

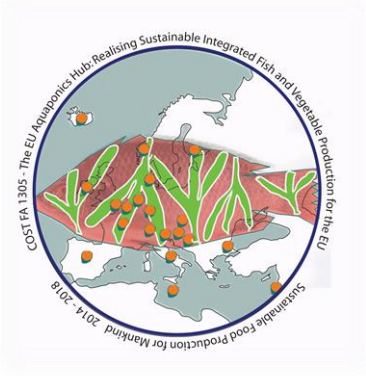
UDESC

Aquaponics in South America:

State of art and perspectives

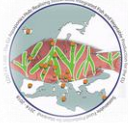
Dr. Maurício G. C. Emerenciano
Santa Catarina State University (UDESC) - Brazil

International Conference 'Aquaponics Research Matters'
Working Group Meetings and Management Committee Meeting



22 – 24 March 2016
University of Ljubljana, Slovenia

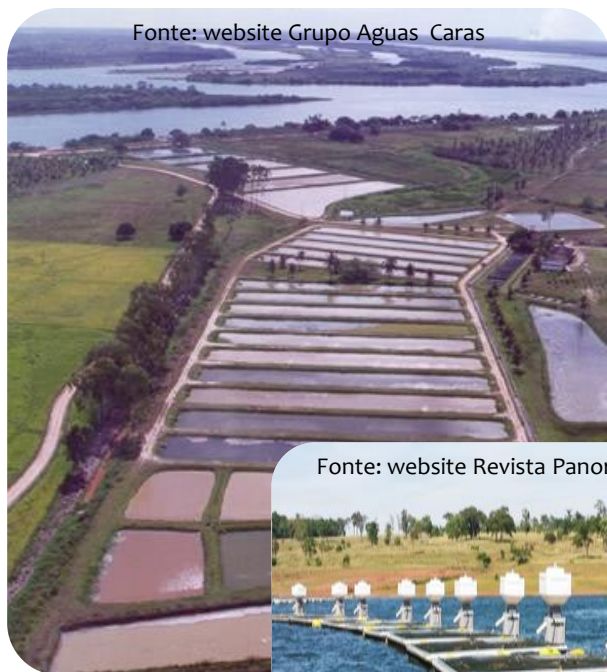
Introduction



**Why we are still searching
for new technologies and/or
production systems?**

Introduction

Traditional aquaculture system are sustainable???

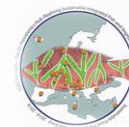


Water consumption

Use of land

Effluents

Introduction



“Modern Aquaculture”

New solutions should be found to achieve:



Productivity

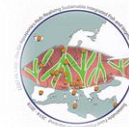


Environmental impact



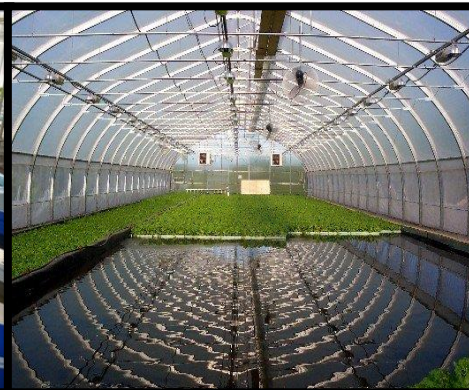
**Sustainable Aquaculture
production**

Introduction



**Aquaponics is an alternative
for “Aquaculture
diversification”**

(Buzby & Lin, 2014)



Introduction

***Aquaponics???* =**

Production system that integrates **Aquaculture** and **hydroponics**.

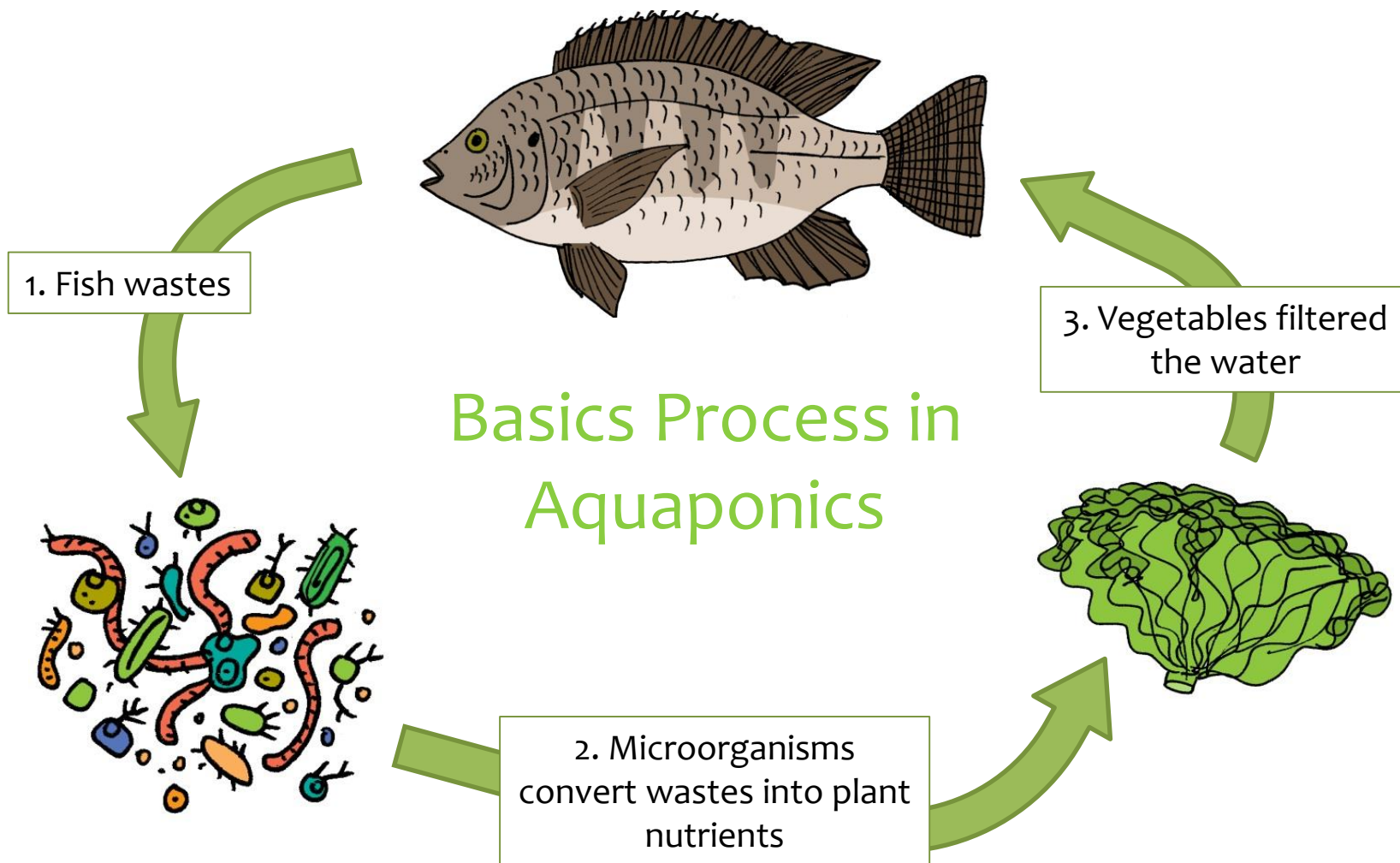


Fonte: website World Fishing



Fonte: website International Aquaponic Societ

Introduction

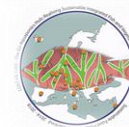


Introduction



Main advantages in Aquaponics...

Introduction



Advantages

High productivity

Rational use of water

Diversification

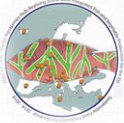
Improvement of feed use

Products with added-value

(Diver, 2006)

(Dediu et al., 2012; Mariscal-Lagarda et al., 2012)

Survey



How is the situation of Aquaponics in Brazil?



Survey



Survey: “Aquaponics in Brazil: research and commercial initiatives”

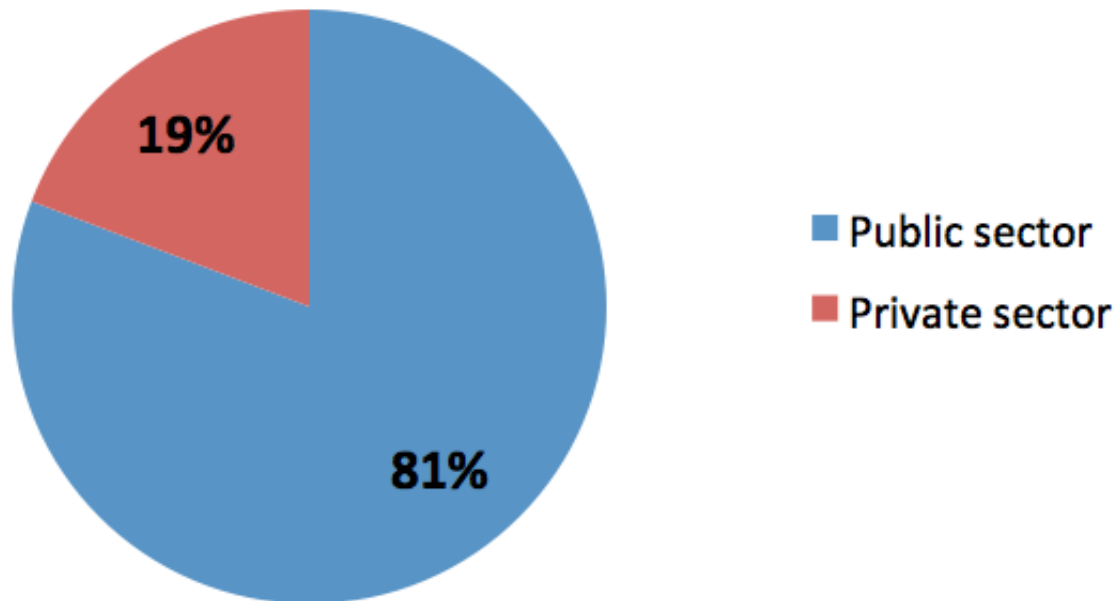
Total: 53 answers (online)

