IANAS WATER PROGRAM MEETING

Water Science Institute – ICA, Peru

November 21th, 2016

Nicole Bernex, Program Coordinator

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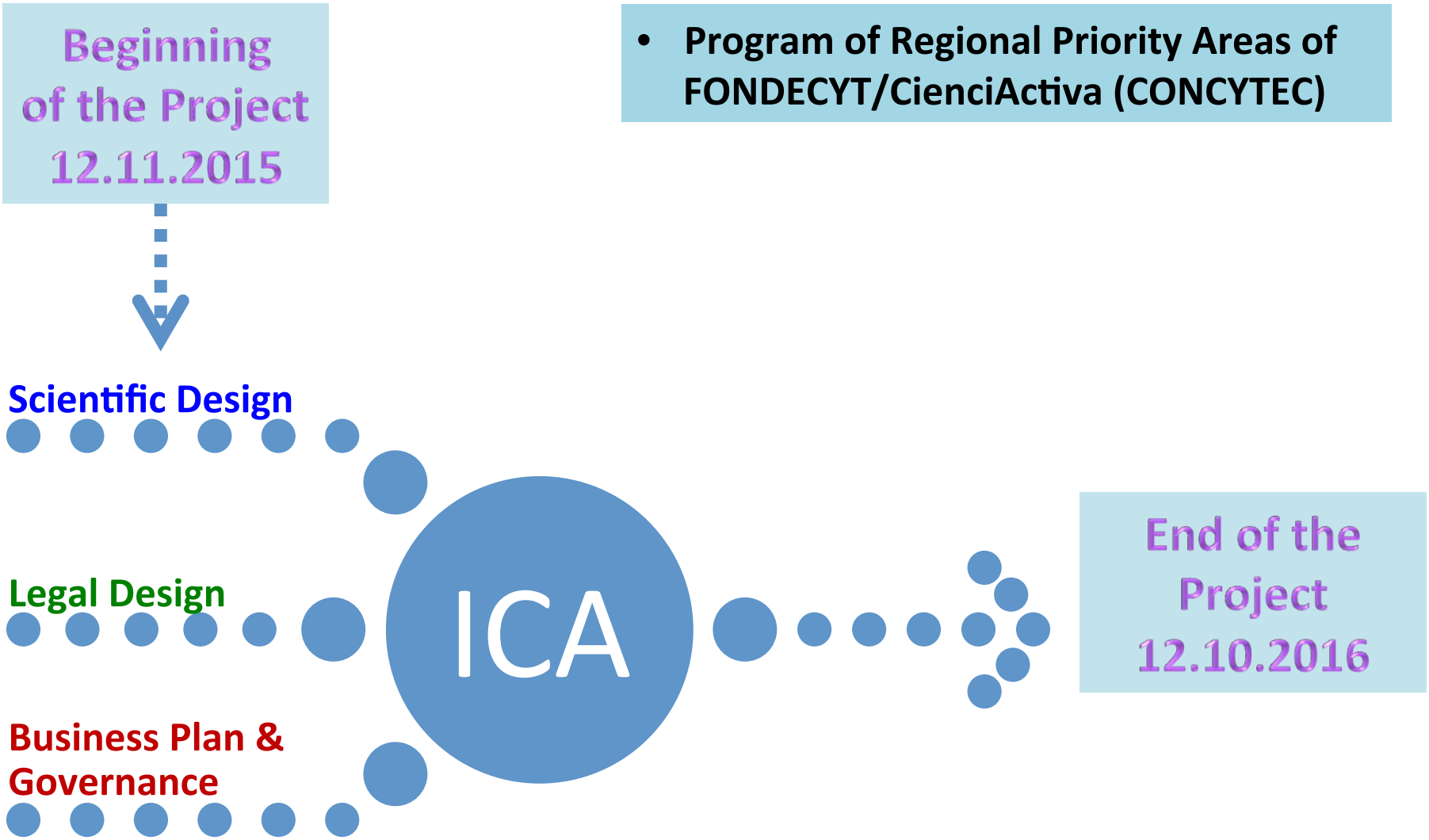
1. Introduction

- **Program of Regional Priority Areas of FONDECYT/CienciActiva (CONCYTEC)**

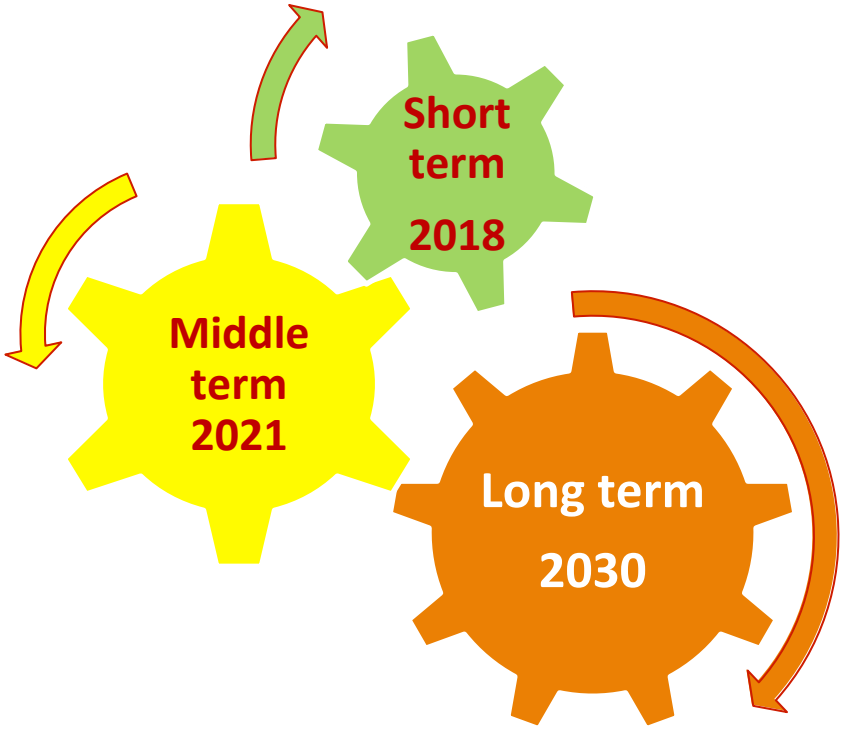


¿WHO?

- We are a team of researchers belonging to national and international institutions, led by the PUCP-IRD partnership, responsible for drafting the proposal for the Scientific, Legal and Financial Design of the Scientific Water Institute ("Instituto Científico del Agua – ICA" in Spanish)

- **Katherine Vammen**
- **Henry Vaux**
- **Salvador Montenegro**
- **Jean Philippe Denux**
- **Cathy Ryan**
- **David Bethune**
- **Jean-Loup Guyot…..**

TEMPORAL STRUCTURE



2. Antecedents.

Regional Government

- Lack of technical knowledge and scientific research.
- Lack of institutionality.
- Absence of water culture.

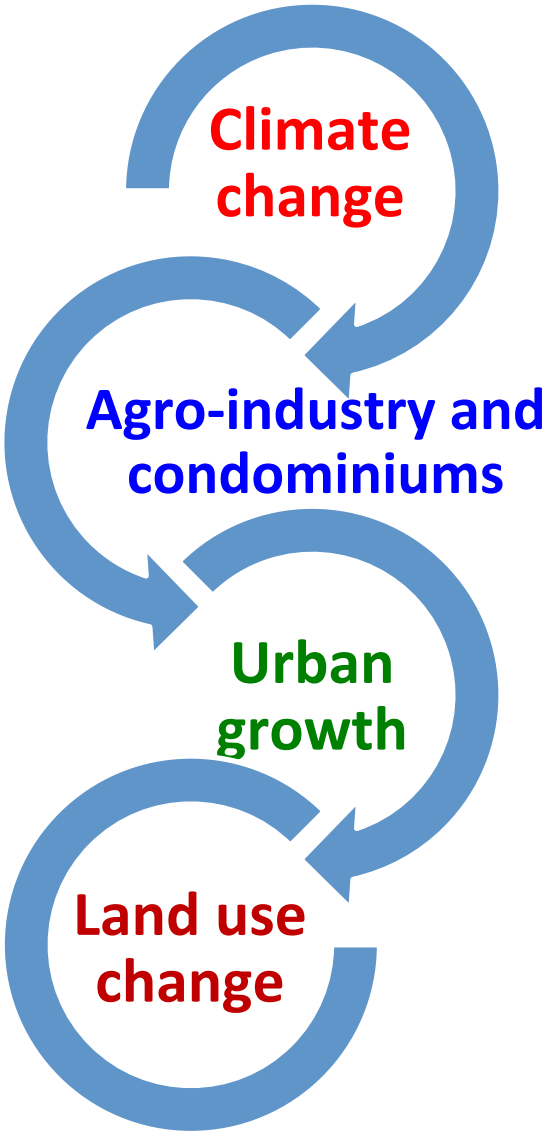
Companies

- Requirement to analyze physical and chemical variables of water, soil and plants.
- Need for information on social variables.

