



## Capacity Building for Bio Trade (CBBT)

**“BioTrade is a catalyst for a Green Economy”**

- ❖ Access and Benefit Sharing (**ABS**)
- ❖ Geographical indication (**GI**)
- ❖ Agreement on the Application of Sanitary and Phytosanitary Measures (**SPS**)
- ❖ Technical Barriers to Trade (**TBT**)

CBBT

BIOTRADE NETWORK  
NAMIBIA, NEPAL AND PERU

Proyecto Desarrollo de Capacidades en Biocomercio (CBBT)  
GTZ/UNEP-UNCTAD CBTF

Red de Biocomercio  
Namibia, Nepal y Perú






## Products and services supported by Biotrade project

- ❖ Natural ingredients and products for cosmetics, essential oils, natural dyes, soaps, creams and butters, moisturizers, etc.
- ❖ Natural ingredients and products for pharmaceuticals: extracts and infusions from **medicinal plants**, natural medicine capsules, etc.
- ❖ Natural ingredients and products for food: fruits, cereals, grains, roots, nuts, cocoa, fish products, jams, sweets and snacks, jellies, pulps and juices,spices and sauces, teas and infusions, food supplements, etc.



## BioTrade

- ❖ By implementing the principles of Ethical BioTrade throughout its supply chains, the laboratory links the benefits of affordable and efficient remedies for patients to providing better living conditions for the different actors in the supply chains, up to the producers.
  - ❖ At Andean countries, Ecuador lead sales (US\$ 301 millions, 2007), followed by Colombia (US\$ 171 millions) and Peru (US\$ 128 millions). The common offer by them is based at cacao, subproducts of caiman and chestnut.
  - ❖ **The sale of BioTrade products grows 10% annually at andean countries.**
- 



## Example of BioTrade Product

- ❖ The plant *Centella asiatica* is used in the cosmetics and pharmaceutical industries for its wound-healing and anti-inflammatory properties. Serdex, a division of Bayer HealthCare and a member of the Union for Ethical BioTrade, uses *Centella asiatica* from Madagascar as an ingredient for its products. It sources from about 1,500 peasant families in an area of over 9,000 km<sup>2</sup> and the collectors receive a 30–50% premium for the species. Serdex also contributes to community projects including supplying electricity to a local hospital
-



## Bolivia-Biotrade programme

- ❖ Bolivia has approximately 1,098,581 square kilometers. Bolivia has border with Brasil, Paraguay, Argentina, Chile and Peru. Bolivia has approximately 226.500 hectares (ha) of cultivated land (11% of total) out of 2.100.000 ha of agriculture land.



## Bolivia-Biotrade programme

- ❖ The biotrade programme includes Medicinal plant chain.
- ❖ **Food and nutraceuticals complex:** native cacao (*Theobroma cacao*), maca (*Lepidium meyenii*), native honey, palqui (*Acacia feddeana*), asaí (*Euterpe precatoria*) and cupuazú (*Theobroma grandiflorum*)
- ❖ **Cosmeceuticals complex:** majo (*Oenocarpus bataua*), Cupuazú (*Theobroma grandiflorum*), isotoubo (*Sapindus saponaria*), cusi (*Attalea speciosa*) and copaibo (*Copaifera langsdorffii*). Considering market and supply conditions.