From december 2015 to february 2016



Survey

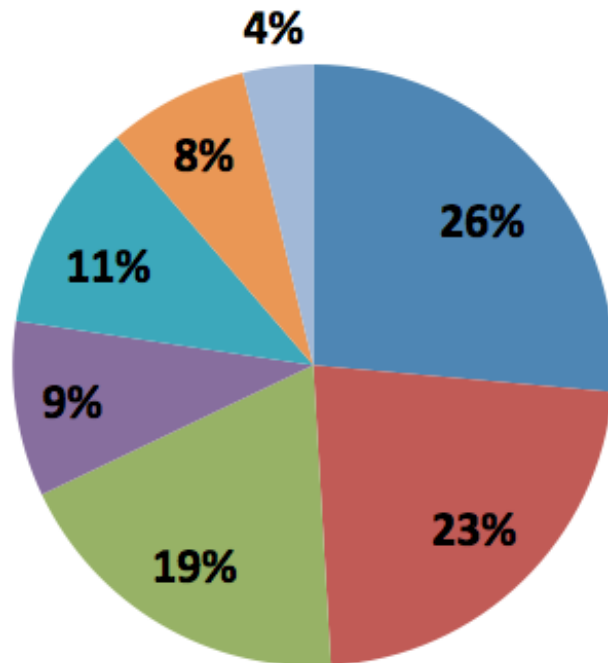
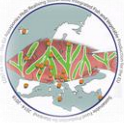
Sector



Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Survey

Survey Profile

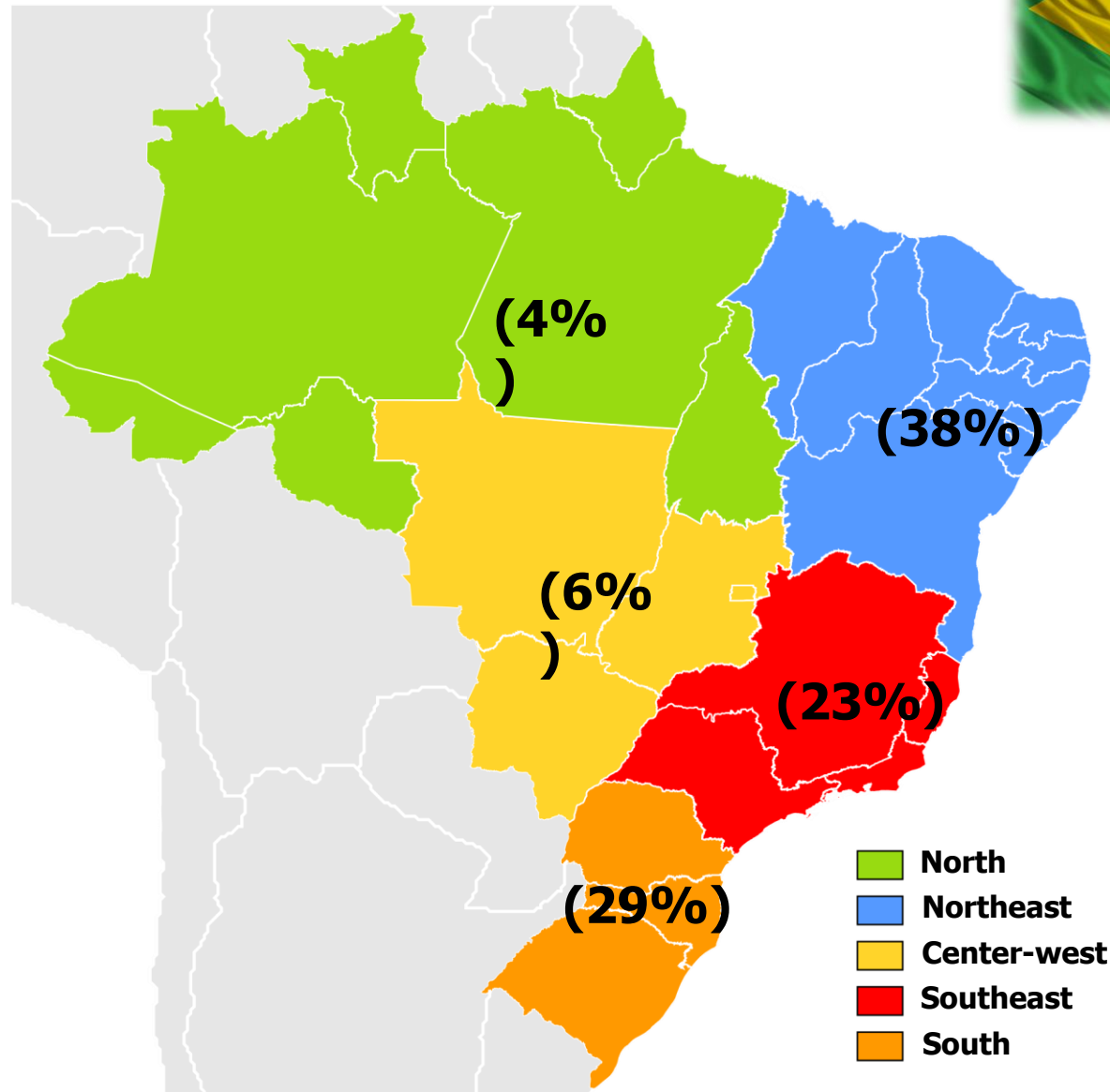







- University professor and researcher
- Underdegree student
- Investor
- Postgraduation student
- Technical
- Researcher
- Extension Specialist



Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Profile By Region



-  North
-  Northeast
-  Center-west
-  Southeast
-  South

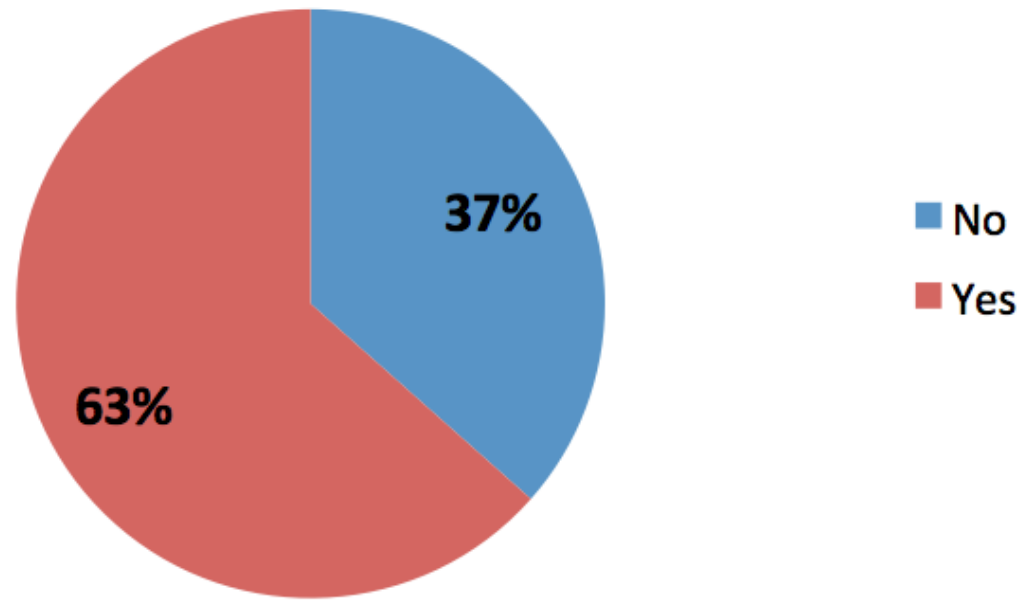
Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)



Survey



Already done research in Aquaponics?

