



# Sustainability Transition in a River Basin in Mexico

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# Transition as a concept

- Represents a **passage** from one form, state, style, or place to another. It has normally evolutionary characteristics. They may **co-evolve** and imply multiples small and bigger **changes** in the socioeconomic system, innovations and the technical transformation where multiple actors are involved (users, scientists, policy makers, social movements, interest groups, and external pressures).
- Transition is understood in **anthropology** as «rite de passage» (Van Genep); in **psychology** as the integration of learning and socialization processes for knowledge building and intelligence (Piaget); in philosophy as a change of a theory into a wider one (incommensurability: Kuhn); in **economy** as the transformation of common goods into private ones (Marx); in **policy** from one regime (socialist) to another (capitalist); in **discourse analysis** as a passage from one subject to another in a discourse (Habermas); in **physics** as transformation from one level to the other; in **biology** as an evolutionary process of species (Darwin); in **ecology** as transformation of one ecosystem into another often through land use change (Steffens).
- Braudel (1976) distinguished between scales and speeds: **structural history** as long durée (geology, mental structures, patriarchy); **conjunctural history** with cycles and crises ( economic, demographic cycles); **eventful history** with ephemera events (politics, newspapers, disasters) with interaction among the three histories.

# Transition processes

- Transition processes are characterized by the **changing and creating of institutions; regimes**; changes in the **role of the state** with fundamentally different governmental institutions; the promotion of **private-owned enterprises, markets** and independent **financial institutions**, and new social organizations (common and private land tenure).
- It is a transition mode with a **functional restructuring** of social institutions, especially the **state** from being a **provider of growth** to an **enabler**, where the private sector and the business community are the engine of transformation.
- Another transition modes are micro and macro, partial and whole, but truly transition models should include both the micro transition and macro transition for a **complete or structural change**.
- Transitions can be **step by step** and with **alignments** between levels and get an evolutionary and a linear process. This is a **long-term process** (50 to 100 years), which gradually emerges and is able to integrate socio-technical and political adaptations. Other transition are **systemic** and change surrounding conditions and subsystems often also called **tipping points** with a complete **restructuring** of the system. This radical shift implies **short term break-through** and involved specific scientific, policy, economic and political communities (Perestroika).

## 2. Local situation



# Survival Strategies (Oswald, 1991, 2007)

1. Massive rural migration to urban slums and the United States
2. Illegal occupation of marginal and risky land
3. Construction of shelter with precarious materials (waste)
4. Chronic unemployment of men and women with lack of cash
5. Credits from family members and neighbors
6. Selling unnecessary goods and some illegal activities
7. Economic crisis increases lack of food and creates malnutrition
8. Recollection and hunting; use of perished fruits and vegetables
9. Collective organization and political involvement of women
10. Rotation of women in collective social organization and household tasks (arrangement of communitarian center, protests, kitchen, child rearing)
11. Collective organization for regularization of land and services
12. Common struggle for basic services and governmental support (electricity, water, community center, credit for productive activities, training, seeds and animals)
13. Struggle for public subsidies and poverty alleviation programs
14. Partial-time paid work and multiple activities: services, handicraft, food, washing, ironing, paid jobs
15. Social organization against organized crime and gangs
16. Empowerment of women and fight against intra-family violence
17. Social and economic consolidation of productive activities, colonies and families



## Disasters

Floods: 1986; 1998; 2010; 2011;  
2012

Droughts: every year

Cholera epidemics: 1992

Dengue fever: from 2005 on  
increase of 600%

Distrito Federal

México

# Threats

Morelos

1. High altitude from Popocatepetl to Yautepec: 5400m down to 1200m
2. High speed of water with rocks and trees
3. Complex hydrology: with a lot of small rivers, often dried out and eroded
4. Deforestation, also in national parks
5. Soil erosion (80%)
6. High sedimentation in river bed
7. Extreme rainfalls
8. Large drought periods
9. Invasion of the river basin
10. Lack of infrastructure
11. Waste in the river
12. Lack of municipal planning
13. Initial cooperation among the three levels of government
14. Few participation of citizens