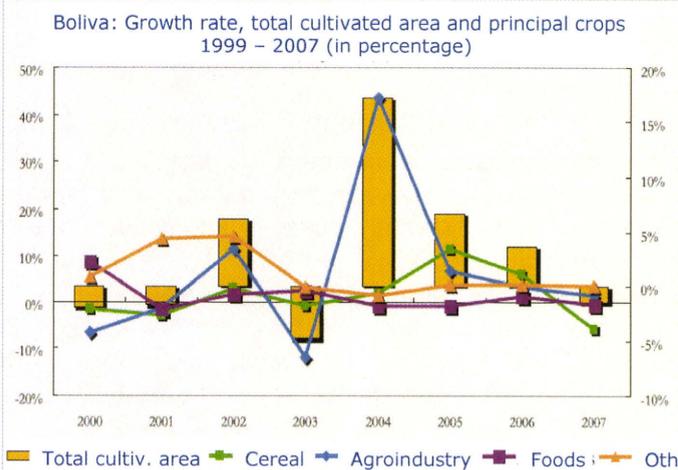
## Bolivia- Health regulation

- ❖ **Medicines Law (Law No. 1737 DS 24672).**
- ❖ **Protection of wild life: DS 22641 (1990)**
- ❖ **Kallawaya ethnic** group listed Intangible Cultural Heritage of Humanity by UNESCO.
- ❖ There are 3000 species of identified plants (Gimenez & Ibish 2003) at country herbariums out of them about 100 have been listed by Ministry of Health and Sport.
- ❖ July 2010: More than 10 *intercultural municipality pharmacies to sell products elaborated from University of San Andres Faculty of Pharmacy and Biochemistry* were inaugurated.
- ❖ The Ministry of Health and Sport has implemented laboratories at several locations in order that medical doctors produce traditional medicines.
- ❖ *Institute of Biochemical at Mayor University of San Andres and San Simon University supports study of herbal medicines from traditional medicines.*



## Bolivia: Herbal medicines

Bolivia: Growth rate, total cultivated area and principal crops 1999 – 2007 (in percentage)



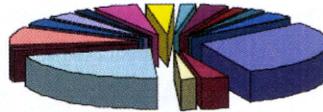
Year	Total cultiv. area (%)	Cereal (%)	Agroindustry (%)	Foods (%)	Others (%)
2000	~5	~0	~-5	~5	~5
2001	~5	~0	~0	~0	~5
2002	~15	~0	~10	~0	~5
2003	~-5	~0	~-10	~0	~0
2004	~45	~0	~15	~0	~0
2005	~15	~5	~5	~0	~0
2006	~10	~0	~0	~0	~0
2007	~5	~-5	~0	~0	~0

Fuente: Ministerio de Desarrollo Rural, Agropecuario y Medioambiente. 2008  
 Elaboración: IICA



## Bolivia: Natural Products market

Natural Products Market



■ Laboratorios Alfa Ltda.	■ Grupo Empresarial Valencia
■ Laboratorios Farcos Ltda.	■ Laboratorios Hahnemann S.A.
■ Laboratorios Crespal S.A.	■ Grupo Alcos S.A.
■ Laboratorios Vita S.A.	■ Laboratorio Inti S.A.
■ Laboratorio Galeno LAQFAGA SRL	■ Laboratorios Harbo Ltda.
■ Industria Tornico Antetoi (ITA)	■ Planta Medica
■ Laboratorios Lafar S.A.	■ Laboratorios Malena
■ Laboratorios Minerva	■ Sol de los Andes

Pharmaceutical presentation forms: infusion, oral drop, syrup, capsule, tablet.  
 At comunal pharmacy, there are: eucalyptus ointment, mentol, anise infusion, camamile, wira wira, plantain infusion.

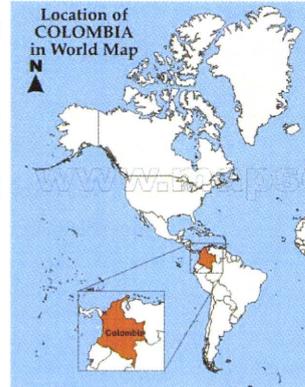


## Bolivia: value chain

- ❖ Valencia Laboratory, Naturalgos S.A, COINCOCA work with communities and agriculture associations and then with pharmaceutical laboratories such as Lab Valencia, LAFAR, VITA S:A, , INTI.
- ❖ Organic Producer Association (ASPROMACH) Quiswarani Maca
- ❖ **Main species:**
- ❖ •Chestnut (*Bertholea excelsa*), asai palmito de asai (*Euterpe precatoria*), latex de caucho (*Hevea brasiliensis*), hojas de jatata (*Genoma spp.*), cusioil (*Orbignyaphalerata*), copaibo (*Copaiferaraticulata*).
- ❖ •Tropical fruits: cedrillo (*Spondias mambin*), cayú (*Anacardium occidentale*), achachairú (*Rehedia spp.*), guapurú (*Leoniacymosa*), bí (*Genipa americana*), paquió (*Hymenaeacoubaril*), urucú (*Bixa orellana*) promoción e investigación de productos andinos Amaranthus, Maca