Society

- Water scarcity for population and agricultural uses.
- Need for training and awareness in water culture.

Severe limitations, but a favorable position



1. Water as a key priority of the national agenda.
2. Need to reverse poverty and rural postponement.
3. Need for data and information.
4. Interest and commitment for science and technological innovation.
5. Request of the governor of the region of Ica.
6. Physical context (D&T axis south of Lima).

3. ICA Mission, vision and objectives

OUR MISSION

Make science and contribute to the creation of scientific knowledge and the development of highly qualified human resources, at different levels and approaches of Water Sciences, **for integrated water management**, *with emphasis on arid and semi-arid regions, progress and life quality of the people and sustainability of vital ecosystems,* **through interdisciplinary research, innovative technologies, scientific networks and collaborative systems.**

OUR VISION

- In 2021, the ICA is a scientific institute dedicated to water which has a renowned professional and technician team, produces scientific information and develops technology excellence with international leadership. The ICA is asked to solve problems in the region, in Peru and other countries

STRATEGIC OBJECTIVES OF THE ICA

Contribute to the sustainability of water resources and freshwater ecosystems of the Ica Region.

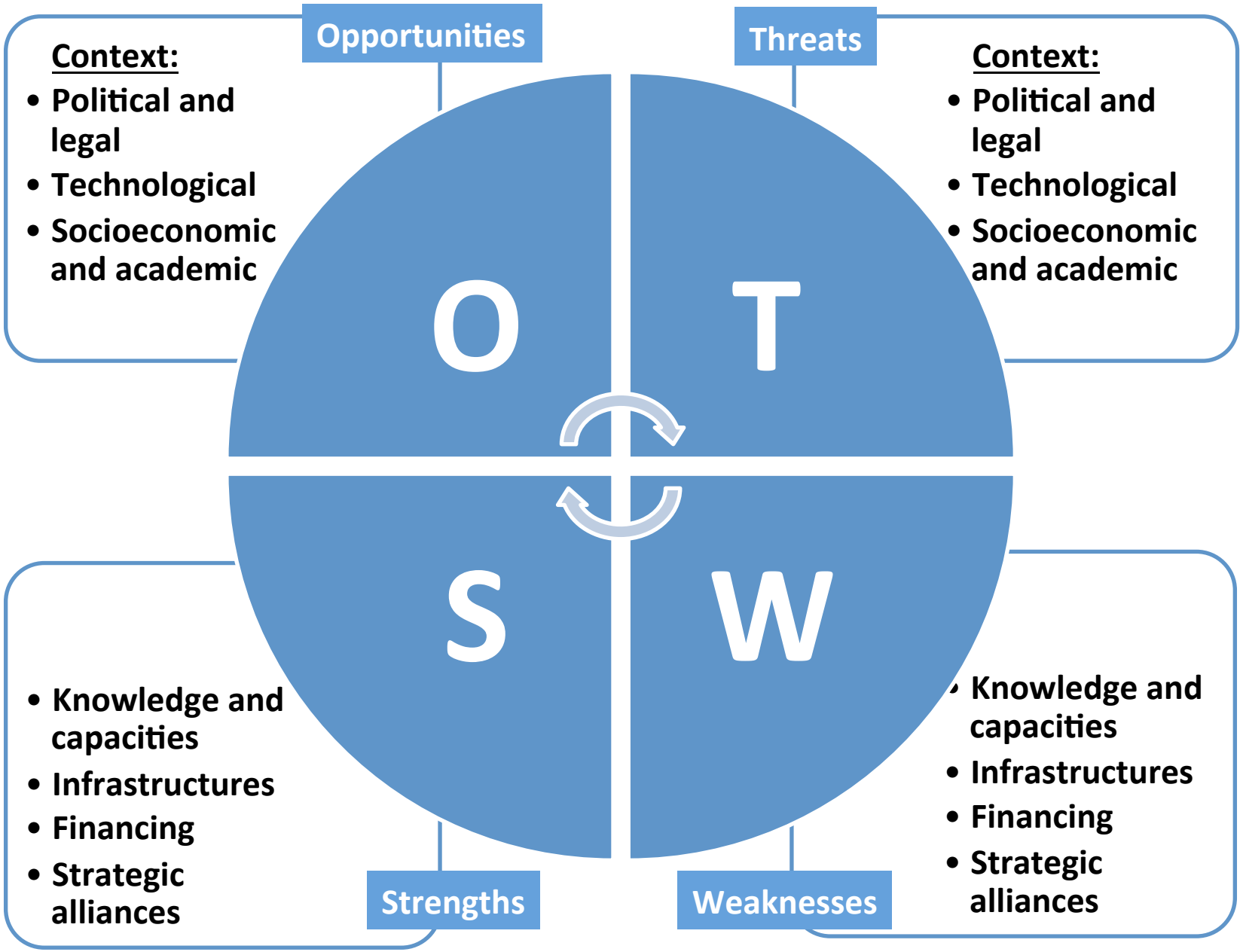
Incorporate the water sector into the knowledge society.

Create a high added value for the institutions of the water sector.

Contribute to the water security and sustainability of the Ica Region, Peru, Latin America and the Caribbean.

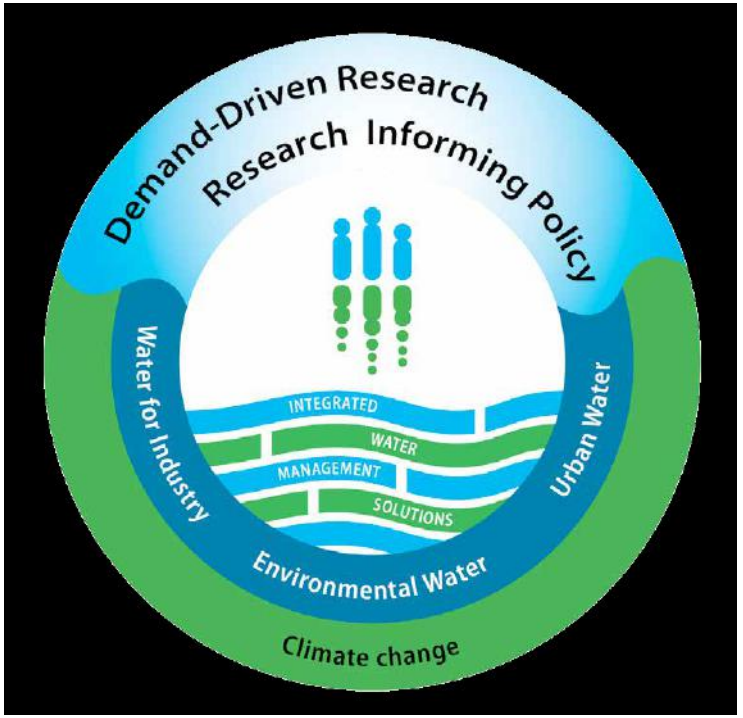
Foster the development of water science and technology.