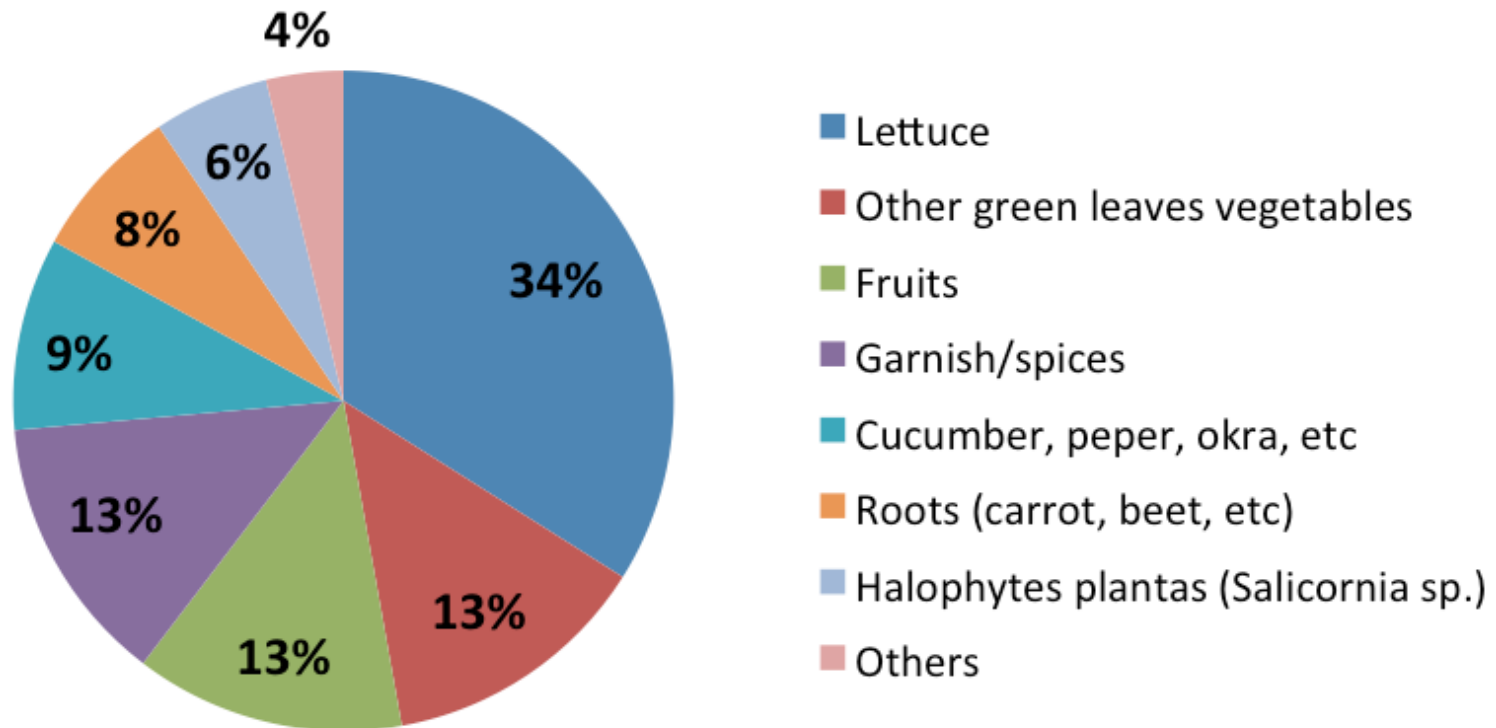


Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Survey

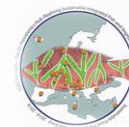


Type of Plants

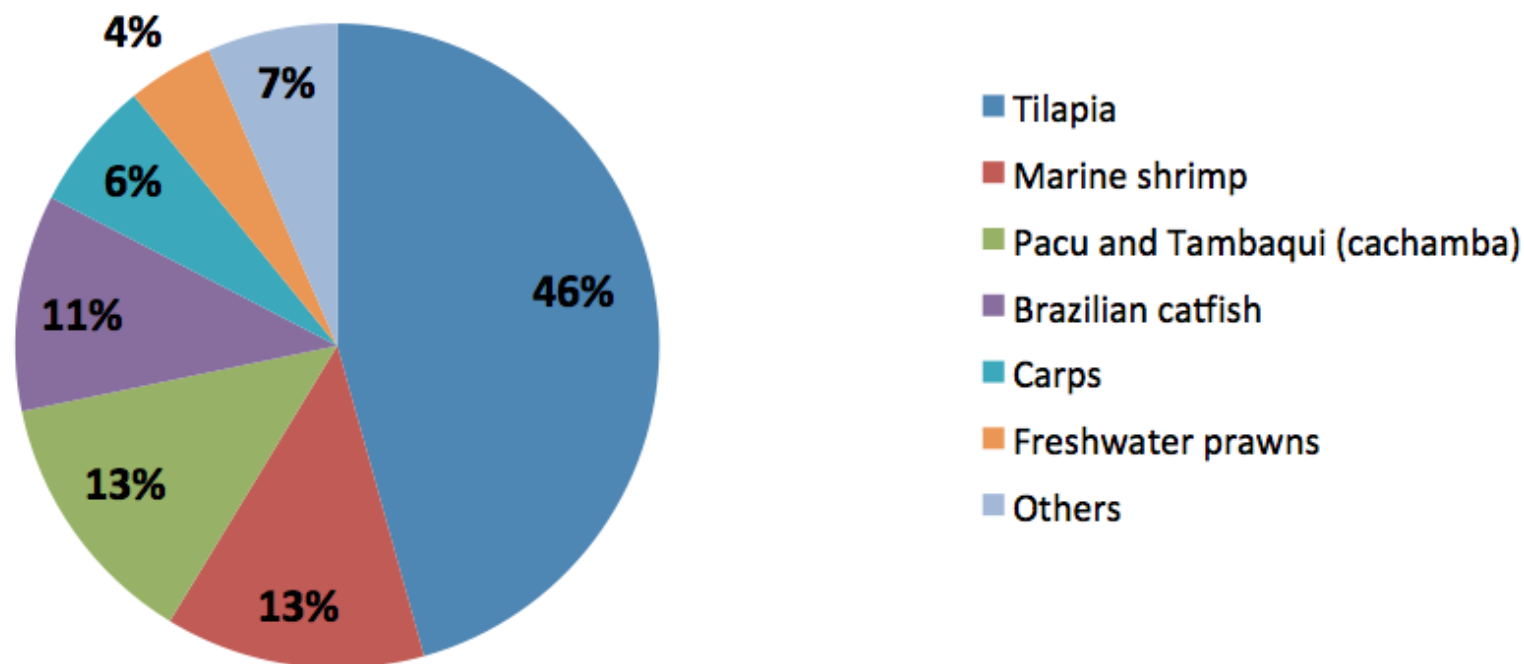


Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Survey



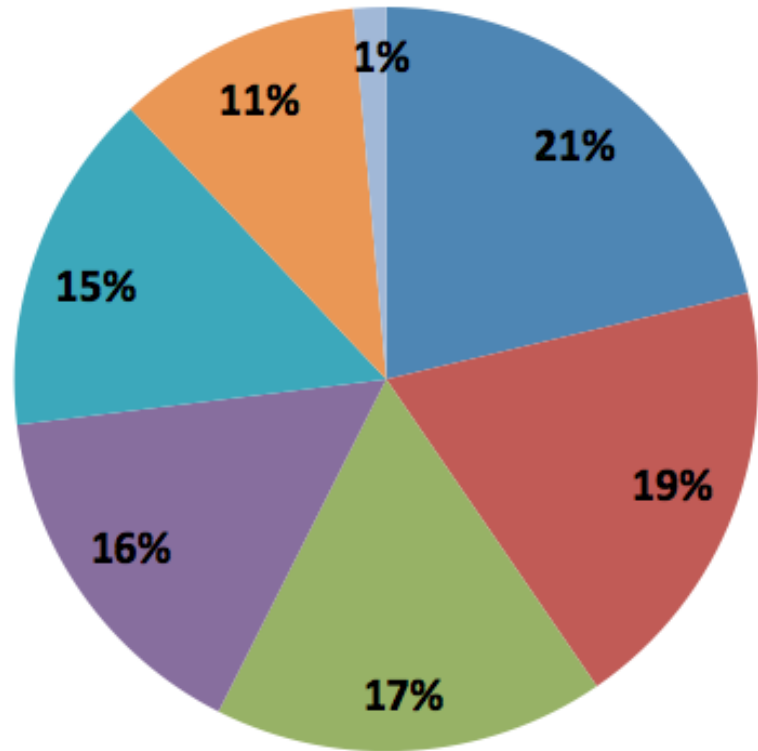
Aquatics Organisms



Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Survey

Research Focus



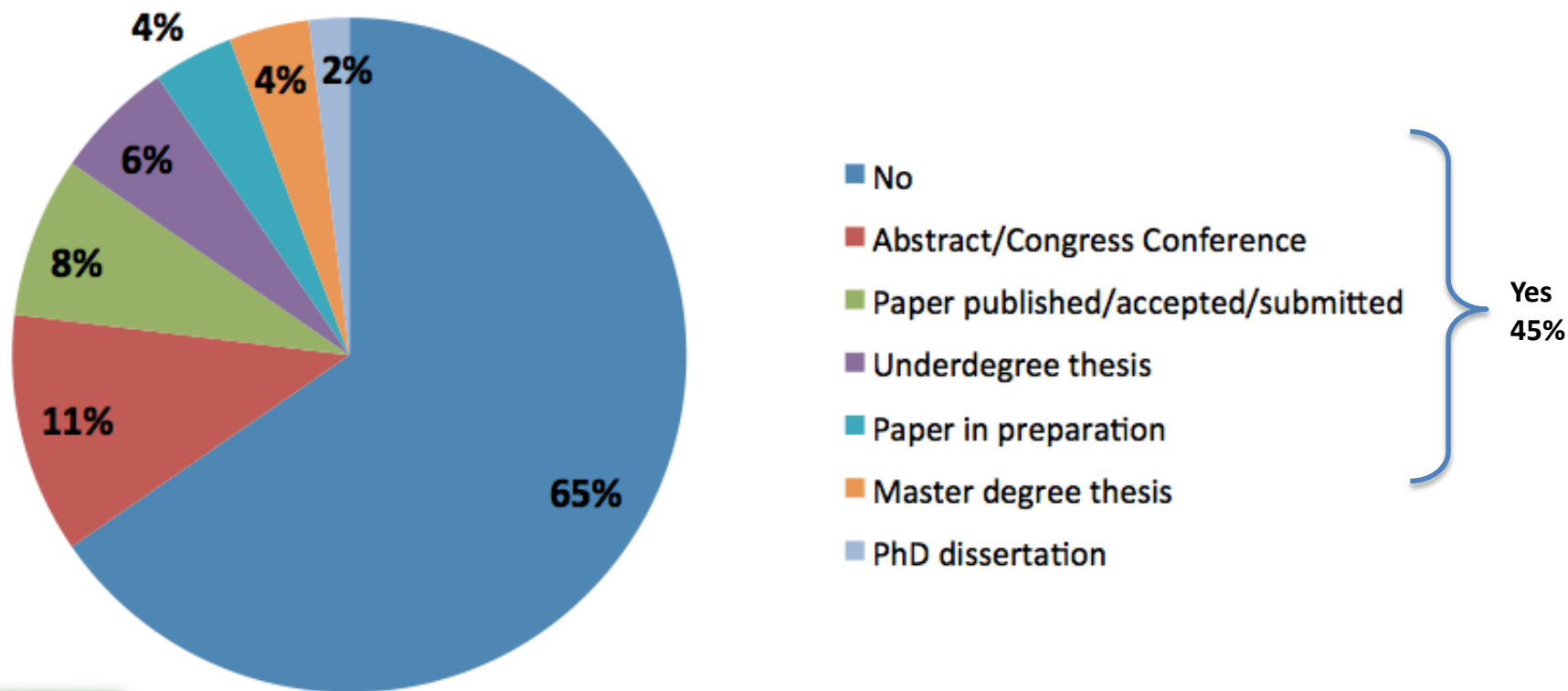
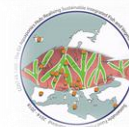
- Small Scale (family system)
- Commercial Scale
- Different aquaculture system in Aquaponics
- Hydraulic design
- Evaluation of different fish/shrimp species
- Nutrition applied to Aquaponics
- Economics analysis in Aquaponics



Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Survey

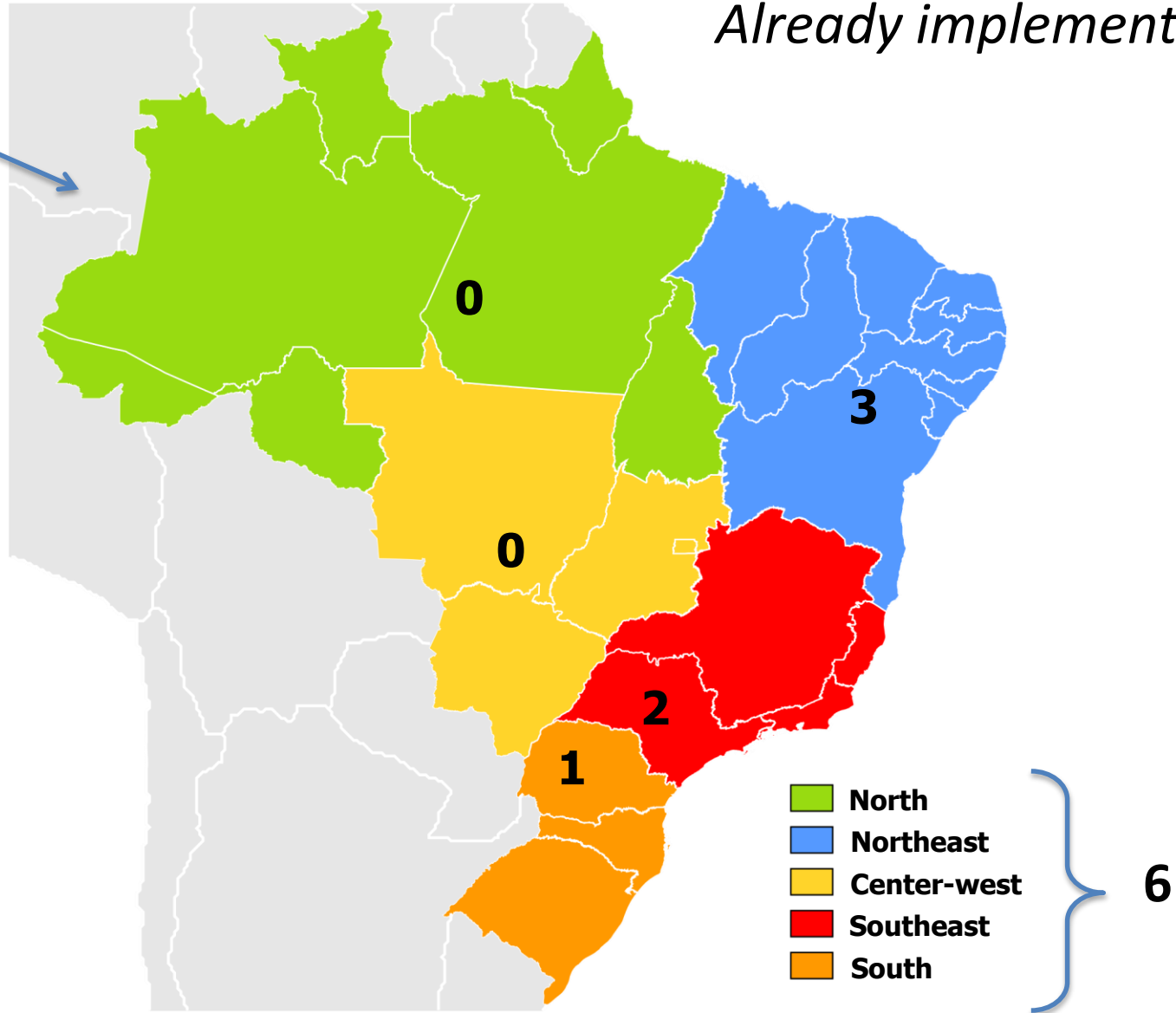
Scientific Production



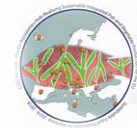
Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

Commercial Aquaponics in Brazil

Already implemented



Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)



Owner: Mr. Ernesto José Kovalski

Technical manager: Mr. Guilherme Lois

Tour cost: 20 usd/person

Project: 12 mil lettuce/month and two 40m3 round tilapia tanks



Curitiba, Paraná State, Brazil





Curitiba, Paraná State, Brazil





SISTEMAS DE AQUAPONIA EQUILIBRIUM



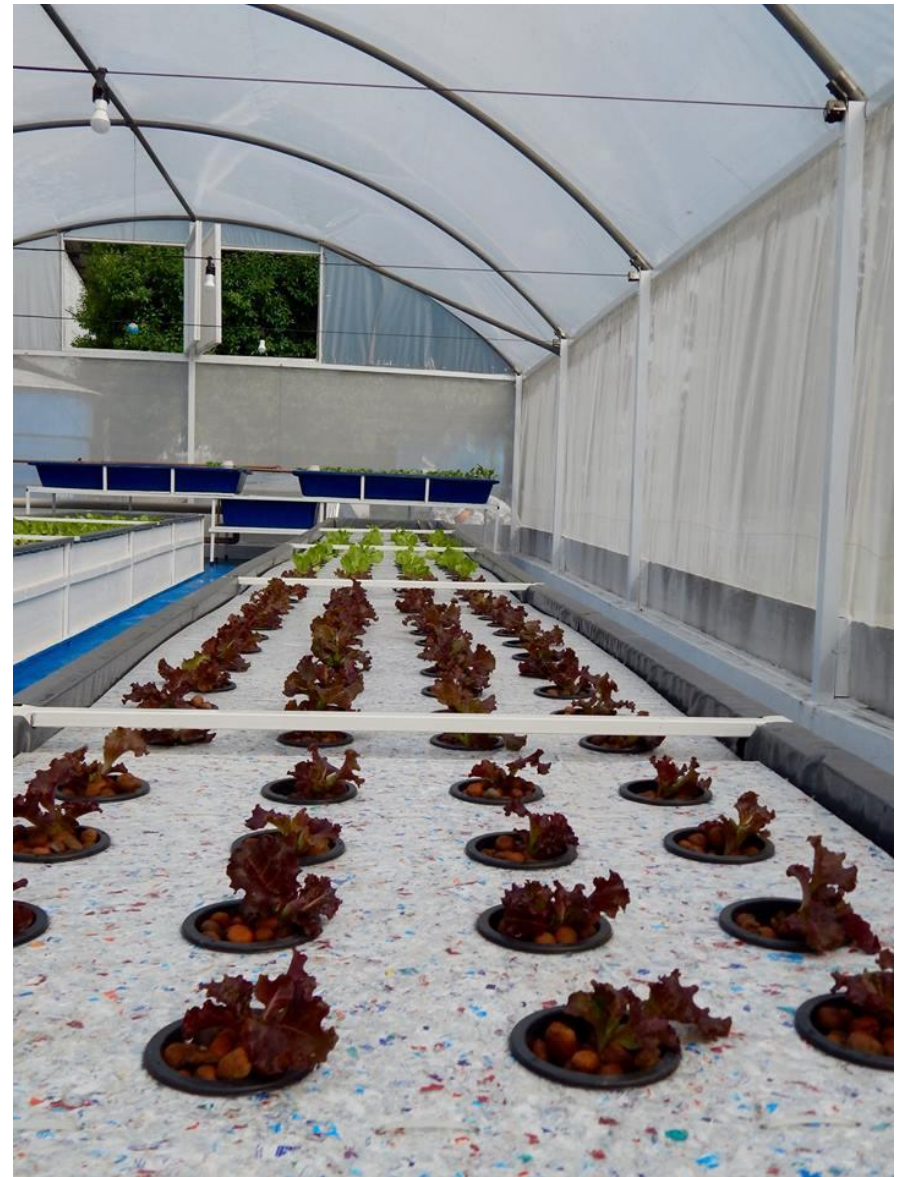
EQUILIBRIUM Aquaponics (Reciclázaro – São Paulo/SP)