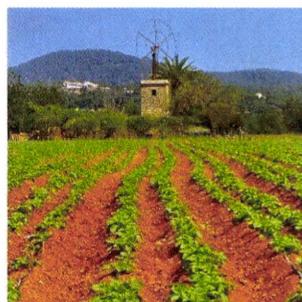
## Colombia

- ❖ Colombia encompasses an area of more than 1.1 million square kilometers.
- ❖ It is the only country in South America with both Caribbean (1,760 kilometers) and Pacific coastlines (1,448 kilometers).
- ❖ Colombia also has international borders with five Latin American nations: Panama, Venezuela, Brazil, Peru, and Ecuador.



## Colombia

- ❖ Land use: *arable land*: 2.42% *permanent crops*: 1.67% *other*: 95.91% (2001). Irrigated land: 8,500 sq km (1998 est.)



## Colombia

- ❖ Colombia has 45.000 plant species equivalent to 15% of world diversity.
- ❖ Herbal Medicines: Decree 677/1995 : Partially regulates Pharmaceutical Preparations based on Natural Products, and other.
- ❖ Labfarve laboratory has successfully asked the Colombian government to include 20 phyto-medicines in its national health care system (**Plan Obligatorio de Salud**). For almost 30 years, Labfarve has strived to combine such economic, social and environmental objectives in its ethical sourcing of biodiversity in Colombia 100 affiliated farmers in charge of the sustainable wild collection of raw materials. Throughout its supply chains, Lafarve is implementing the principles of Ethical BioTrade.

## Herbal medicines and aromatic plants: most traded

Specie Frequency

Especie	Frecuencia
Caléndula	13.21%
Alcachofa	11.32%
Valeriana	9.43%
Ajo	7.55%
Diente de León	5.66%
Ortiga	5.66%
Totumo	5.66%
Cidrón	3.77%
Manzanilla	3.77%
Uña de gato	3.77%
Zarzaparrilla	3.77%
Ajenjo	1.89%
Berenjena	1.89%
Boldo	1.89%
Chuchuguaza	1.89%
Cola de Caballo	1.89%
Eucalipto	1.89%
Gingko Biloba	1.89%
Ginseng	1.89%
Limoncillo	1.89%
Marrubio	1.89%
Prontoalivio	1.89%
Sábila	1.89%
Toronjil	1.89%
Yerba buena	1.89%

Fuente: encuesta nacional de plantas medicinales y aromáticas, una aproximación al mercado de las PMPA en Colombia

- ❖ Of the 156 reported medicinal and aromatic plants, 63 (40.4%) are in the list INVIMA
- ❖ 20% were obtained by collecting wild plants. Ex: Totumo (*Crescentia cujete*), Sarsaparilla (Zarzaparrilla, *Smilax officinale*) and Cat Claw (uña de gato, *Uncaria tomentosa*).
- ❖ 56% of traded plants come from cultivated crops. Ex: Artichoke (alcachofa), pot marigold (caléndula), valerian (valeriana) and rosemary (romero).
- ❖ 9% correspond to naturalized species: dandelion (diente de león, *Taraxacum officinale*) and elder (sauco, *Sambucus nigra*).

## COLOMBIA

16 of medicinal and aromatic plants from the survey are included in the Monograph of 28 WHO selected plants