# Marginalization and poverty



## » Población

Habitantes



tasa de crecimiento  
2000 - 2010

1.3% cuenca

1.7% nacional

Marginación

| Índice   | Localidades (%) |
|----------|-----------------|
| Muy bajo | 13.6            |
| Bajo     | 22.4            |
| Medio    | 19.3            |
| Alto     | 39.9            |
| Muy alto | 4.8             |

## Esperanza de vida (años)

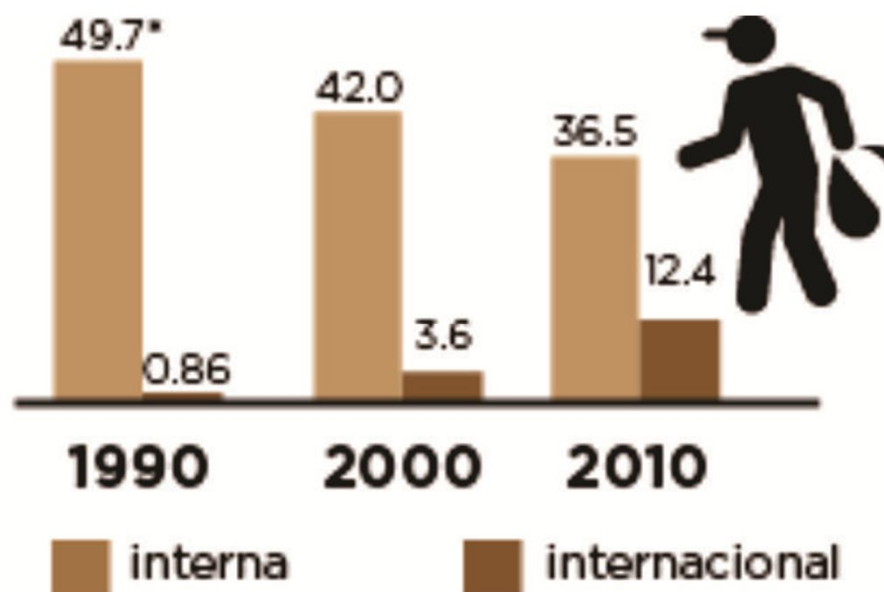
|      | cuenca | nacional |
|------|--------|----------|
| 2006 | 75.6   | 74.8     |
| 2010 | 76.0   | 75.4     |

## » Vivienda

Servicios

|              | 1990  | 2010  |
|--------------|-------|-------|
| tomas        | 82.1% | 99.5% |
| drenaje      | 55.1% | 92.1% |
| electricidad | 95.1% | 99.5% |

Migración



\*49 de cada mil hab. vivía en otra entidad o EUA



Coping strategies

- What do people *know* and *believe* about the risks being posed?
- What is the *past experience/outcomes* of information use?
- Is the new information *relevant* for decisions in the particular community?
- Are the sources/providers of information *credible* to the intended user?
- Are practitioners (e.g., farmers) *receptive* to the information and to research?
- Is the information *accessible* to the decisionmaker?
- Is the information *compatible* with existing decision models (e.g., for farming practice)?
- Does the community (or individuals in the community) have the *capacity* to use information?

## Primary Actors

### INTERNATIONAL

- Bilateral and multilateral partners
- Intergovernmental organizations

### NATIONAL / SUB-NATIONAL

- National government and statutory agencies
- Civil society organizations
- Private sector
- Research and communication bodies
- Local government agencies