4. Competitive Environmental Analysis



5. ICA organization

a) ICA organizational structure
b) Scientific research
c) Laboratories
d) Support for capacity training
e) Scientific production
f) Services



Fuente: Goyder Institute
Añadiendo agua para la agricultura ….
Cambio climático y sostenibilidad

5. ICA Organization: values and principles

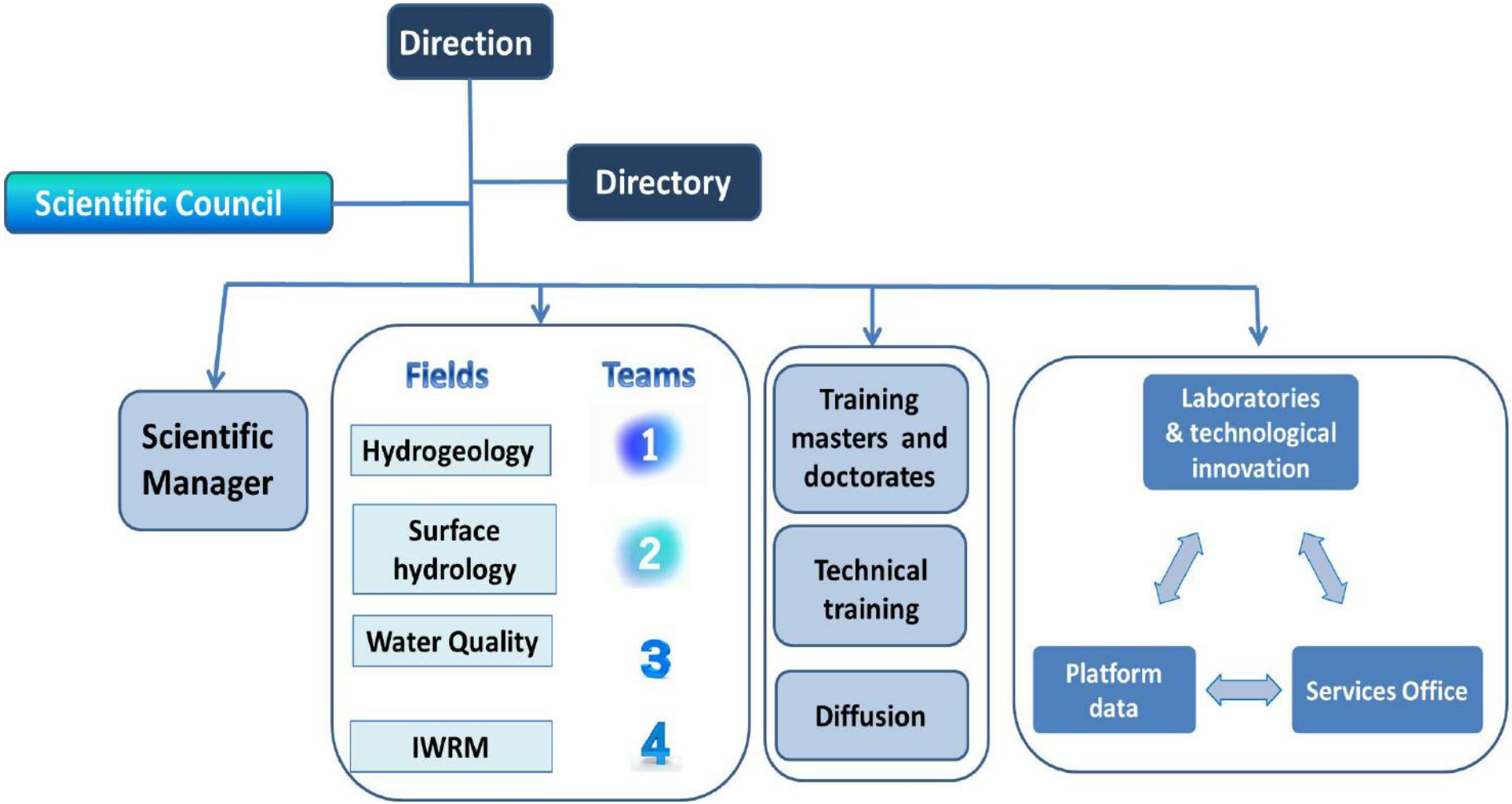
Our values

- Search for truth.
- Respect for the dignity of the person.
- Pluralism.
- Social responsibility and commitment to constant improvement.
- Leadership.
- Honesty.
- Solidarity.
- Justice.
- Tolerance.

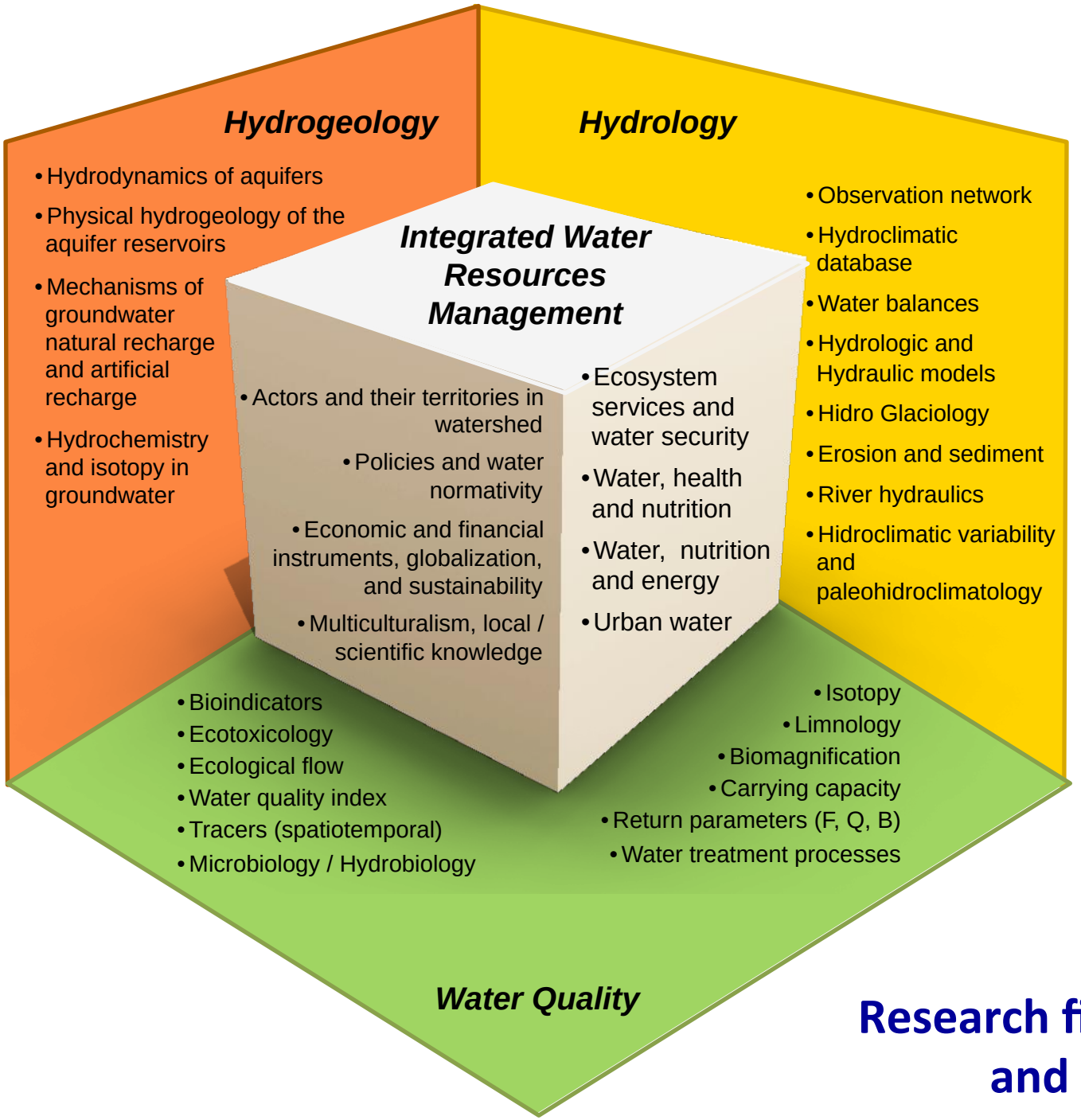
Our principles

- Excellence in research
- Mind-opening.
- Integration.

5. ICA organization: structure



5. ICA organization : Scientific research



Research fields and axes

5. ICA organization : Scientific research

KEY RESEARCH QUESTIONS in a short-middle term

The interdisciplinary work between areas, around research questions, allows to know the status of the issue, generate "hard" information and build integrated scenarios ...

¿Which are the hydrogeological characteristics of the aquifer and its dynamics of exploitation?