Medicinal plants traded in Colombia and approved by WHO

Nombre OMS	Nombre Científico	Nombre Común
Bulbus Allii Sativi	Allium sativum L.	Ajo
Rhizoma Curcumae Longae	Curcuma longa L.	Azafran
Cortex Cinnamomi	Cinamomum verum J.S	Canela
Bulbus Allii Cepae	Allium cepa L.	Cebolla
Herba Centellae	Centella asiatica L.	Centella asiática
Folium Gingko	Ginkgo biloba L.	Gingko
Radix Ginseng	Panax ginseng	Ginseng
Rhizoma Zingiberis	Zingiber officinale R.	Jengibre
Flos Chamomillae	Chamomilla recutita L.	Manzanilla
Semen Plantaginis	Plantago spp.	Psylum
Radix Glycyrrhizae	Glycyrrhiza glabra L.	Regaliz
Rhizoma Rhei	Rheum palmatum	Ruibarbo
Aloe	Aloe vera L.	Sábila
Folium Sennae	Cassia senna L.	Sen
Herba Thymi	Thymus vulgaris L.	Tomillo
Radix valerianae	Valeriana officinalis L.	Valeriana

Fuente: encuesta nacional de plantas medicinales y aromáticas, una aproximación al mercado de las PMyA en Colombia

- ❖ Ecuador has border with Colombia and Peru.



There are three geographical zones well defined. First, The Sierra or highlands, second: the coastal area and third: the amazon.





## Ecuador

- ❖ Ecuador has **2.607.960 ha**
- ❖ **1.235.5831** ha with agriculture potential.
- ❖ Importance of agriculture activity is decreasing.
- ❖ The geographical diversity available in the country generate diversified production.
- ❖ Ministry of Agriculture is designing strategies for agriculture development.



## Herbal medicines and aromatic plants

Ecuador has the capacity to offer 150 plants, native or naturalized as well as oils, infusions, condiment, cosmetic and herbal medicines.

They have organic certification, clean production, GMP, GAP, just commerce, etical standards, etc.



MASHI NUMI: Red de Productores y comercializadores Ecuador

14 Organizaciones (Costa, Sierra y Amazonia)



3 Joint ventures: Productores + Comercializadores

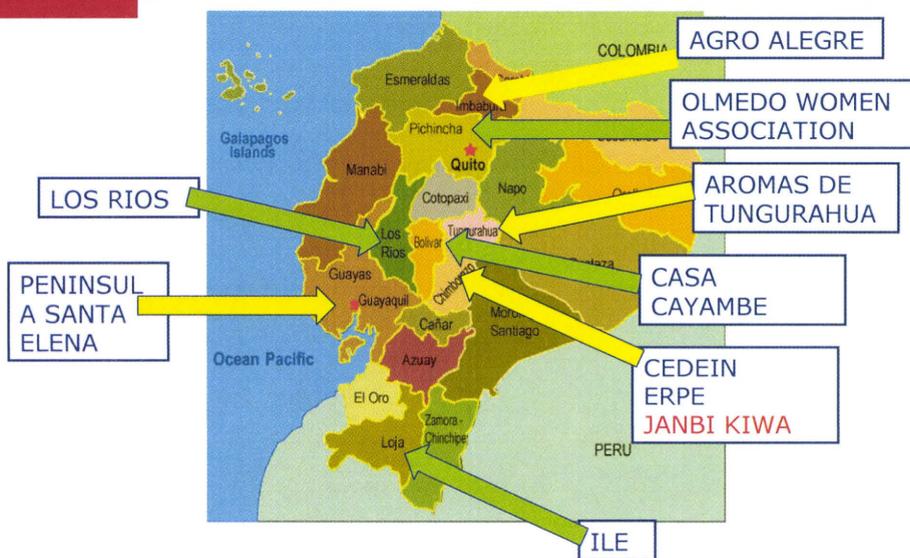


## Ecuador

- ❖ Organic Law of Health; Art. 137; Natural Products are subject to sanitary register.
- ❖ Accord 1281 of Public Health Ministry (May 7, 1999)
- ❖ Approximately 125 out of 500 medicinal plants are commercialized. 80% of population depends of medicinal plants. Resources are collected not cultivated.
- ❖ Species with great trading percentage:
  - Hypericum (St. John herb)
  - Valerian (root)
  - Aloe Vera
  - Camomile
  - Garlic (bulb)
  - Pot Marigold (Calendula) ( flower)
  - Ginger