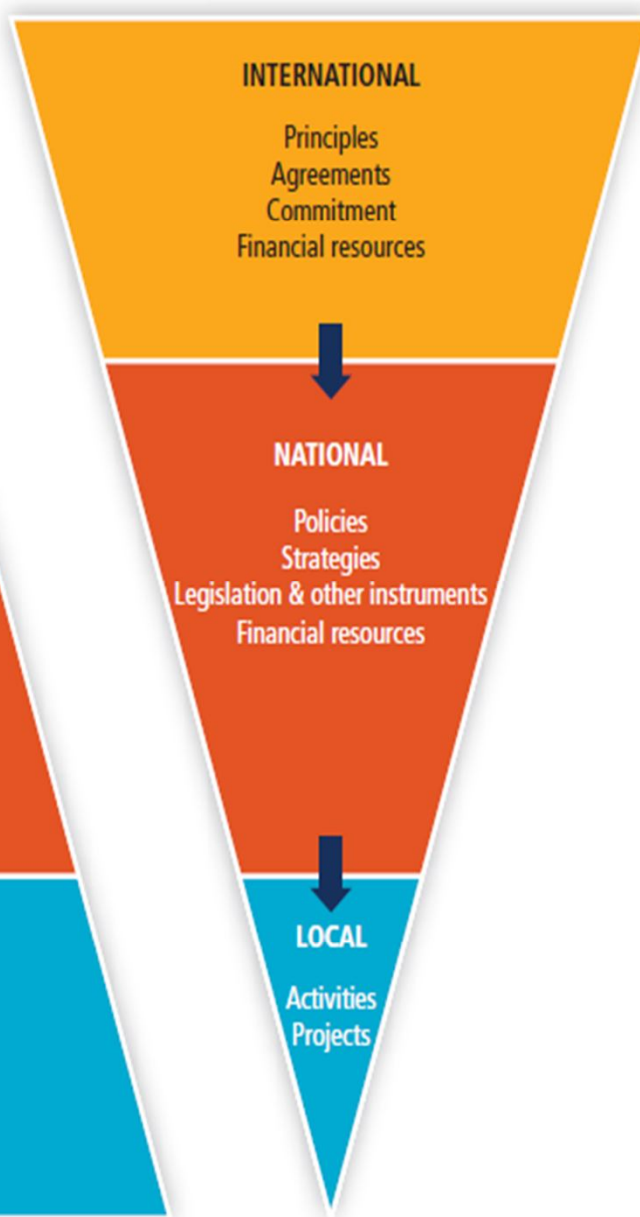
### LOCAL

- Individuals, households, and communities
- Private sector
- Community-based organizations
- Faith-based organizations