- *(How does the water move in aquifers? Which are the contamination processes?*
- *Which are the economic effects that the aquifer recharge, the safeguarding of ecological flow and the water footprint control report to a company?)*

2. What are the characteristics, strengths, limitations and challenges of water resources governance?

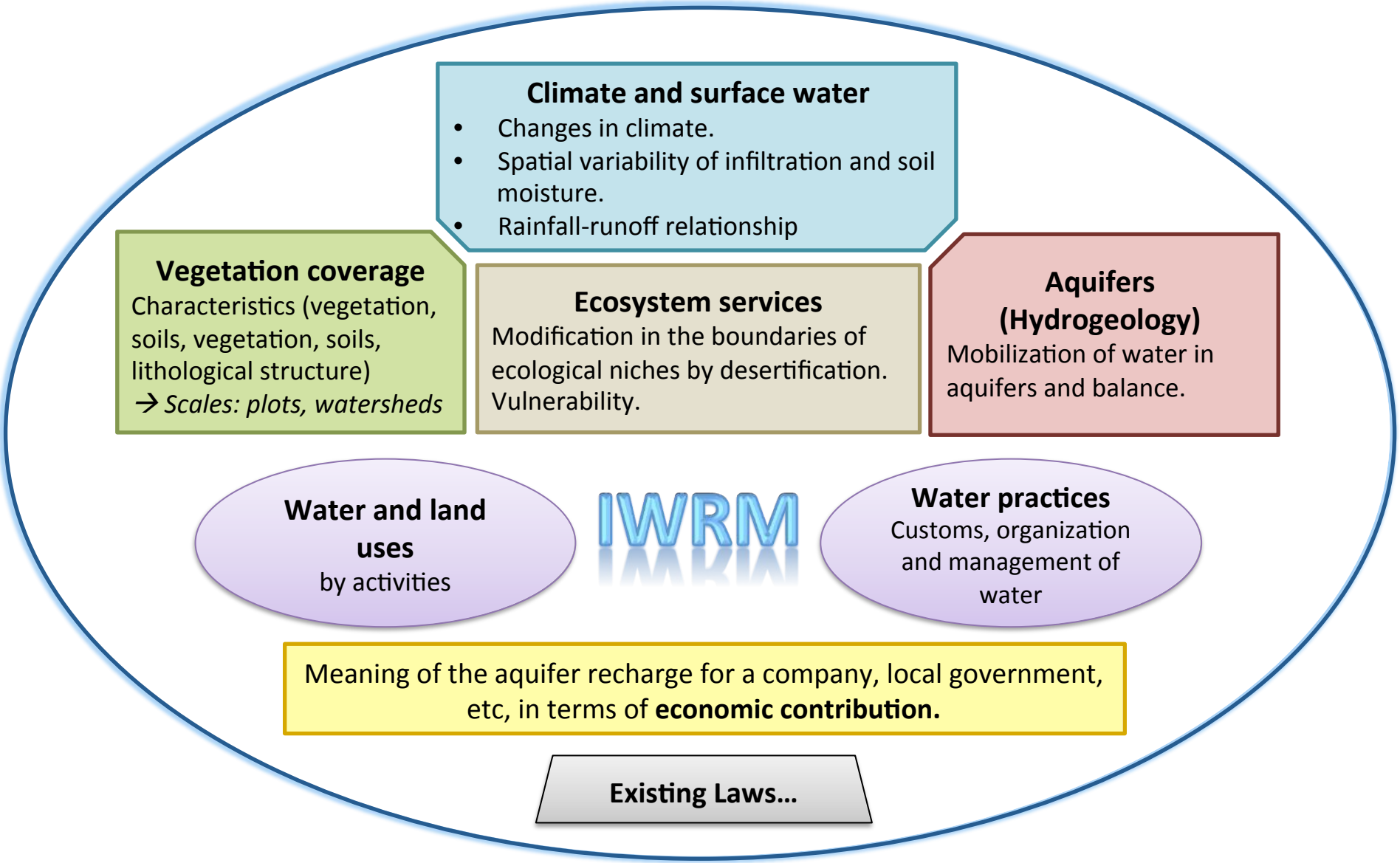
What are the emergent conflicts in the actual scenario of water stress in Ica, Huancavelica, Ayacucho, Apurimac?

Who are the different watershed actors, (mapping of actors, roles, capacity, conflict/cooperation nexus) ?

What are the stages of an integrated groundwater management?

3. What is the pollution load, the effects on the water quality and on the degradation of ecosystem services?

Interdisciplinary example: case of research in **planting and harvesting rainwater**



Full range of disciplines

- Economics, sociology and policy analysis
- Hydro(geo)logy and hydraulics
- Climatologist / meteorologist
- Biochemist, biologist and botanist
- Agronomy
- Geography
- Lawyer water.

- **Method for inter - transdisciplinarity: complex system modelling and simulation, integrated assessment, participatory research.**

5. ICA Organization: laboratories

Hydrometry and Hydrogeology laboratory

Measurement of variables in the field and obtaining samples for analysis. The data will be used for modeling.

- *Hydrometeorological instruments: rain gauges, limnigraphe, meteorological stations.*
- *Acoustic Doppler current profiler, ultrasonic current meter.*
- *Suspended load sampler.*
- *Bottom trawl load sampler.*
- *Resistivity meter.*

Chemical and physical analysis laboratory

Determination of physical and chemical variables of surface water, ground water and residual water samples.

- *Ion Analyzer.*
- *Inductive coupling plasma mass spectrometer (ICP MS).*
- *UV / VIS Spectrophotometer.*
- *Gas Chromatograph and mass detector, high sensitivity, with purge and trap.*
- *TOC Analyzer.*
- *Equipment for determination of BOD / COD.*

Isotopy laboratory

Analysis of stable and radioactive isotopes of the environment for the characterization of the dynamic behavior of water.

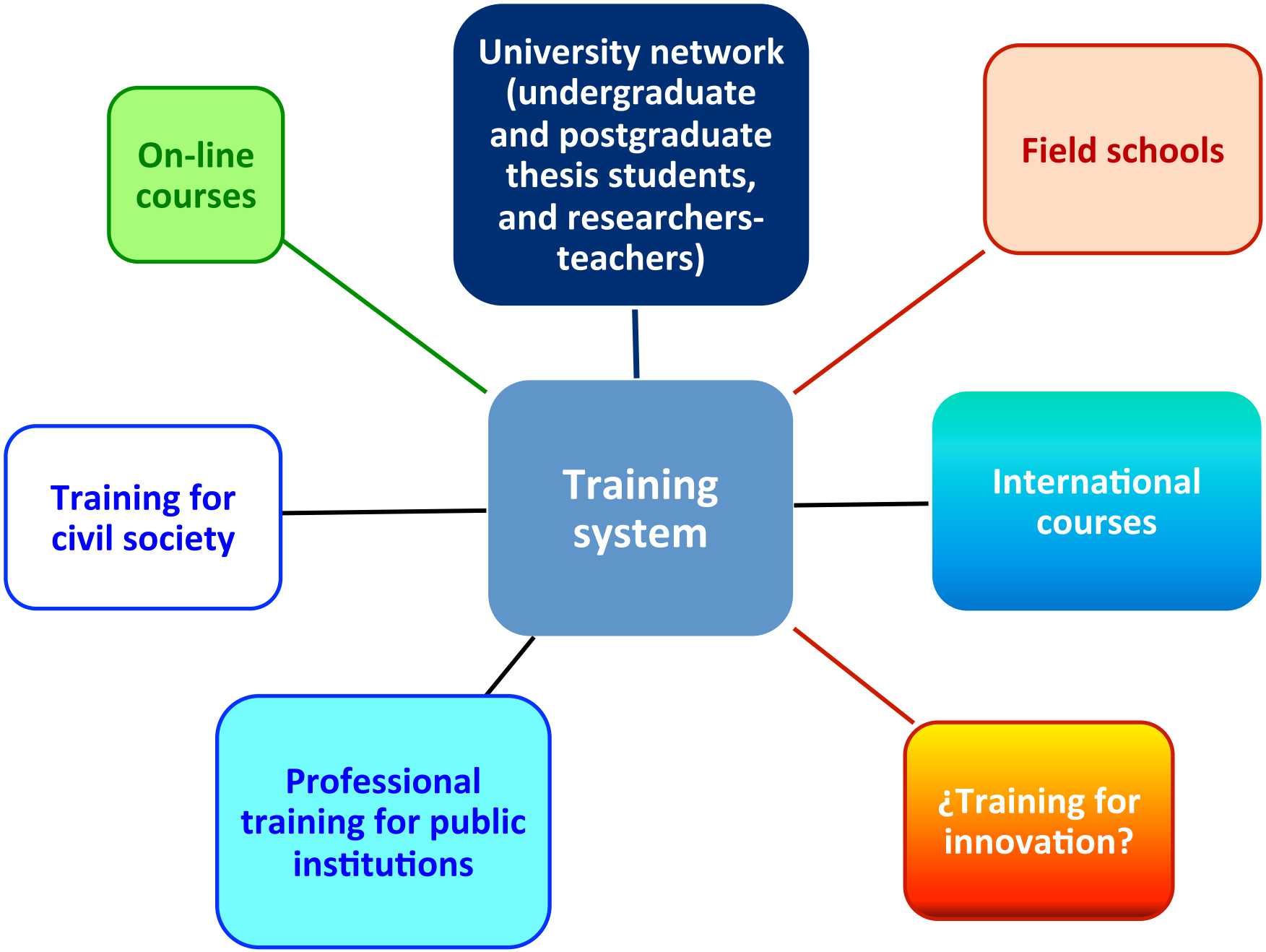
- *CRDS Cavity Rirg Doun Spectroscopy-Picarro.*
- *CRDS (C13, N15, etc.)*
- *IMRS (Sr, Pb, etc.)*
- *Liquid scintillation counter.*
- *Multiparameter probe (CTD)*