## ECUADOR PRODUCERS



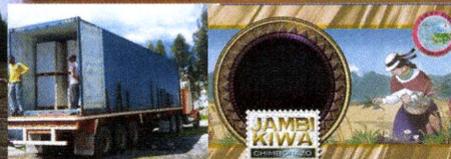


## JAMBI KIWA

- Community-based SME
  - Women led initiative involving over 600 families
  - Medicinal and aromatic plants
- Activities supported included:
  - Organizational strengthening & managerial skills
  - Quality and differentiated VA products in niche markets
  - Establishment of a Micro-credit



## ECUADOR –CHIMBORAZO. Crops at different climate levels, from 600 to 4,200 m.





## ECUADOR: JAMBI KIWA

There are 432 families as producers from 48 indigenous communities of the province (80% are women). The mean family participation is 5 members



## PERU

Location of  
**PERU**  
in World







**PERU**



The Institute of Peruvian Amazon Research (IIAP) has 1028 species registered as traditional collective knowledge at The National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI), approximately 200 species belong to Aguarunas native community.

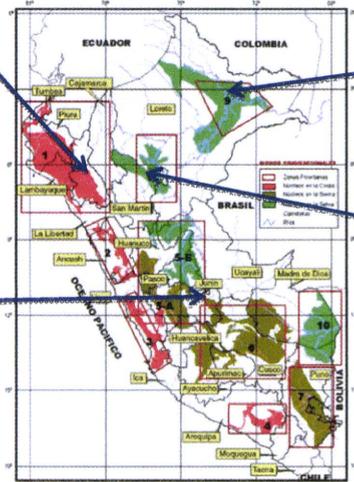





**Perubiodiverse Project: Priority areas for Peru BioTrade development**

**Tara and Yacon :**  
Cajamarca





**Camu camu:** Loreto



**Maca :** Junin



**Sacha Inchi :** San Martin



Instituciones Impulsoras del GIS

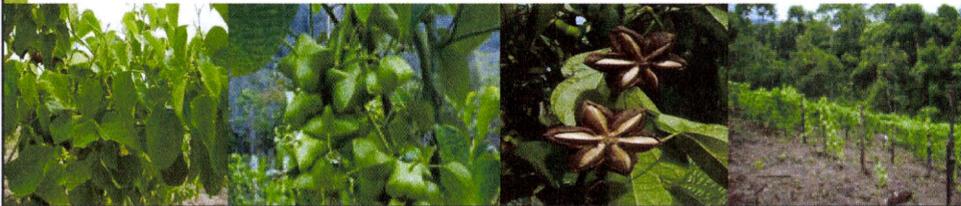


Leellish, M., I. Silva, C. Martínez y P. del Pozo. 2005. Criterios de cobertura geográfica para el establecimiento de áreas prioritarias para el desarrollo del biocomercio, Lima, Perú. (Criteria for geography scope for stablishment of priority areas for development of BioTrade, Lima, Peru)



## **SACHA INCHI** **(*Plukenetia Volubilis* L.)**

- ❖ Amazon region Product
- ❖ Inca peanut (Maní del Inca )
- ❖ Natural source of omega 3 and 6, high content of protein; it is a good alternative to include at diet.
- ❖ It is considered as high economical return crop.



## **Ethnobotanic** ***Plukenetia voluvis* L .**



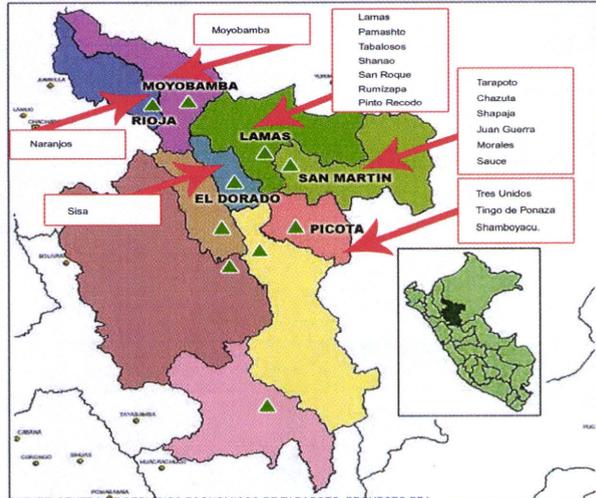
- ❖ The Yahuas, Cocamas, Shipidos and Chayahuitas eat tender leaves of *P.v.* as salads as part of their food diet. ( **CIDRAP 1976** )
  - ❖ The elder women at Mayorunas , Chayuhitas, Campas, Huitotas Shipibas, Yahuas and Boras mix oil of *P.v.* with flour of this almond and prepare a cream to revitalize and rejuvenate the skin ( **CIDRAP 1983** )
  - ❖ The indigenous Secoyas, Candoshis, Amueshas, Cashibos, Dapanahuas and Boras consume toasted almond of *P.v.* to recover strenght and to hail muscular and reumatic pains. ( **CIDRAP, 1985** )
  - ❖ **SECAB Promissory Vegetable Species from Andres Bello Agreement.**
-



