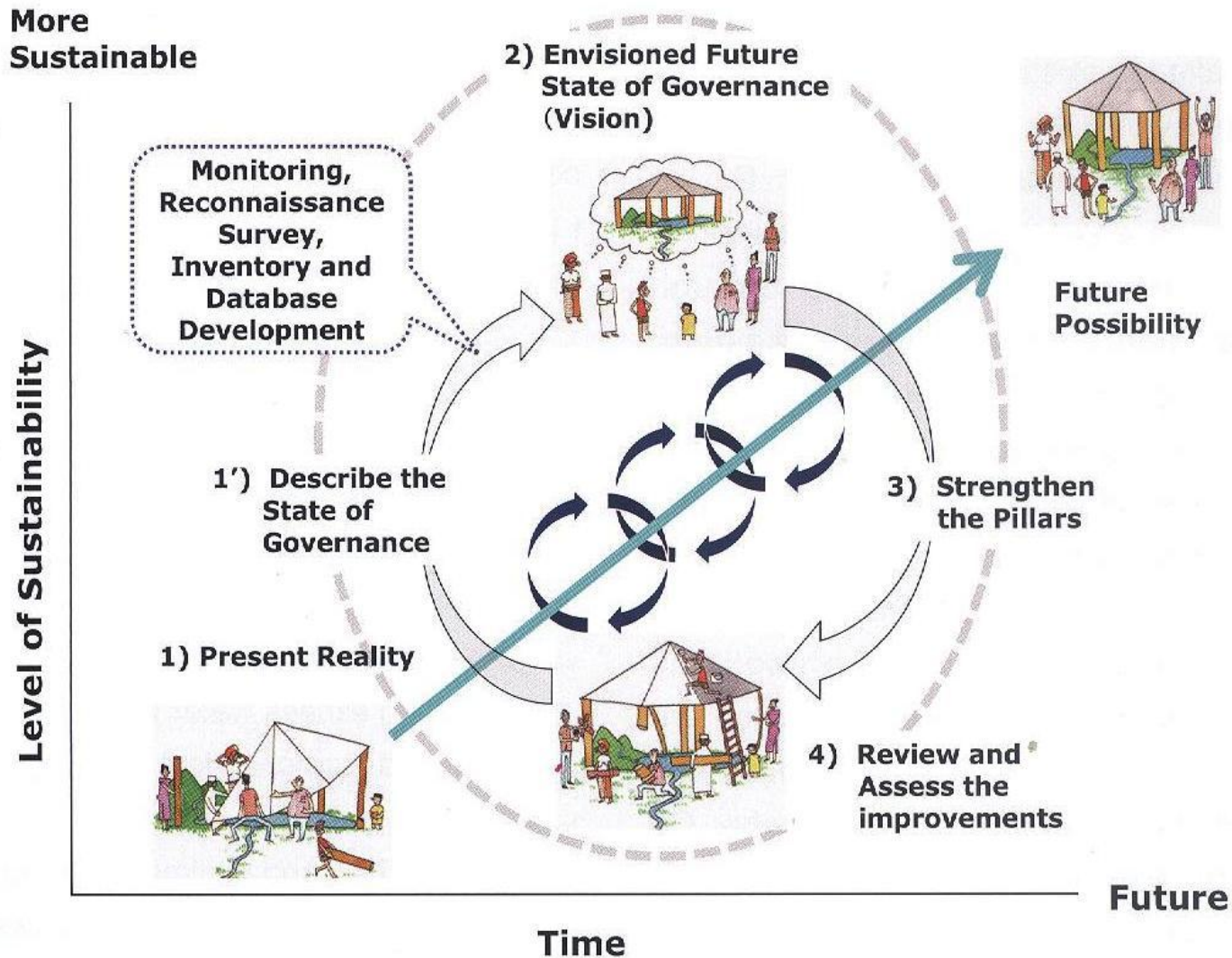


Figure 9. Schematic Illustration of a Cyclic ILBM Platform Process

Acessibilidad al agua: (Water Security)