## "BOTTOM-UP" Functions



## "TOP-DOWN" Functions



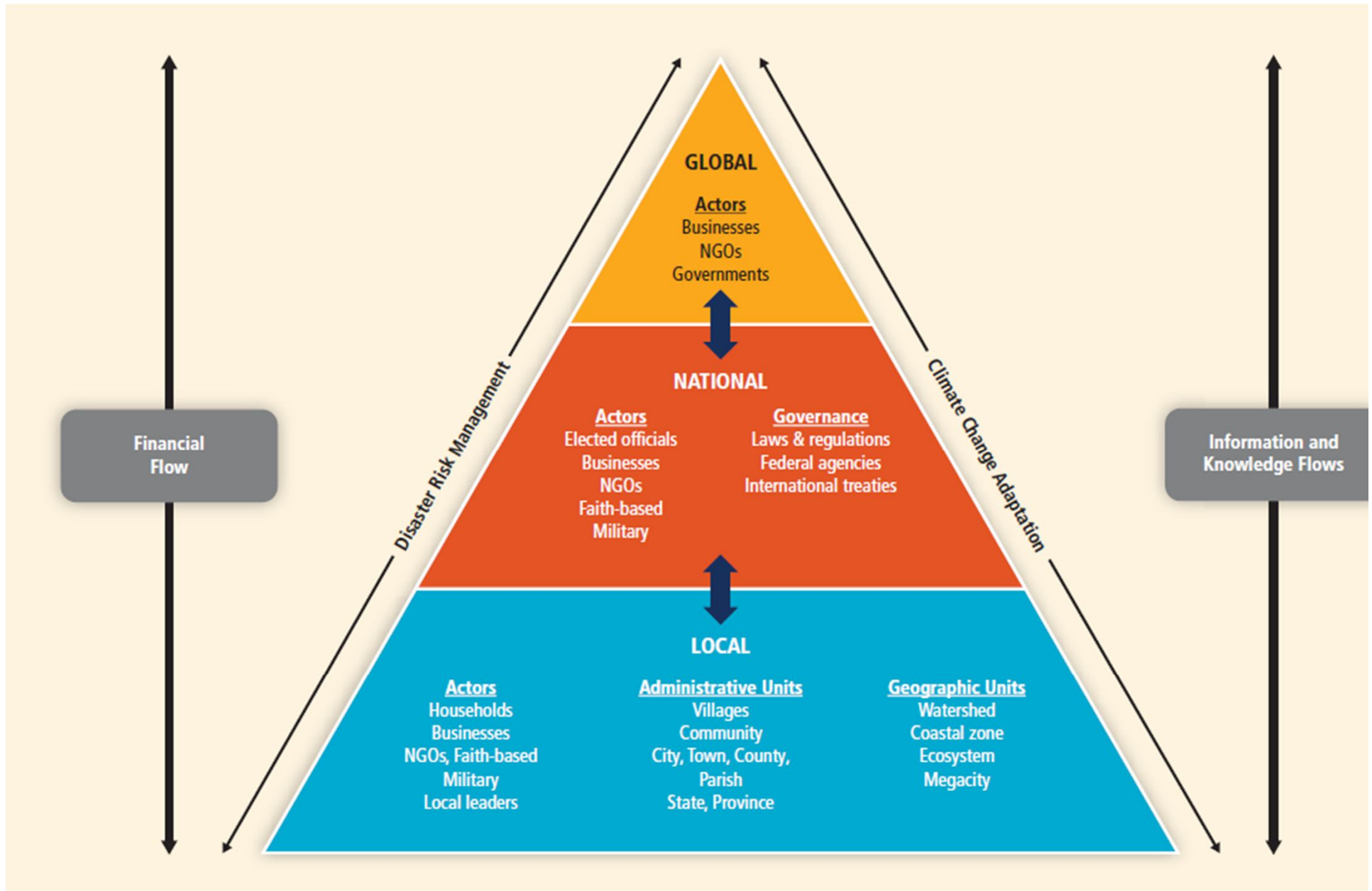
Global Climate Projections

Regional / National Climate Projections

Scientific and Local Experiential Knowledge

Vulnerability, Risk, and Adaptation Assessments

# Linking local to global actores and responsibilities



Gender vulnerability and women's discrimination increase vulnerability of exposed communities: even non-extreme events can have extreme impacts in loss of lives and livelihood

## Managing the risks: **drought** in the context of **food security** in the drylands

### Risk factors

- more variable rain
- ecosystem degradation
- hotter days
- discrimination of women
- poor health and education conditions



### Risk Management/Adaptation

- improved water management
- sustainable farming practice
- drought-resistant crops
- drought forecasting

ipcc

INTERGOVERNMENTAL PANEL ON climate change



Indigenous people  
are highly  
vulnerable and at  
risks during  
extreme events:  
hurricane Stan  
(2005)

highly vulnerable people  
and regions





Economic losses from climate-related disasters have increased, with large spatial and interannual variation, but are higher in industrialized countries, while fatalities are higher in developing countries.

## Managing the risks: floods

### Risk Factors

- population growth
- increasing property value
- higher storm surge with sea level rise



### Risk Management/ Adaptation

- better forecasting
- warning systems
- stricter building codes
- regional risk pooling

Projected globally: *likely* increase in average maximum wind speed and associated heavy rainfall (although not in all regions)

ipcc  
climate change







## 4. Common interests

# Mi Río Yautepec

Niños, niñas y adultos de 13 municipios de los estados de Morelos y México construimos el futuro de nuestro río para hacer de este pequeño territorio un lugar seguro de trabajo, educación, agua limpia, bosques y selvas.

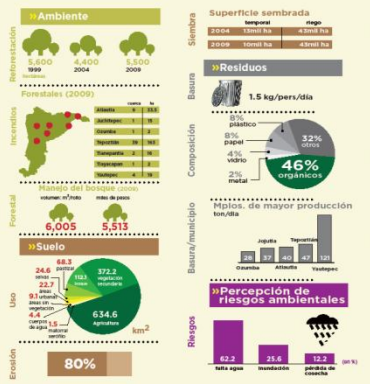
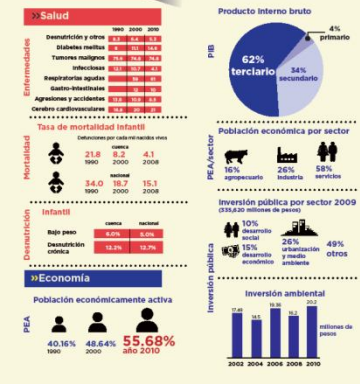
2 Pueblos Mágicos