EQUILIBRIUM Aquaponics (Reciclázaro – São Paulo/SP)



EQUILIBRIUM Aquaponics (Reciclázaro – São Paulo/SP)



EQUILIBRIUM Aquaponics (Reciclázaro – São Paulo/SP)

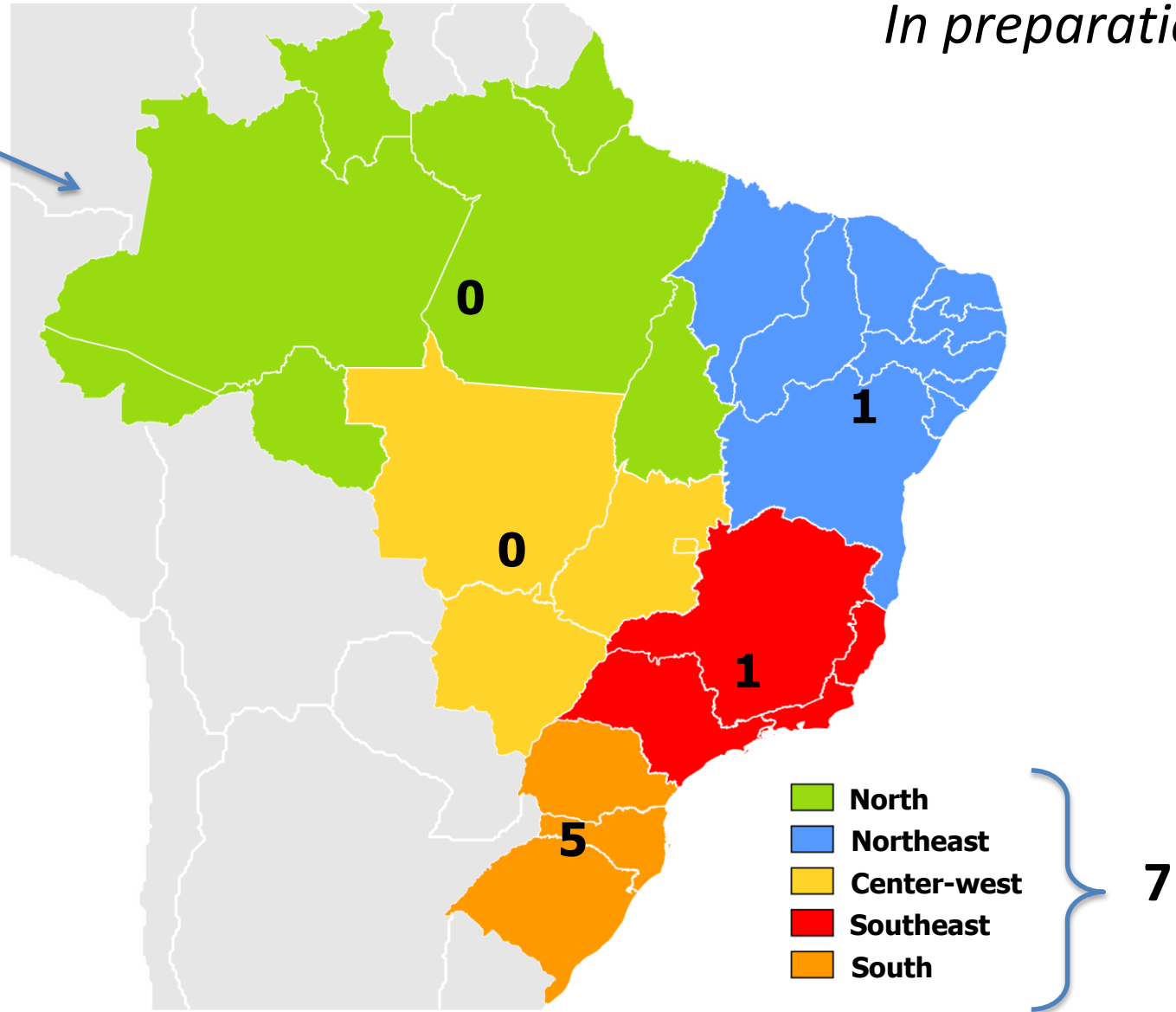


Viva green Aquaponics (Jaguariúna –SP)



Commercial Aquaponics in Brazil

In preparation



Source: UDESC-Brazil (M. Emerenciano, 2016)
Total: 53 answers (from december 2015 to february 2016)

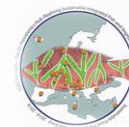
Future...



“Predictions showed that Sao Paulo city will have Aquaponics systems under building roofs in a few years...”

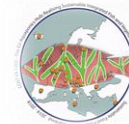
Source: Hopeness blog, 2015

Situation?



**How is the
situation of
Aquaponics in
South America?**

Situation?



Pretty the same situation as compared to Brazil:

- Few research done
- Few farms implemented → we only detected 2 farms (Chile and Colombia)



- Some projects under preparation (Chile and Colombia)



Commercial Aquaponics in South America

Some examples (2):



Chile
(implemented)



Colombia
(under preparation)





Diaguítas

Granja Agro-Acuícola

... mucho más fresco



Owners:

Dr. Germán E. Merino

Dra. Elisabeth von Brand

Excellent Midia impact in Chile

Cultivan hortalizas y truchas en pleno valle de Elqui

El sistema de acuiponía busca diversificar la producción e incrementar la eficiencia del uso del agua, a través de un sistema de recirculación del recurso. Inversión superó los 204 millones de pesos

ARTICULO | 26 JUN O 2013 - 9:49AM | POR EQU PO EL DIA




Portal del Campo

Fomento Agrícola Mercado Agrario El Tiempo Precios Estadísticas Calendarios Noticias

Home : Mercado Agrario Actualidad

Y un gran respaldo profesional y técnico a lo largo de todo Chile

Con la misma agua cultivan truchas y lechugas en el valle del Elqui

El Mayor proveedor de Maquinaria AGRICOLA

Atención a Clientes: 600 410 5000

Publicado el 26/06/2013

Desechos de los peces entre el crecimiento de las hortalizas, albahacas y camarones.



MUNDO Acuicola Pesquero
Comunicando con innovación

Home · Salmonicultura · Mitilicultura · Ostión · Algas · Abalón · Crustáceos · Otras Especies

Acuicultura · Pesca · Empresas · Investiga-

Región de Coquimbo:

Empresa desarrolla sistema acuapónico para cultivar truchas y hortalizas en el Valle del Elqui

El sistema de acuaponía —cofinanciado por la Fundación para la Innovación Agraria— permitirá diversificar la producción e incrementar la eficiencia de las semiáridas (Mundo Acuicola).



TVN

ELIZABETH VON BRAND
GRANJA AGRO ACUICOLA DE DIAGUITAS

<http://www.youtube.com/watch?v=rBz92dk0>



Diaguitas Granja Agro-Acuícola

Valle de Elqui: Innovador proyecto de Acuiponía

En momentos en que la Región de Coquimbo atraviesa una crisis agrícola una familia que hoy vive en el Valle de Elqui inició un proyecto innovador. Gracias a la recirculación del agua, cultivos de hortalizas y alevinos producen productos naturales. Lo que aporta, además de la acuaponía.