Microbiology and ecology laboratory

Microbiological analysis of surface water and residual water samples. Support in the biomonitoring and studies of ecological flows.

- *Epifluorescence / Fluorescence microscope.*
- *Inverted microscope with internal camera.*
- *Stereo microscope with built-in camera.*
- *Filtration equipment.*

5. ICA organization: scientific training



UNIVERSITY OF CALGARY

Need for a Masters Program in Peru

MASTER OF HYDROGEOLOGY IN PERU

International academic level to be a professional hydrogeologist:

Master of Science with specialization in Hydrogeology

Two years full time including thesis

Year 1: Courses

Year 2: Applied research

Student financing: grants (tuition allowance) and research funds

Development of sector capacity

Applied research

Teacher training

M a s t e r

Cooperation with water sector

Regional and international cooperation

Public education

Demand of the Commonwealth of the Andes' universities (Junín, Huancavelica, Ica, Ayacucho and Apurimac regions)

Stage 1

- Diploma in water governance
- MSc in Hydrogeology
- Field schools in karstic geology, in ecological flow, in aquifer recharge.

Financing strategy

a) Direct Regional Funds (Regional Research Agenda)

b) Funds transferred to CONCYTEC from the regional government for training.

c) Agreement letter.

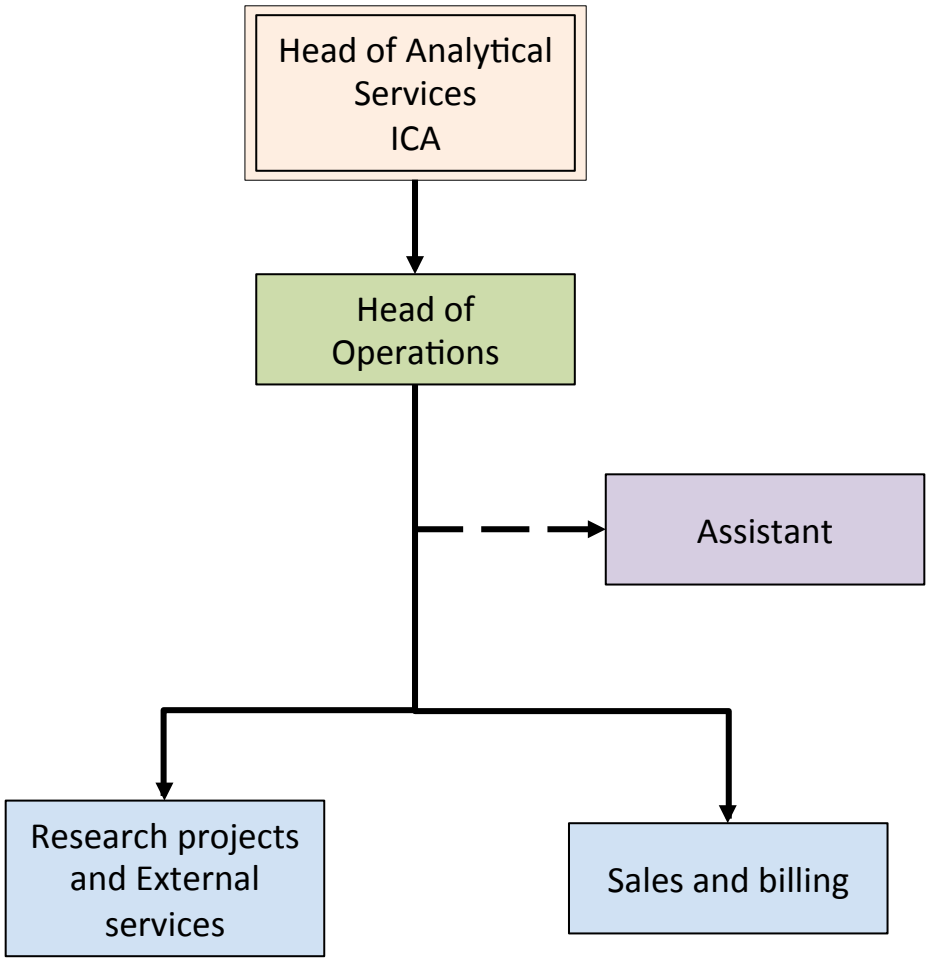
5. ICA Organization: Scientific production

- ❑ Thesis
- ❑ Development of software and databases
- ❑ Publications

Document type	Details
Article	International or national indexed journals
Article	International or national not indexed journals
Scientific work management	
Coordination of special numbers	International or national indexed journals / International or national not indexed journals
Management of scientific vulgarization works	
Coordination of scientific popularization magazines	
Scientific book chapters	
Chapters of work of scientific popularization	
Academic conferences	National/International Congress
Contributions in conferences proceedings	National/International Congress
Expertise studies	
Movies, radio or television interviews	
Exhibitions or interventions for the Public	
Newspapers	
Technical articles	