| Gestión ambiental (al final del primer año): inversión \$ 350 millones   | Gestión ambiental mediano plazo (4 años): inversión \$ 950 millones   |
|--|---|
| <ul style="list-style-type: none"> <li>3 presas rompepicos y derivadoras</li> <li>15 actualizaciones de planes de ordenamiento urbano y ambiental</li> <li>1 modelo matemático de riesgo hídrico</li> <li>PTA Yautepec rehabilitada</li> <li>Reubicación y ampliación de colectores</li> <li>1 Asociación de Usuarios del Río Yautepec</li> <li>2 viveros y un centro de genoplasmia</li> <li>15 millones de árboles reforestados</li> <li>3 centros de acopio de desechos sólidos</li> <li>3 mercados con separación de desechos</li> <li>3 compostas de residuos orgánicos</li> <li>15 limpiezas del río</li> <li>50 escuelas con educación ambiental</li> <li>3 jagüeyes recuperados</li> <li>861 hectáreas de producción rural sustentable</li> <li>Manejo integral del manantial Michiate y resolución del conflicto comunitario</li> </ul> | <ul style="list-style-type: none"> <li>1 presa Morelos 1</li> <li>1 cauce de alivio en barranca La Nopalera</li> <li>2 viveros con 15 millones de plantas nativas</li> <li>60 millones de árboles reforestados</li> <li>4 jagüeyes y 6 manantiales recuperados</li> <li>3 programas de desarrollo ecoturístico</li> <li>Construcción de colectores</li> <li>13 planes de ordenamiento urbano y ambiental</li> <li>15 centros de acopio</li> <li>13 compostas de residuos orgánicos comerciales</li> <li>1 relleno intermunicipal</li> <li>5 mil ha de producción rural sustentable</li> <li>15 limpiezas de cultura ambiental</li> <li>Inventario de flora y fauna nativa</li> <li>2 mil microempresas</li> <li>Programa de ecoturismo</li> </ul> |

### Planeación ambiental (10 años)

| Social   | Económico   |
|--|---|
| <ul style="list-style-type: none"> <li>Educación socioambiental</li> <li>Abastecimiento de polvos</li> <li>Integración de ONG's</li> <li>Vínculo entre y con Ayudantías</li> <li>Consejo comunitario desarrollo rural sustentable</li> <li>Capacitación nutricional</li> <li>Combate a diabetes</li> <li>Prevención de embarazos en adolescentes</li> <li>Medicina y curaciones tradicionales</li> </ul> | <ul style="list-style-type: none"> <li>10 mil empleos</li> <li>10 mil ha de agricultura orgánica</li> <li>Mercado justo</li> <li>Pago por servicios ambientales</li> <li>1 centro de encadenamiento productivo</li> <li>5 mil microempresas</li> <li>5 mil huertos domésticos</li> <li>5 mil manidos forestales</li> <li>Ecoturismo cultural</li> </ul> |
| Ambiental  | Político  |
| <ul style="list-style-type: none"> <li>7 presas contra inundaciones</li> <li>150 millones de árboles reforestados</li> <li>20 mil ha de suelos recuperados</li> <li>1 centro de cultura ambiental</li> <li>3 rellenos sanitarios intermunicipales</li> <li>1 ordenamiento integral de la cuenca</li> <li>5 mil ha de riego eficiente</li> <li>500 ha de árboles frutales</li> </ul>                      | <ul style="list-style-type: none"> <li>Justicia ambiental</li> <li>Legislación ambiental</li> <li>Vigilancia ciudadana</li> <li>Tribunal ambiental ciudadano</li> <li>Seguridad humana y ambiental</li> <li>Equidad de género</li> <li>Derecho de niños</li> <li>Controlaría ciudadana</li> </ul>   |