# Zone Producers at San Martin

Main Sacha Inchi areas of farming

**SAN MARTIN** PRINCIPALES ZONAS DE CULTIVO DE SACHA INCHI



# Organizations involved

Project: " Chemistry, Pharmacology and Toxicology of Sacha Inchi oil"  
Executing: UNMSM-Agro business Peruagro SRL  
Dr. Arilmi Gorriti and collaborators



ESSALUD- Traditional Medicine Institute (IMET-Iquitos)  
Dr. Jose Aranda and collaborator



IIAP Dr. Carmen Rosa Garcia ;  
Eng. Victor Sotero and collaborators  
IIAP –Iquitos  
Eng. Dante Cachique (IIAP-Tarapoto)

Eng Emma Manco, Gloria Arévalo (INIA), Dr. Gilberto Dominguez (UNALM), Dr. Leon Villegas (UPCH) , Dr. Ana María Muñoz( UPSMP), Dr. Mary Medina (UNSM-Tarapoto), Eng Lino Saavedra ( PDRS-GTZ Tarapoto- San Martin), Regional Government, Shanantina and other NGOs.



# Project- Products

Universidad Nacional Mayor de San Marcos  
(Ciudad de América)

**Caracterización química, farmacológica y toxicológica del aceite de sacha inchi destinado al mercado de productos funcionales**

Autónomos: Jorge Arroyo, Fredy Quiroz, Felisoldi Gonzalez, Bertha Jurado, Martin Condorbanan, Yanita Guillano, Armando Espinoza, Daniel Caceres

Lima Abril del 2013

gtz PERU BQ DIVERSO

TOXICIDAD ORAL A 90 DIAS DEL ACEITE DE SACHA INCHI (Phytolacca esculenta, L.) Y MACA (Lepidium meyenii Walpers) Y DETERMINACION DE LA DOSE LETAL 50 EN ROEDORES

Autores: Jorge Arroyo, Fredy Quiroz, Felisoldi Gonzalez, Bertha Jurado, Martin Condorbanan, Yanita Guillano, Armando Espinoza, Daniel Caceres

RESUMEN

El presente estudio tuvo como objetivo determinar la toxicidad oral a 90 días del aceite de Sacha Inchi (Phytolacca esculenta, L.) y Maca (Lepidium meyenii Walpers) en roedores. Se realizó un estudio de toxicidad oral a 90 días en ratas Wistar, donde se evaluó la dosis letal 50 (DL50) de ambos productos. Los resultados mostraron que la DL50 del aceite de Sacha Inchi fue de 1,5 g/kg y la de la Maca fue de 2,5 g/kg. Estos resultados indican que ambos productos son seguros para su consumo humano en las dosis recomendadas.

Publications from San Marcos University



Preclinical assay

Traditional Medicine Institute  
IMET-ESSALUD  
Loreto



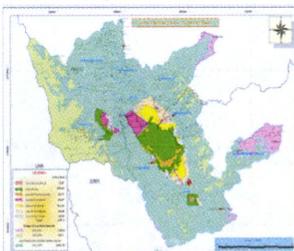
Lamas San Martin Peru-producer



# Maca (*Lepidium meyenii* Walpers)

This specie is found at the highlands, specially at the Junin Pampas. It grows at 3 500 - 4 500 m a.s.l. Presents 11 g % of proteins in the dry root and 14 g % in the integral paste (Nutrition Institute 1978). Cellulose and lignin have been found in the analysis of the roots, besides carbohydrates, maltose, fructose and tannins. The maca starch contains calcium, phosphorus, iron, fatty acids, and natural oils. The following oligoelements are also found in the maca root: potassium, magnesium, silica, iron, aluminum, sodium, manganese, copper, tin, zinc and bismuth.