5. ICA Organization: Services

Service office – Initial organization chart



STRATEGIC AXES

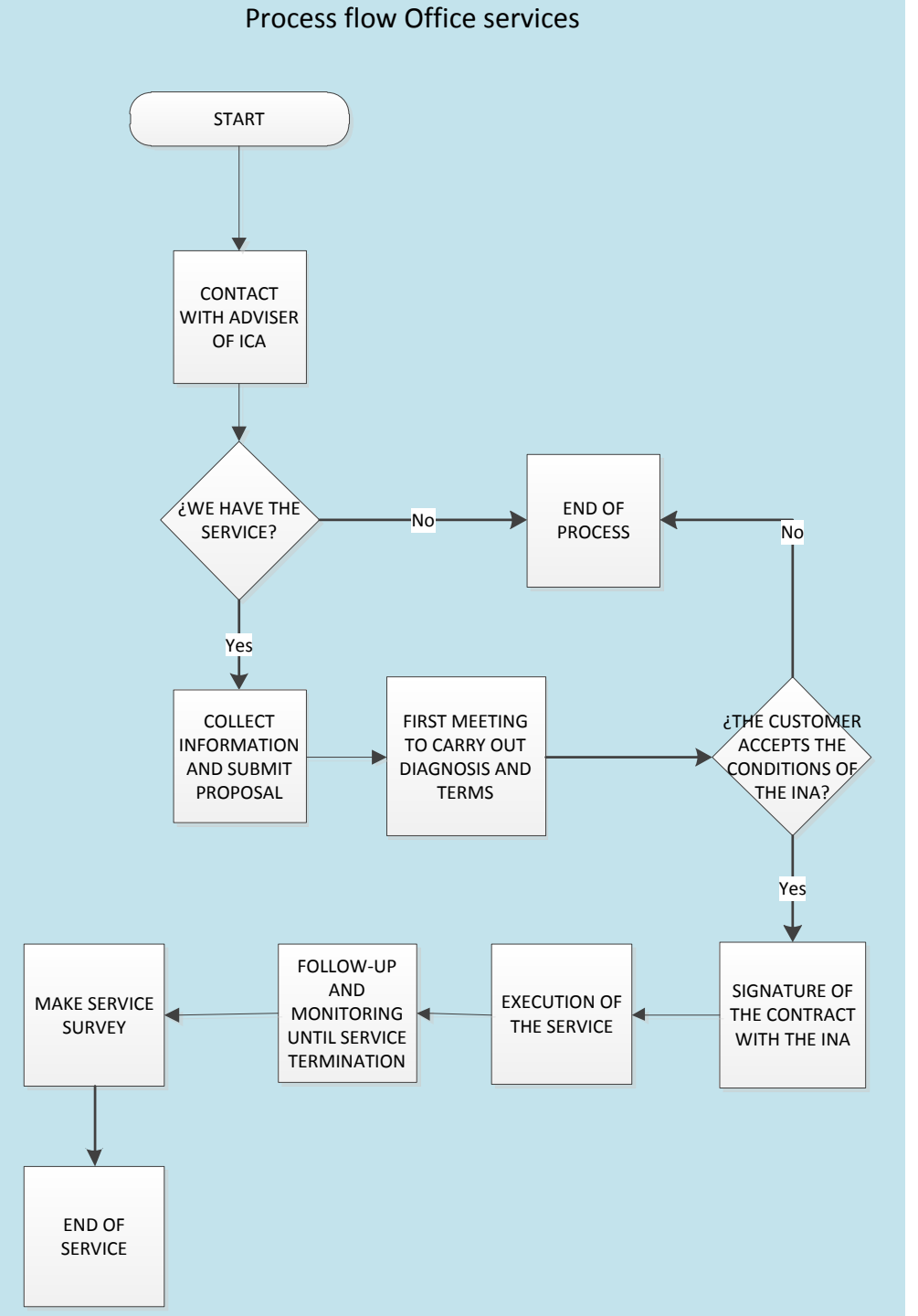
Service

Main axis of the ICA's office, because all efforts are oriented to provide the different types of services that are requested and to maintain an international level quality, that should be oriented to obtain ISO 9001.

Financial stability

One of the most important axes, because the office seeks to be self-sustaining, and depends on an adequate organizational functioning, through proper financial planning.

5. ICA Organization: Services



6. Good corporate governance and Business Plan

In this context, a serie of key questions appears, and they need to be answered in order to establish a solid institution for Ica and Peru.

Key Questions – ICA Business Plan

Impact

- What are the scientific fields we want to cover?
- What divisions are to be formed? What are the objectives of each division?
- Apart from Ica, which are the regions we look as secondary?
- Who are the people we need in order to achieve the objectives of the ICA?
- What resources will be needed in the short and medium term?
- Is it feasible everything we want to do? How do we prioritize initiatives?
- What are the costs in the short, medium and long term?
- Of the identified costs, which are only effect and which are recurrent?

Sustainability

- Are the products created with social impact purposes can be marketed?
- Is there raw material from the scientific work to create marketable products?
- Who could be interested in acquiring products from ICA?
- What income levels could reach with recurring products from ICA?
- Do potential incomes identified are sufficient to cover the costs of ICA?
- Which are the additional sources of income?
- What are the constraints in terms of Good Corporate Governance that could affect the long-term project?

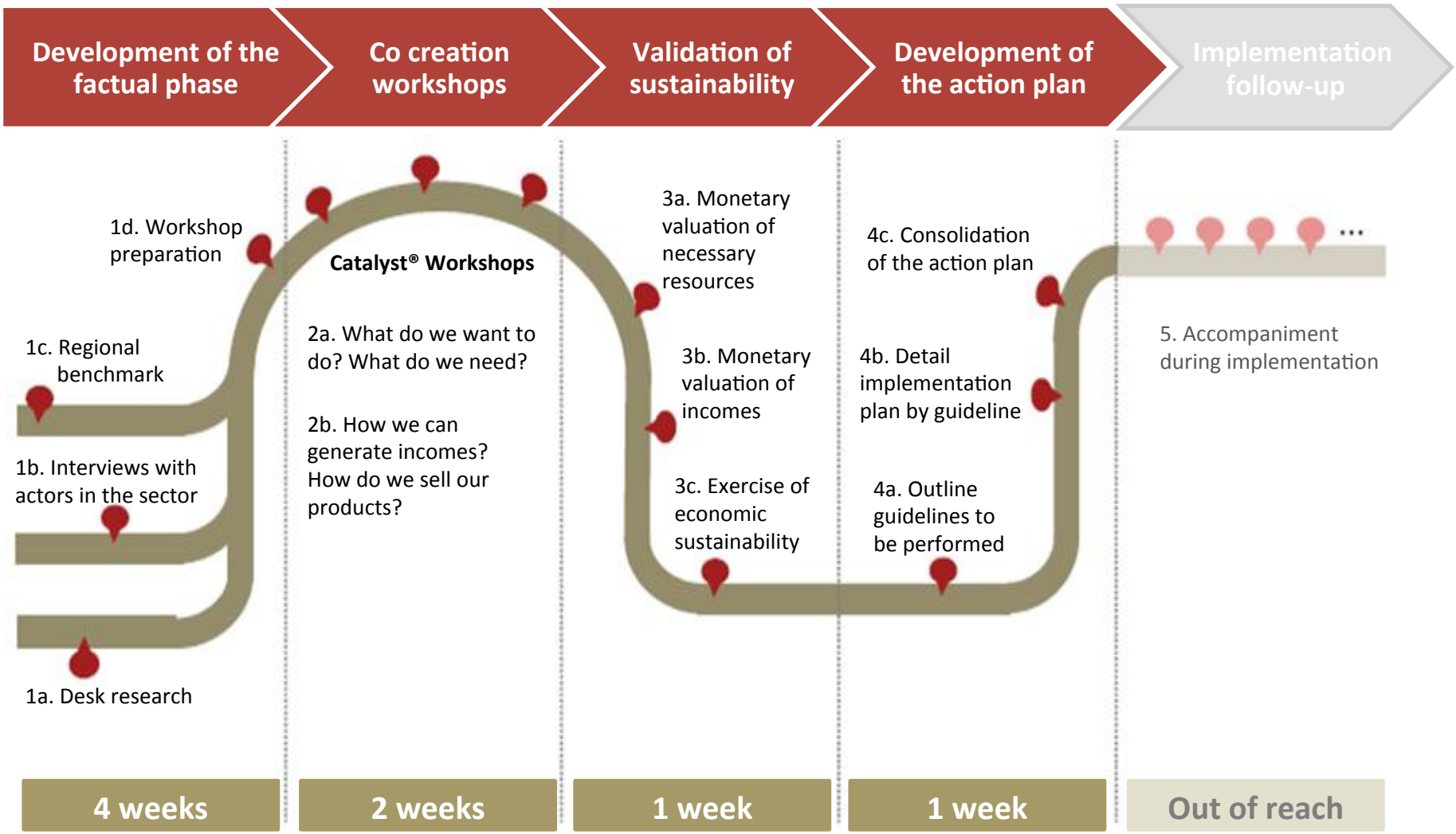
The five pillars of a good corporate governance

Key framework elements	Leadership strategy and culture	Structure and performance oversight	Risk	Management information and controls	Transparency and reporting
Code 'Principles'	Leadership	Effectiveness	Accountability	Remuneration	Relations with shareholders

"Crucially, risk occupies a position at the heart of the five pillars, and is the unifying element linking them all".