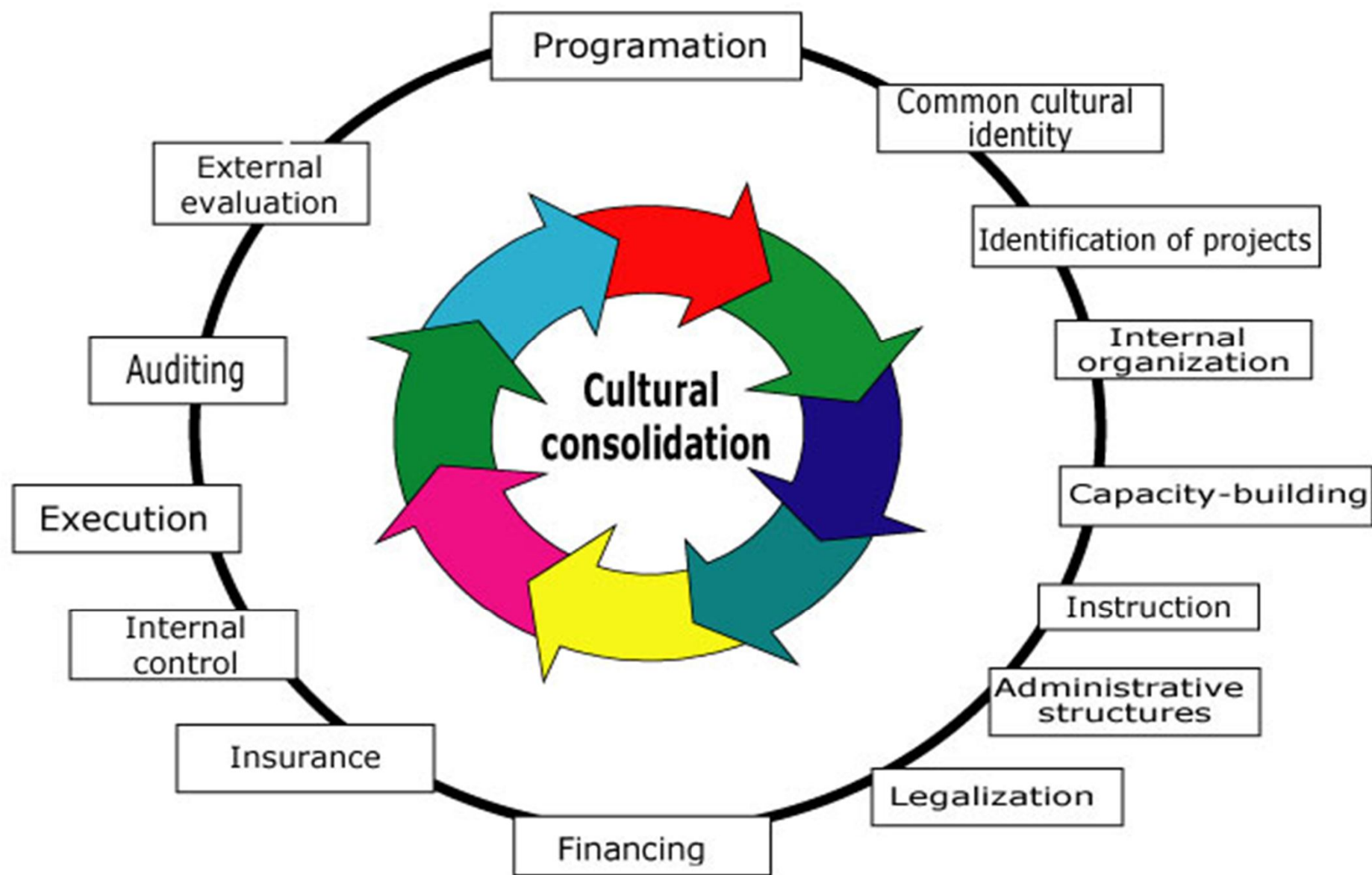
Multi-stakeholder, multidisciplinary and integrated management of the Yautepec river with involvement of the four levels of government, business community, trade social movements, NGO, schools and affected people

PTA: Planta de Tratamiento de Aguas Residuales  
 OSMOS: Uruba Oswald, Angel Flores, Arana Estrada, Alejandro Morales, Héctor Cruz  
 www.rechlaguapn.com