MUNDO Acuicola Pesquero
Comunicando con innovación

Truchas y hortalizas: La tecnología del primer cultivo acuapónico en Chile

EILERS DOOSAN

NOTA TVN CAMARONES DE RIO

... mucho más fresco



ENERO 11, 2014



Diaguítas
Granja Agro-Acuícola



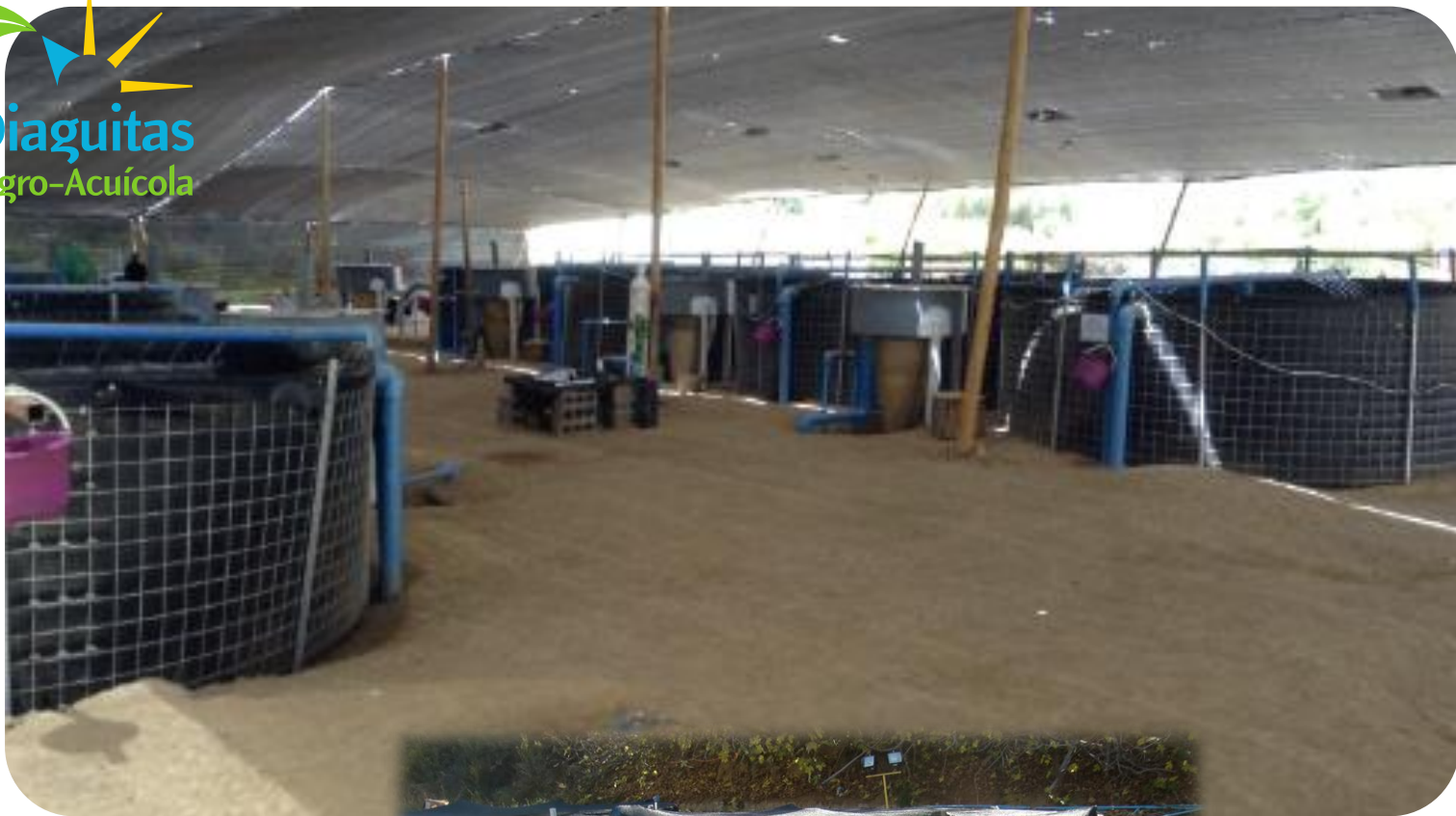
AÑO 2013



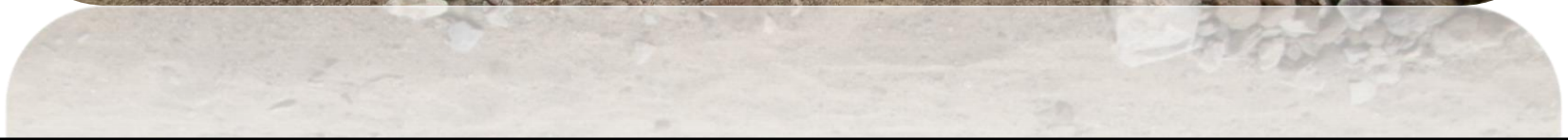
AÑO 2013

ENERO 11, 2014





Fish tanks



Fish (Trout)



Plants



First Aquaponics products in Chile



Lettuces



Radiccio



Basil



Scallion and parsley



Spinach and watercress



Fruits (melon)



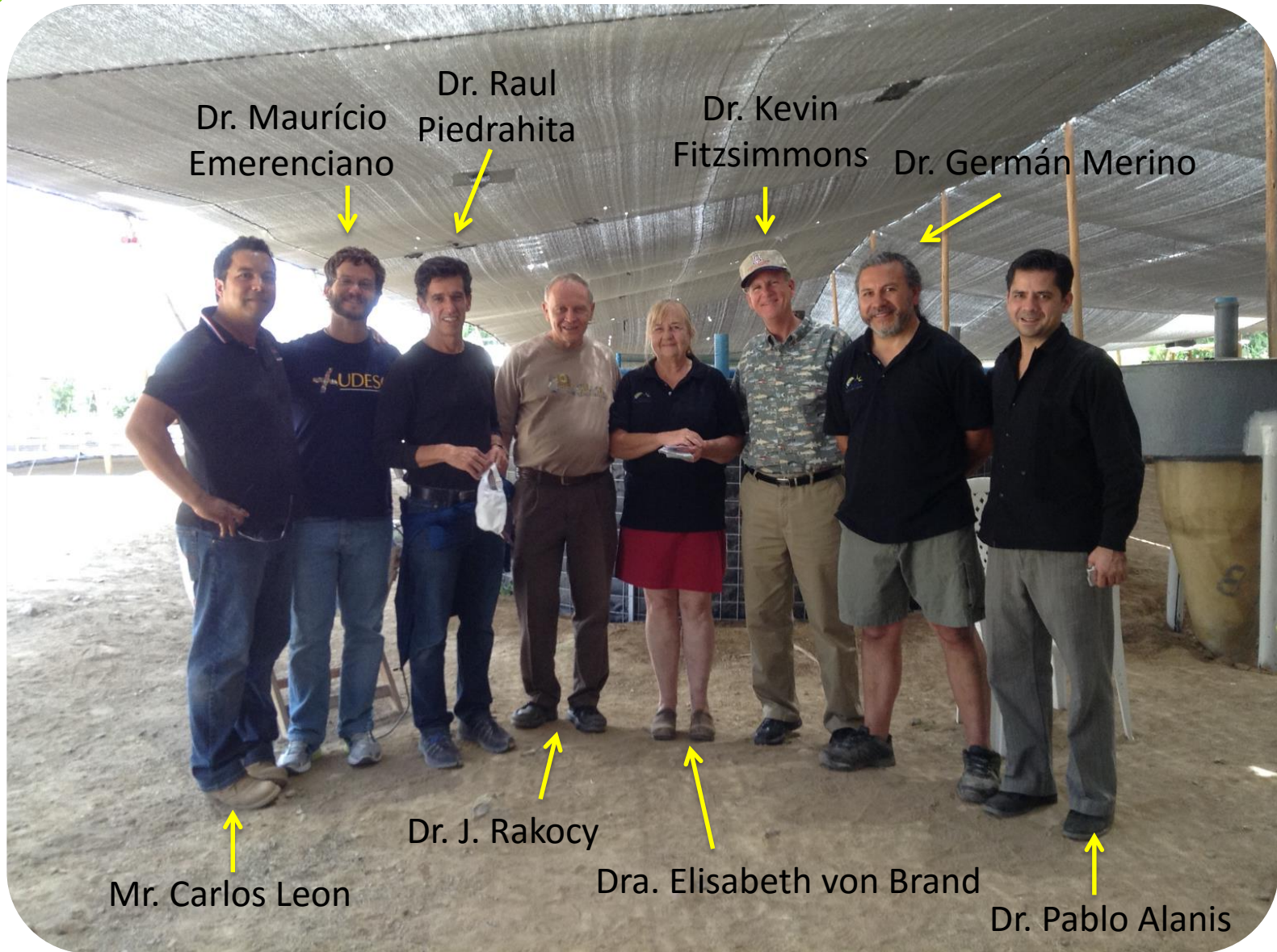
Fruit irrigation



Tours and visits

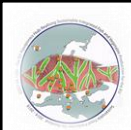


Visit during “V International Aquaponics Congress (Chile 2014)”



Visit during “V International Aquaponics Congress (Chile 2014)”





Focused on tilapia cage culture
(Colombia)



NUESTRA ESPECIALIDAD
CULTIVO SOSTENIBLE DE **TILAPIA**

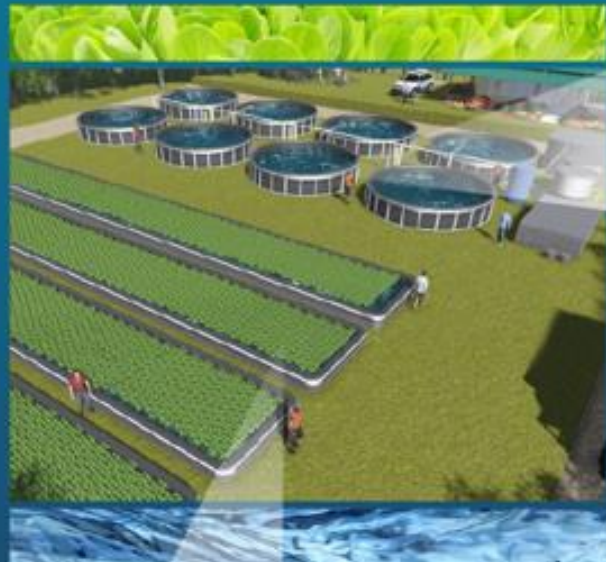


NUESTRA ESPECIALIDAD
CULTIVO SOSTENIBLE DE **TILAPIA**



Diversification...