6. Good corporate governance and Business Plan

Approach – Overview



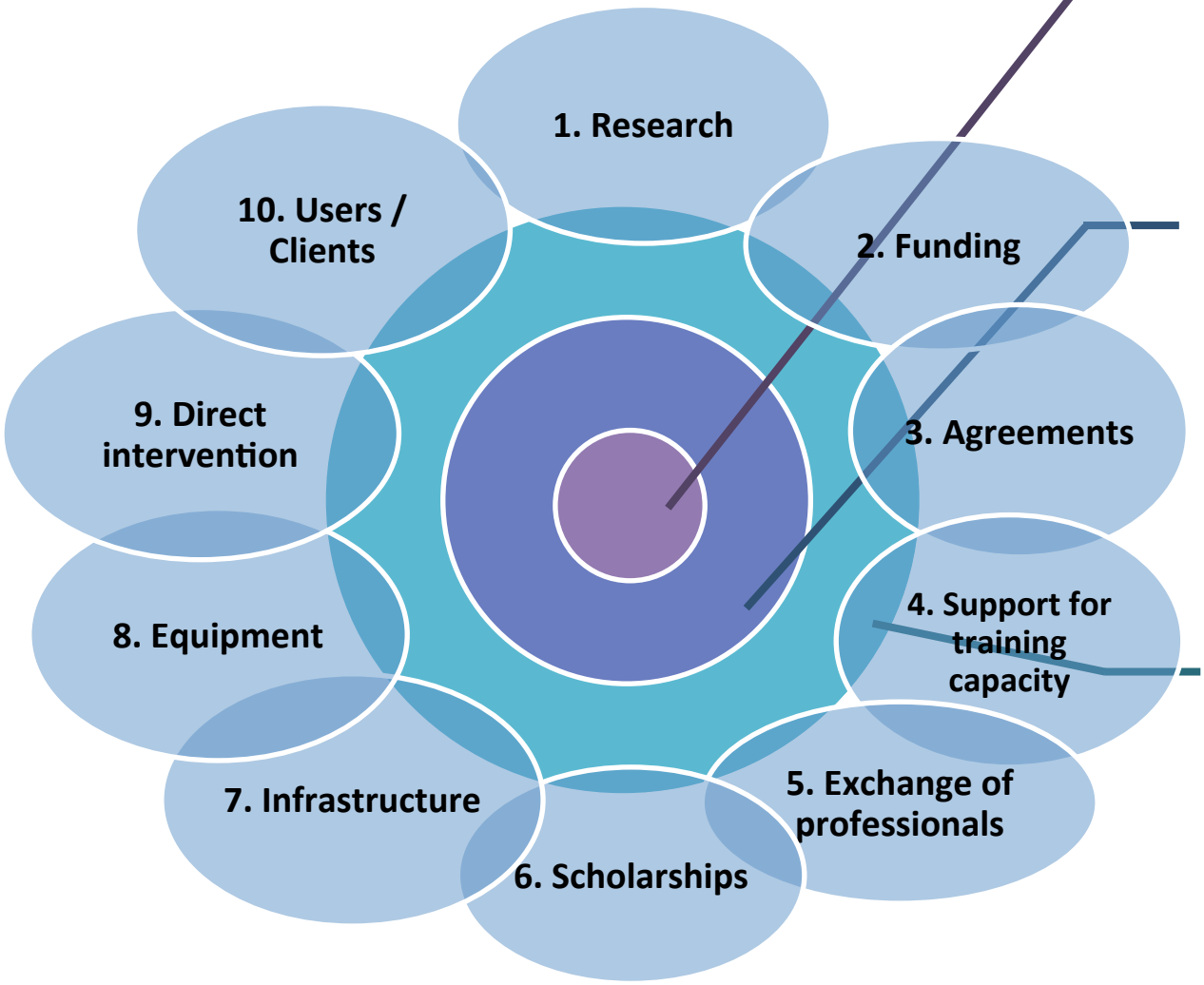
7. Legal design

It must ensure the governance and institutional sustainability of the Institute. There are several options: Private Public Association, Private Association, Public Institution, Foundation. To be attached to a university ....

Comparative table of possible constitutive figures

	Foundation	Association
Purposes	Non-profit organization instituted through the allocation of assets for the realization of objectives of a religious, cultural or other social interest.	Stable organization of natural or legal persons, or both, that through a common activity pursues a non-profit.
Constituents	Natural persons / legal persons.	Natural persons / legal persons.
Contributions for the constitution	Requires one or more quantifiable assets that are or are assigned in favor of the Foundation.	Quantifiable assets of the partners contributed at the time of forming the association
Decision making body	Founder.	General assembly of associates.
Governing body	Administrative board.	Board of directors.
Executing body	General manager.	General manager.
Incomes	From the foundation's own economic activities.	From the payment of fees and economic activities to cover the expenses of the Association.
Supervisor	Consejo de Supervigilancia de Fundaciones, Organization dependent on the Ministry of Justice.	
Utilities	Profits can not be shared among managers.	Profits can not be shared among associates.
Liquidation	The assets will be destined to the fulfillment of the object of the Foundation. If not possible, be delivered to other foundations or to Public Benefit.	The assets will be delivered to the employees or the Public Benefit.

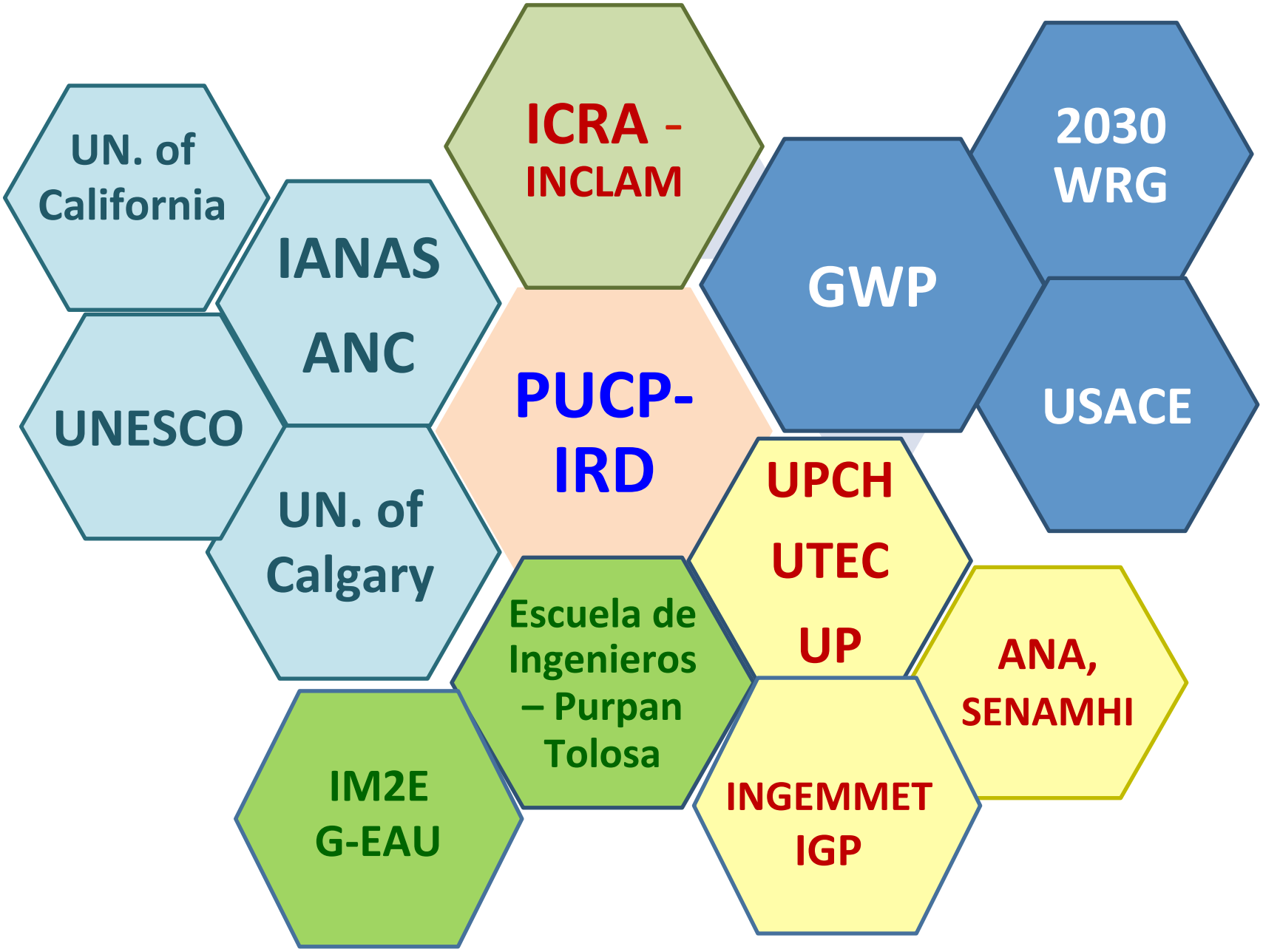
8. Strategic alliances and agreements.