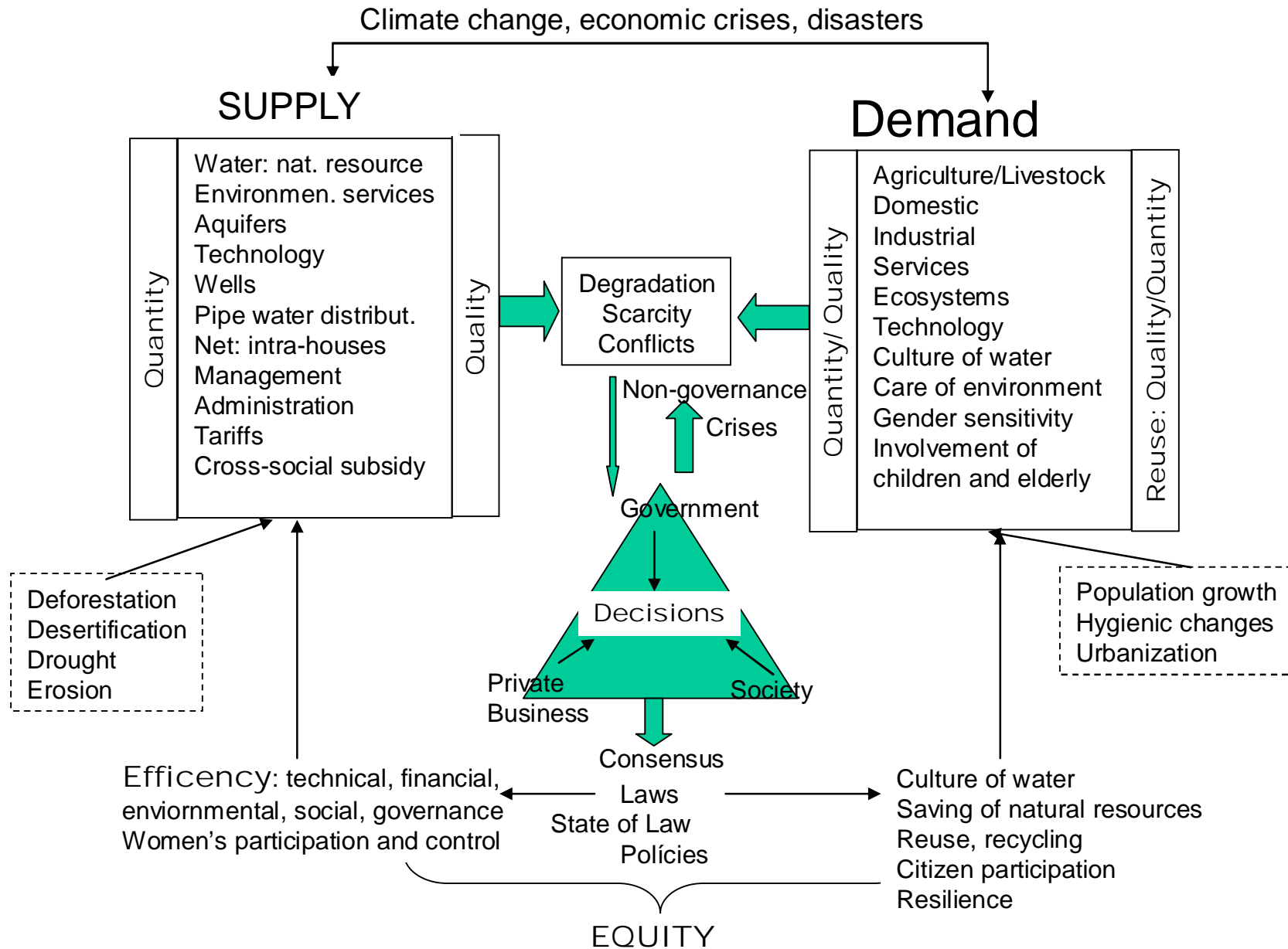
# Integral proposal of poverty alleviation and environmental recovery to reduce migration