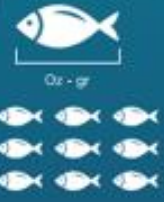
PROTOTIPO ACUAPÓNICO ACTUALMENTE EN DESARROLLO



Sistema Acuapónico



Instalaciones de engorde

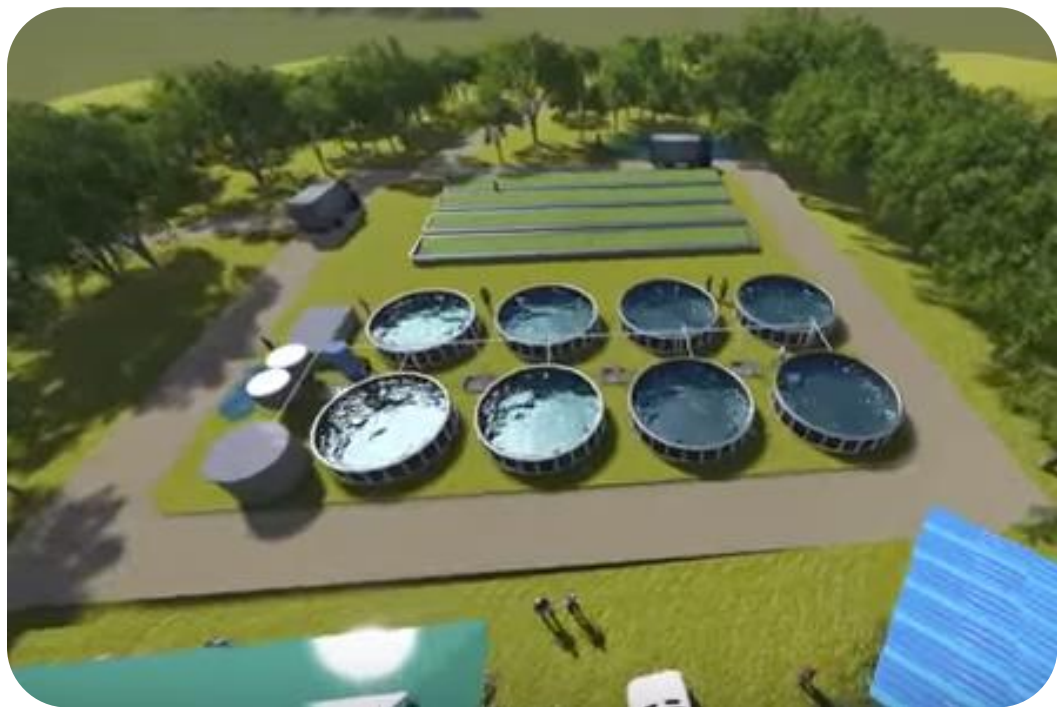


Cultivo de Albahaca



UBICACIÓN





Source: <https://www.youtube.com/watch?v=QEXD2yymjjQ>



Research in Brazil

Some examples:





Research focused on small scale (family) aquaponics and on effluents
Team leader: Dr. Paulo Carneiro





UNIVERSIDADE FEDERAL
DE ALAGOAS

**Research focused on small scale (family)
aquaponics**

Team leader: Dr. Emerson Soares





**UNIVERSIDADE FEDERAL
DE SANTA CATARINA**

Research focused on Marine shrimp and Halophytes sp. (i.e. *Salicornia* Sp.)

Team leader: Dr. Walter Quadros Seiffert





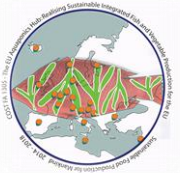
Research at UDESC

5 cycles (2 experiments)



Research focused: aquaculture systems, plant and aquatic organisms species; as well as nutrition/nutrients balance

Team leader: Dr. Maurício Emerenciano





Objectives of trials

1. **Comparison between biofloc (BFT) systems vs RAS system on lettuce aquaponic system**



2. **Evaluation of alternative species pacu (*Piaractus mesopotamicus*) in aquaponics systems**



Submitted



Contents lists available at ScienceDirect

Aquaculture

journal homepage: www.elsevier.com/locate/aquaculture



Application of biofloc technology (BFT) on the aquaponics production of different varieties of lettuce *Lactuca sativa*

Sara Mello Pinho¹, Diego Molinari¹, Giovanni Lemos de Mello¹, Kevin M. Fitzsimmons², Maurício Gustavo Coelho Emerenciano^{1,3*}

¹Universidade do Estado de Santa Catarina (UDESC), Departamento de Engenharia de Pesca, Laboratório de Aquicultura (LAQ), Laguna-SC, Brazil

² University of Arizona, Department of Soil Water and Environmental Science, Tucson, AZ, USA

³Programa de Pós-Graduação em Zootecnia (PPGZOO/UDESC), Chapecó-SC, Brazil

Submitted



Contents lists available at [ScienceDirect](#)

Aquaculture Reports

journal homepage: www.elsevier.com/locate/aqrep



Research article: Aquaculture Reports

Integrated production of pacu *Piaractus mesopotamicus* and two varieties of garnish (scallion and parsley) in an aquaponics system

Short title: Pacu and garnish species in an integrated aquaponics system

Sara Mello Pinho^a, Giovanni Lemos de Mello^a, Kevin M. Fitzsimmons^b, Maurício Gustavo Coelho Emerenciano^{a,c*}

^aUniversidade do Estado de Santa Catarina (UDESC), Departamento de Engenharia de Pesca, Laboratório de Aquicultura (LAQ), Laguna-SC, Brazil

^bUniversity of Arizona, Department of Soil Water and Environmental Science, Tucson, AZ, USA

^cPrograma de Pós-Graduação em Zootecnia (PPGZOO/UDESC), Chapecó-SC, Brazil

Devices



Devices



Greenhouse- 18 m² area
and 3 m high

Devices

- **Experimental design**

BFT
(exper. 1)

Pacu
(exper. 2)

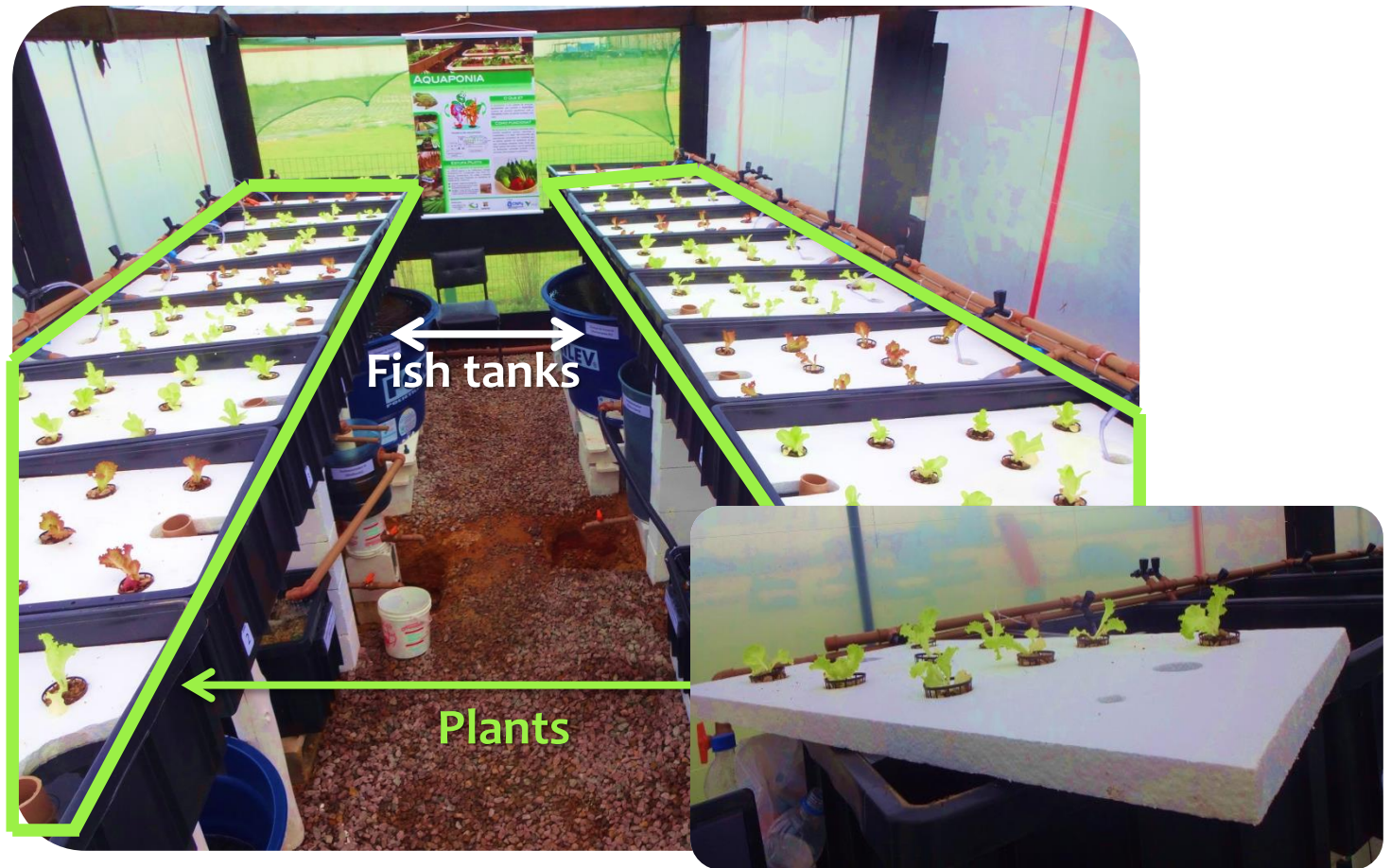


RAS
(exper. 1)