- Protección de las fuentes del agua;
- Reducción de las pérdidas en la red;
- Control de la calidad en el sistema público (fuentes & distribución);
- Educación sanitaria de la población;
- Implementación del re-uso del agua (industria, agricultura);
- Almacenamiento de los múltiples usos;

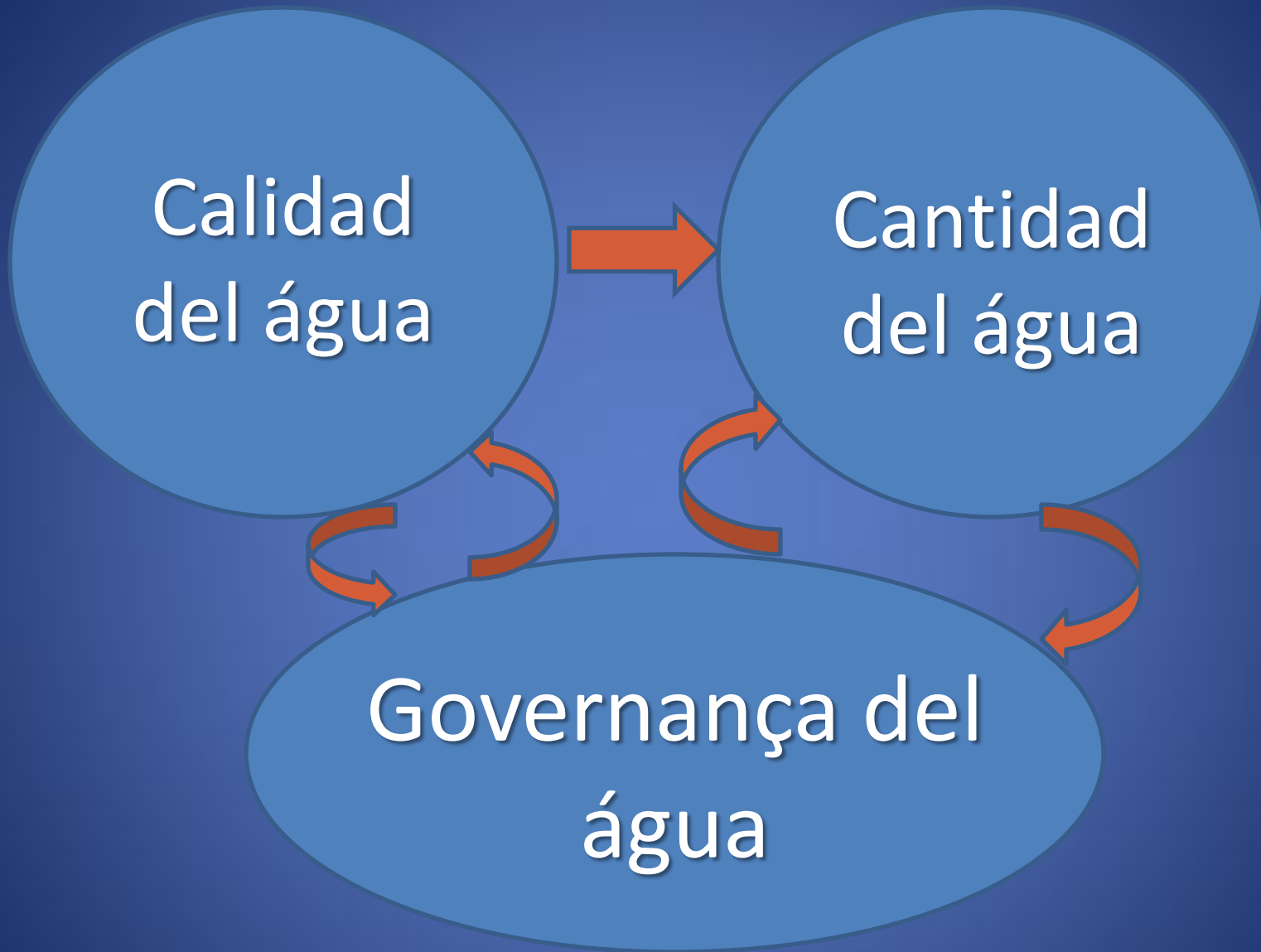
Acessibilidad al agua: (Water Security)