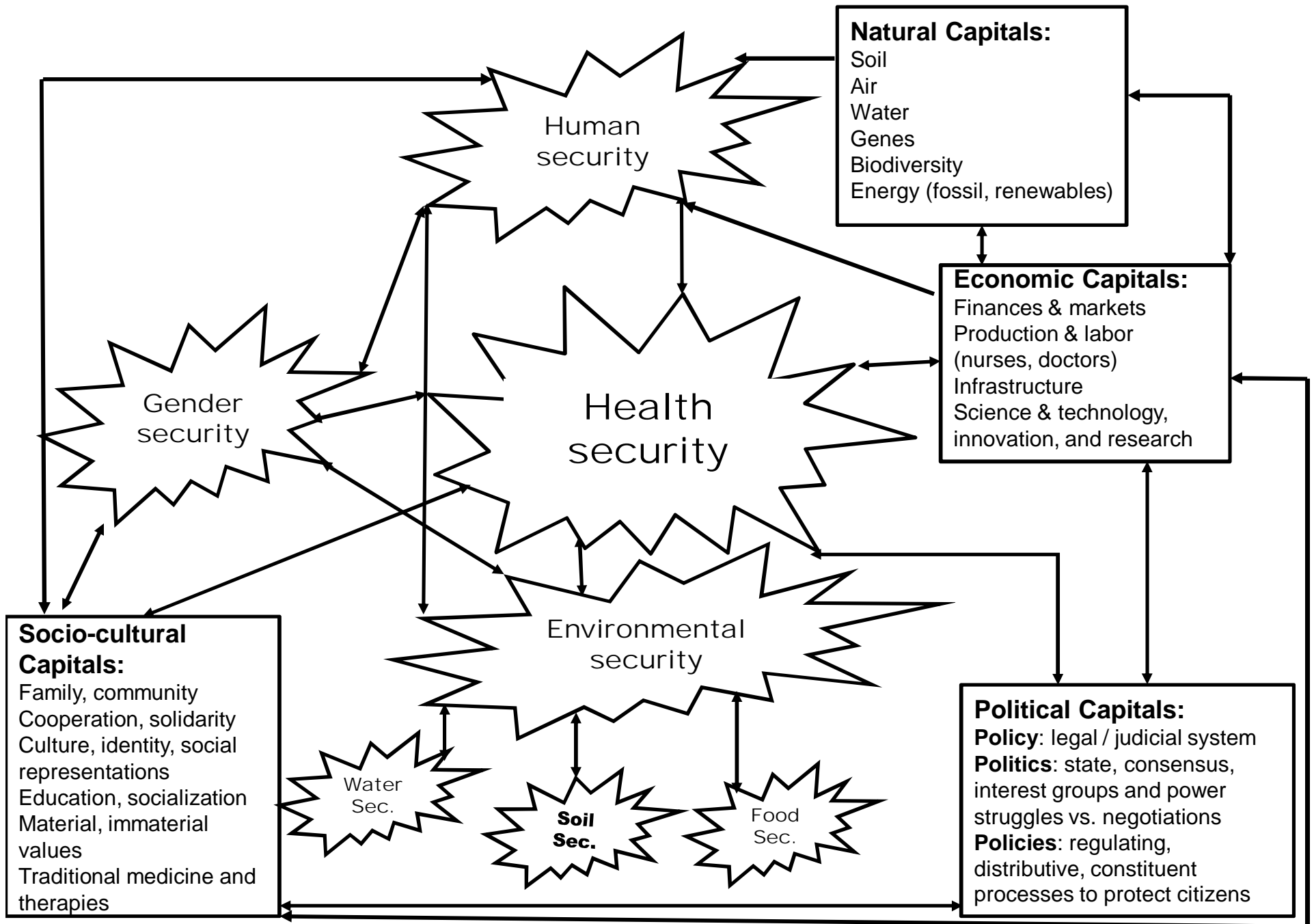


Fig 1. Model of self-reliant entrepreneurship



# Efficiency and Equity with Natural Resources







# Transition to Alternative Livelihoods and Sustainable Economy

- **Decentralized governance: traditional knowledge from women, peasants, *grassroots* movements against desertification**
- **Consolidation of leadership (local clergymen, spiritual leaders, doctors, lawyers, schools, teachers) and training (old/young people, migrants)**
- **Off-farm jobs create financial resources to recover degraded land and feed people**
- **Concrete Action Programmes to prevent migration, crises and conflicts.**

Thank you very much for your  
attention