## Maca Map zonation



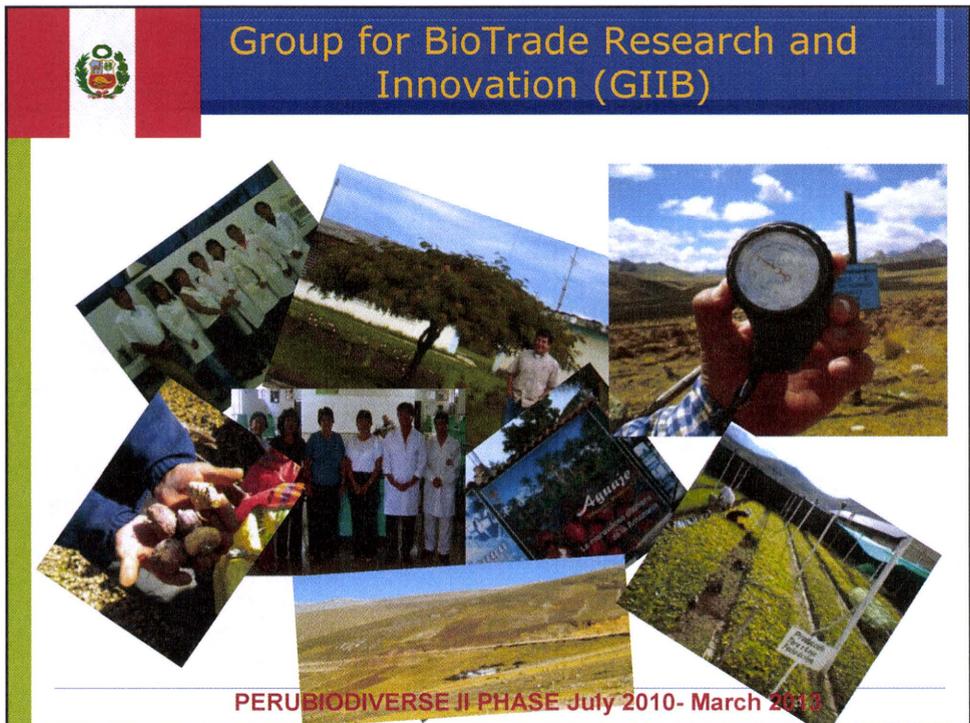
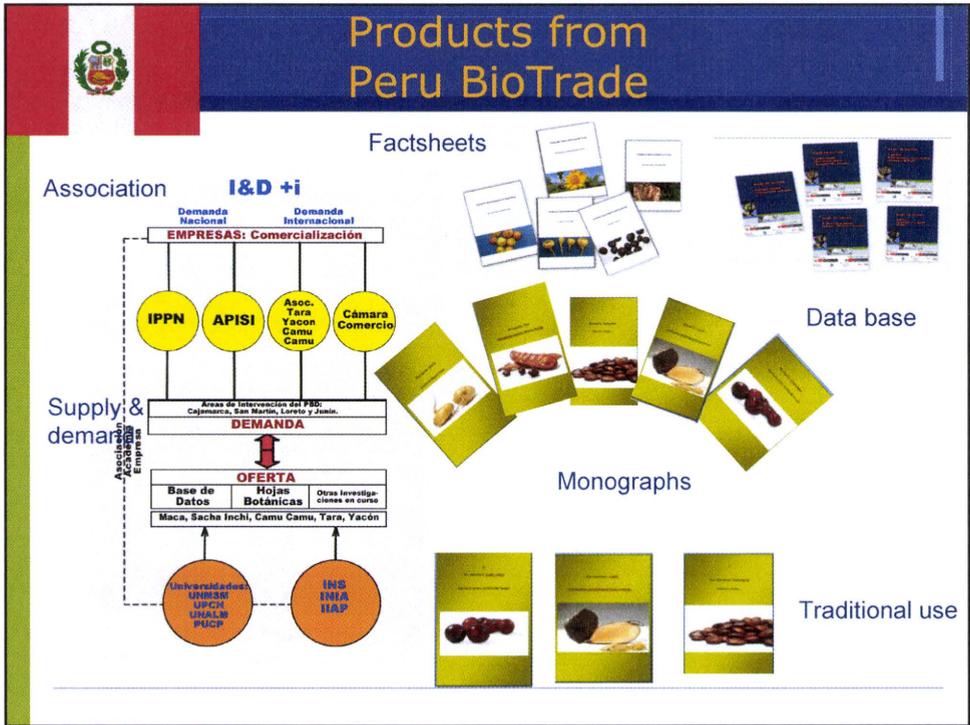
Agriculture University – Hersil-ESSALUD developed Gelatinized maca.