Local and Regional Scale: GORE Ica, Local Governments, NGOs, Public and private universities, Institutes, AAA - ALA

National Scale: Universities, Institutes, Platforms, Professional Association, Banks, Laboratories, Ministries, National Dispute Tribunal.

International Scale: Banks, Foundations, intergovernmental organizations (United Nations system, OEA, Europe Union, Andean Community, GWP, GIZ, JICA, COSUDE), Universities, Institutes, Research networks, NGOs.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USACE
UN. of Calgary
UPCH
UTEC
UP
Escuela de Ingenieros – Purpan Tolosa
ANA, SENAMHI
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G-EAU
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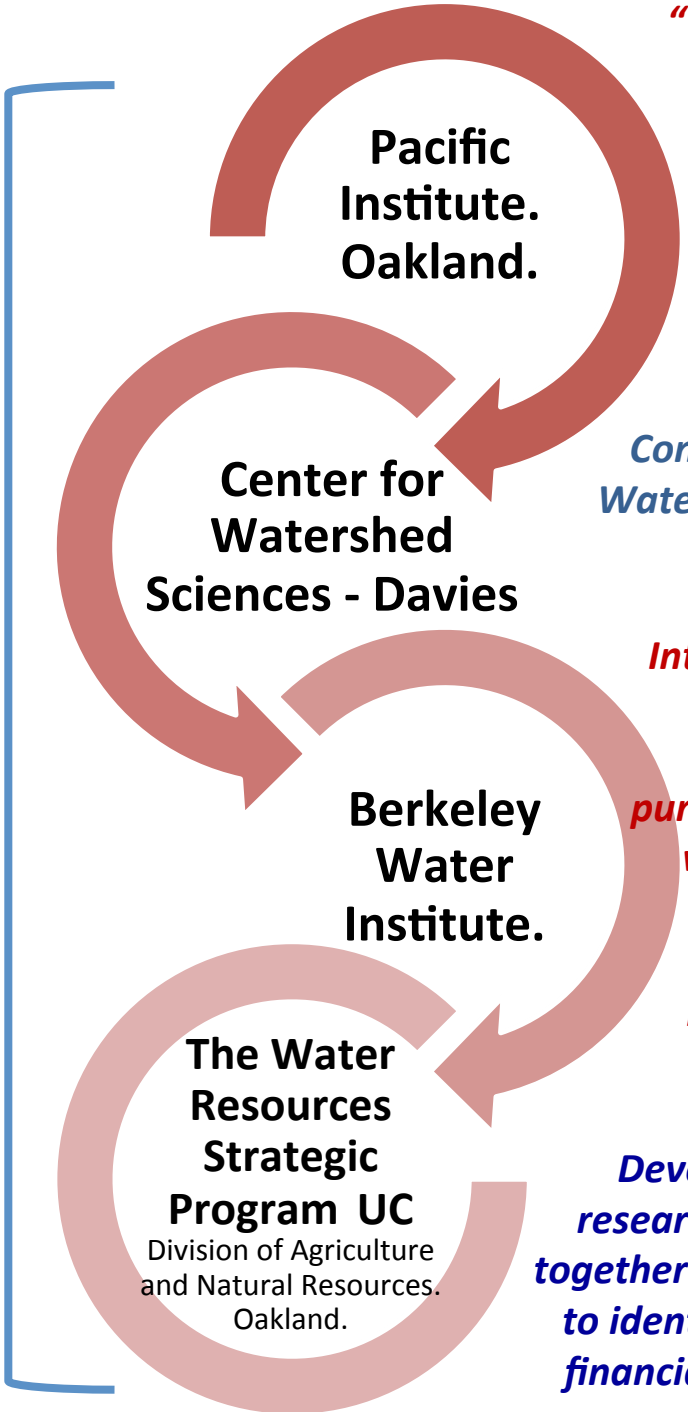
EXAMPLE OF A STRATEGIC ALLIANCE

UNIVERSITY OF CALIFORNIA-UC



"We produce research that advances a sustainable environment, healthy economy, and social equity with science-based solutions that lead to social and political change".

Drought, Water Policy, Floodplains, Aquatic ecosystems Ecology and Conservation, Modeling and Informatics, Water Economics and Management Group and Watershed Restoration

Inter disciplinary gathering of academic faculty, researchers, students across several departments at UC Berkeley pursuing studies in water and promoting water-related research. Incorporating Public Health, Water Infrastructure, Engineering, Natural Resource Management, Agriculture, Economics and Law

Developing and supporting water-related research, education, and outreach; bringing together local, state, and federal stakeholders to identify issues and sources of political and financial support for water-related research.

RESOURCES AND ECOSYSTEMS

- Hydrological processes
- Lacustrine and reservoirs systems
- Fluvial systems
- Modelling of ecosystems and basins

WATER QUALITY

- Chemical contamination of water bodies
- Pollutants in waste water
- Quality and Microbial diversity
- Ecotoxicological response of the biota to pollutants

TECHNOLOGIES AND EVALUATION

- Purification and distribution
- Treatment/reuse of waste water
- Modelling and management systems

EXAMPLE OF A STRATEGIC ALLIANCE

- **Promotion of innovation**
- **Employability and attractiveness of graduates**
- **A partnership dimension for the south**
- **Expertise for public policy**

CURRENT FIELDS OF EXCELLENCE

- Hydroclimatic risks
- Hydrosystems: circulation and resources
- Metrology and innovative processing techniques
- The dynamics of contaminants and responses by aquatic systems
- Water, stakeholders and geographical territories

EMERGING ISSUES

- Viability and interactions in hydrological territories
- Water resources and prospective scenarios
- Water and agriculture
- Technological innovations for protecting, saving and reusing water
- Risks, contaminants, health

SCIENTIFIC BENEFITS

1. **Extensive knowledge production** that owes its originality to research on the interfaces of academic fields
2. **Progress of all the research teams** towards excellence through coordination and collective leadership
3. **High-level scientific output** enhanced by stronger synergies

G-eau
Gestion de l'Eau, Acteurs, Usages

Characterize co-evolution water-society; Regulation of water availability, quality and uses; Methods for analysis and evaluation

Example of agreement letters.

Institut de Recherche pour le Développement
FRANCE
Instituto francés de Investigación para el Desarrollo

REPRESENTACIÓN EN EL PERÚ
www.peru.ird.fr

Calle Diecisiete Nº 455 - San Isidro
Lima 27 - PERÚ
tel. (511) 719 98 95 fax (511) 718 32 19
perou@ird.fr

CARTA DE COMPROMISO DE PARTICIPACIÓN DE ENTIDAD ASOCIADA

INSTITUTO DE INVESTIGACIÓN PARA EL DESARROLLO (IRD)

Estimada, Dra. Nicole Bernex
Coordinadora General del Proyecto ICA

Me es grato saludarla cordialmente y a la vez manifestarle el interés del Instituto de Investigación para el Desarrollo (IRD) para prestar apoyo al Instituto Científico del Agua, una vez que este se encuentre implementado.

El IRD desarrolla programas de investigación, de formación y de difusión de resultados, los cuales están definidos en los Convenios Marco y los Convenios de Investigación suscritos con "Institutos Sectoriales Públicos de Investigación", universidades, empresas públicas y organismos internacionales. En ese sentido, conocedores de los ejes que desarrollará el futuro ICA (investigación básica y aplicada, y apoyo a la formación), el IRD se compromete a garantizar el apoyo en la medida de sus posibilidades.

Las actividades a las que se compromete son las siguientes:

1. Desarrollo de escuelas de campo en los diferentes temas del ICA
2. Capacitación técnica para personal de campo y de laboratorio
3. Direccion científica de maestrías y doctorados
4. Participación de investigadores del IRD en las actividades científicas del ICA, en misiones temporales (de corta o larga duración) o directamente acreditados, según las modalidades de selección del IRD

REPRESENTACION EN EL PERU
I.R.D.

Jean Loup Guyot
Representante del IRD en Perú

Thank you very much
Muchas gracias
Merci beaucoup

nbernex@pucp.edu.pe

CIENCIACTIVA
INNOVACIÓN PARA EL DESARROLLO

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Instituto francés de Investigación para el Desarrollo

PUCP