- Control de todas las fuentes de degradación: aire, suelo, agua.
- Combinación de rápida urbanización y gobernanza débil produce escasez;
- Prioridades para áreas urbanas y periurbanas en América Latina (y periurbanas);

The priority water scarcity issue in the LAC region is in urban areas, in particular to improve governance of water utilities

Other important priorities are:

- Improve water efficiency in irrigated and rainfed agriculture;
- Manage groundwater resources sustainably;
- Reduce the impacts of urban and rural floods;
- Increase efficiency of pollution control;
- Address emerging conflicts of water allocation;



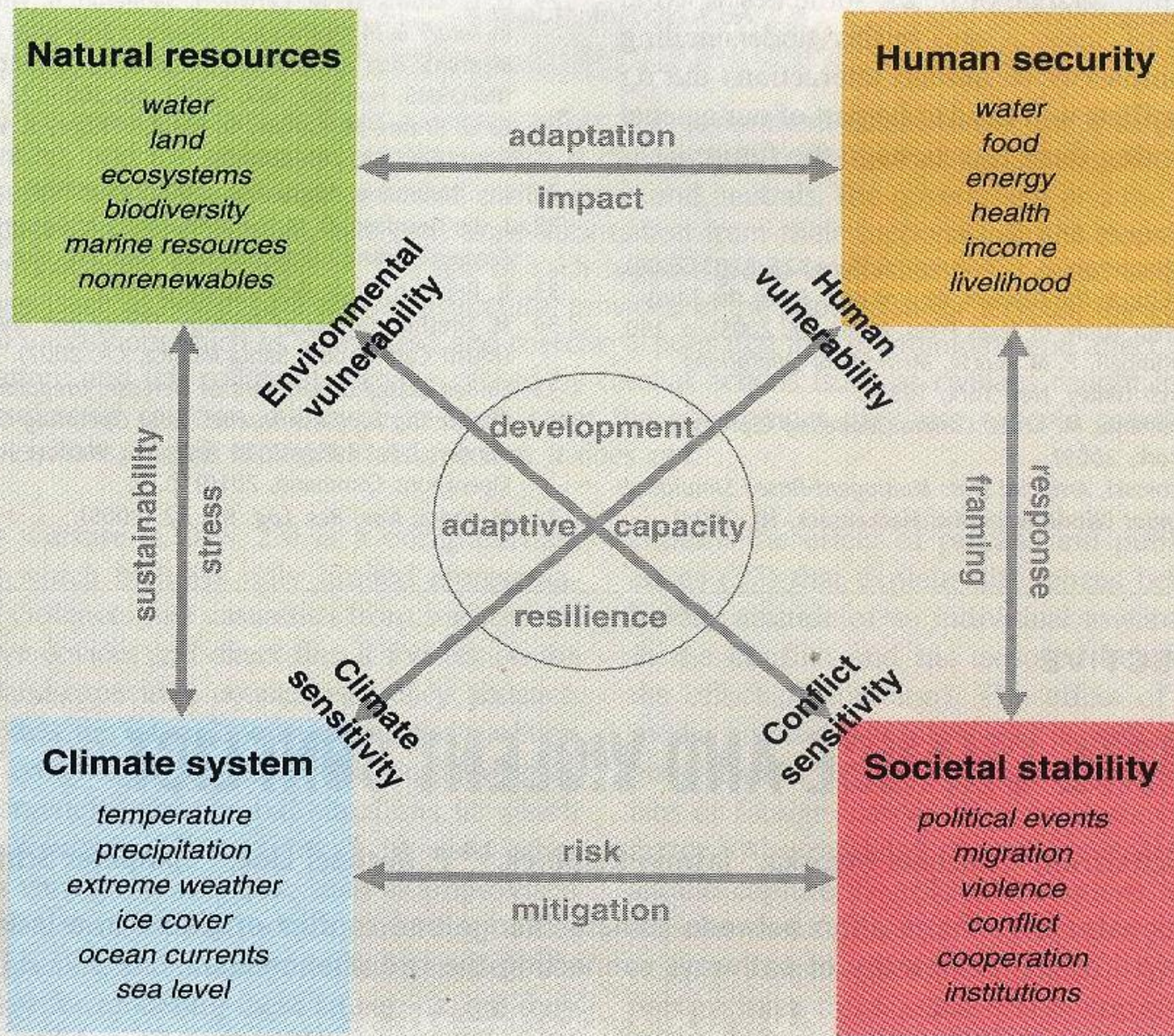
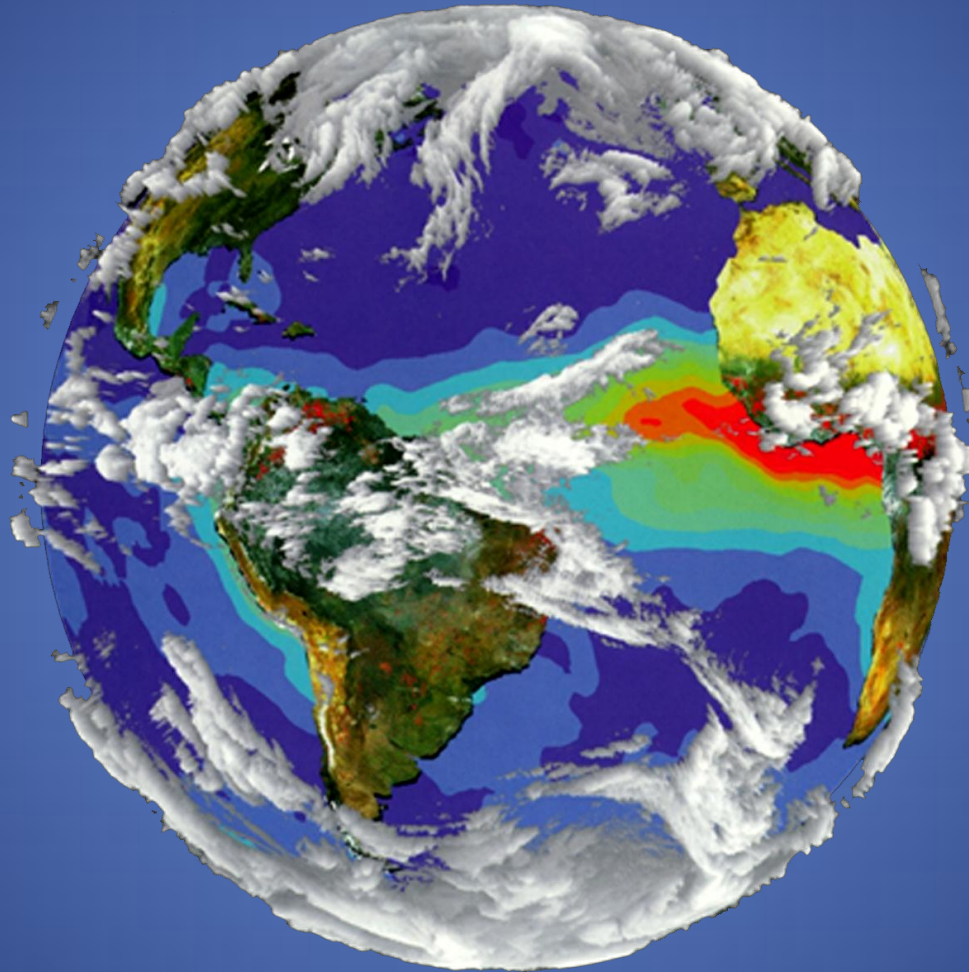


Fig. 1. Analytical framework of linkages between the climate system, natural resources, human security, and societal stability [based on (28)].

MUCHAS GRACIAS!



José Galizia Tundisi
tundisi@iie.com.br
www.iie.com.br
Rua Bento Carlos, 750
Centro – São Carlos – SP. - Brasil

OBRIGADO!