Peruvian Univeristy Cayetano Heredia has published 35 papers international journals



Bebidas Interandinas Agriculture University - APROTMACA –UEBT developed a beverage

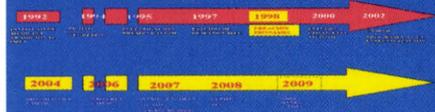




# Social Insurance: Complementary Medicine Centers Installed

Resolution of General Management  
GG48711PSS -198 (07 /05/1998)

Number of patients at  
Complementary Medicines Centres  
from 1998 to 2009

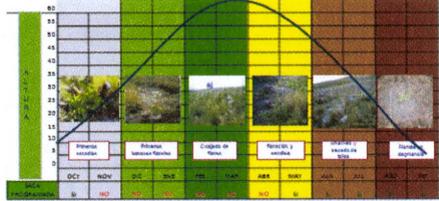


National  
Program of  
Complementary  
Medicine

Phytoterapics  
products  
41940 cases  
(2009)



## Cajamarca 3200- 4000 m *Valeriana pilosa* R & P



Comité Comunitario  
Comité Agraria  
Comité Educativo



Comité de Regulación  
Autoridad Reguladora



**Resultados:**  
- Incremento del precio de venta de valeriana verde de 5 a 12 soles (1.7 a 4 \$)  
- Eliminación de intermediación en las zonas donde tiene presencia la APEAC  
- Articulación directa a clientes industriales



Organic certification



## ANCASH-CEDEP Medicinal and Aromatic Plants (thyme (tomillo), oregano, rosemary (romero))



Foto CEDEP: Preparación de terreno con Yunta en Quingao - Sihuas



Foto CEDEP: Preparación de terreno con Tractor en Urcón - Corongo



**TOMILLO**  
*Thymus officinalis*



**ORÉGANO**  
*Origanum vulgare*



**ROMERO**  
*Rosmarinus officinalis*



**Location:** The department of Ancash is located north of Lima between the Pacific Ocean and the Marañón River.

**Area: 35 029 km<sup>2</sup>**

**Sihuas (2680 m)**

**Corongo (3141 m)**

Cultivo	Distanciamiento entre Planta	Distanciamiento entre Surco	Nº De Plantas x Ha.
ORÉGANO	30 a 35 cm	40 a 45 cm	80 a 90 000
TOMILLO	30 a 35 cm	40 a 45 cm	80 a 90 000
ROMERO	40 a 45 cm	60 a 65 cm	40 a 60 000



## Tacna: Asociatividad CITE agroindustrial

In Tacna Highland, it is harvested more than 1,300 ha of oregano with approximate production of 4,400 ton

It has Organic Certification from USA & UE: 22 ton of organic oregano.

- ❖ Approximately 1,500 families are involved
- ❖ Municipalities (Tarata, Candarave and Jorge Basadre)
- ❖ 10 districts.
- ❖ Virtual Platform: LATU Project with Uruguay.

Objective: To integrate and train at the value chain all actors from producers to market.