Tilapia
(exper. 2)

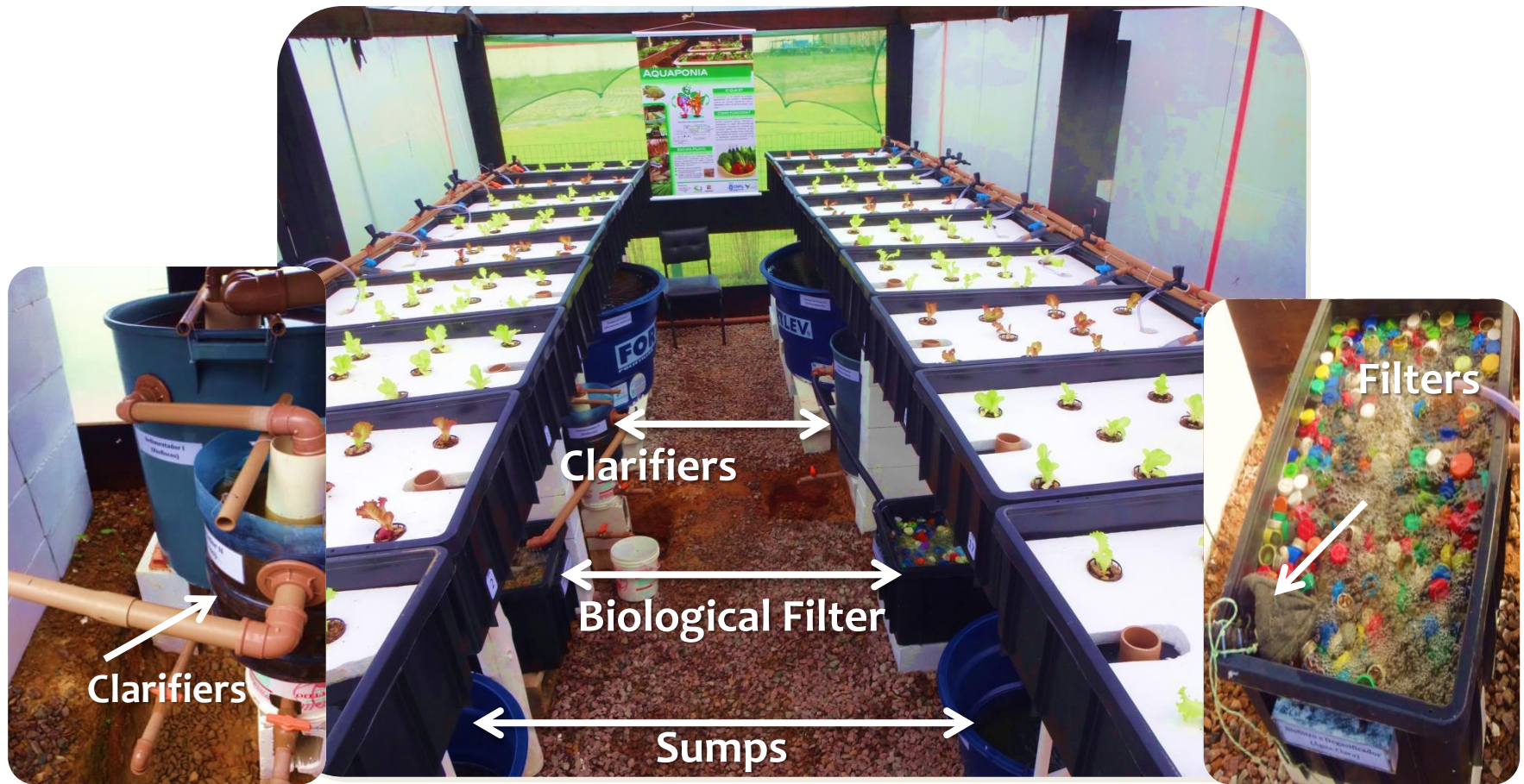
Devices

- Experimental design



Devices

- **Experimental design**



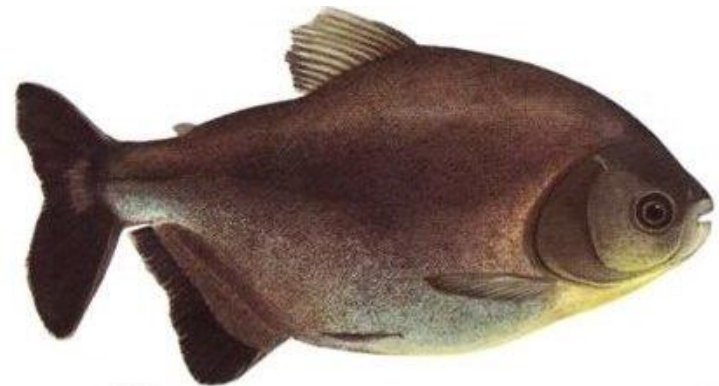
Resultados

Plant Growth



Conclusions

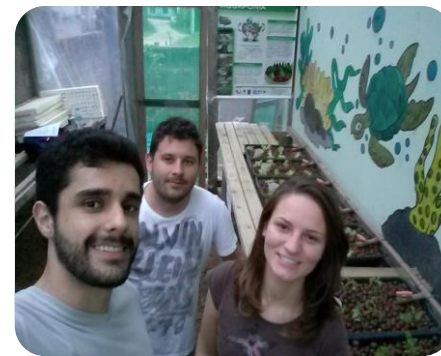
- Both BFT and Pacu are suitable for aquaponic systems, enhancing the productivity and improving plant quality





Other contributions from UDESC

Experimental Unit at a local high school



Experimental Unit at a local high school



<< Voltar

RSS Imprimir Aumentar fonte: a a a

15/12/2015 ~ 19h16min

Escola parceira da Udesc Laguna ganha prêmio ambiental da Epagri por projeto com aquaponia

Sistema de produção agroalimentar integra aquicultura e hidroponia



Alunos e responsáveis pela iniciativa mostraram ação no começo deste mês - Foto: Ascom Epagri

Information

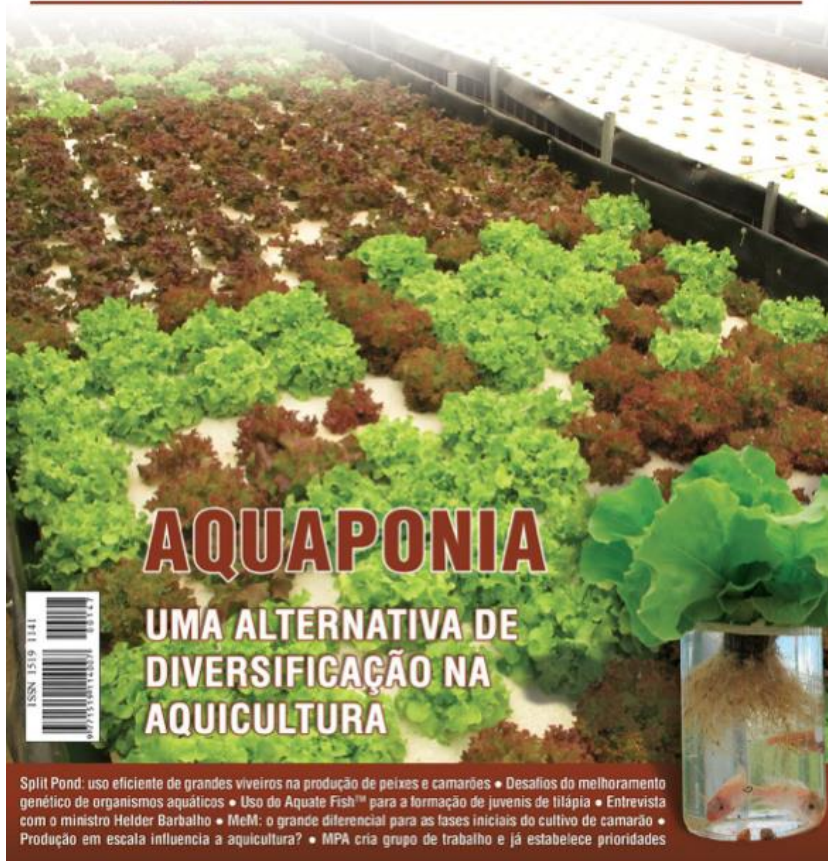
www.panoramadaaquicultura.com.br

Uma Publicação
Sobre Cultivos Aquáticos



Vol. 25, nº 147
Janeiro / Fevereiro - 2015

Panorama da AQUICULTURA



AQUAPONIA

UMA ALTERNATIVA DE
DIVERSIFICAÇÃO NA
AQUICULTURA



Split Pond: uso eficiente de grandes viveiros na produção de peixes e camarões • Desafios do melhoramento genético de organismos aquáticos • Uso do Aquate Fish™ para a formação de juvenis de tilápia • Entrevista com o ministro Helder Barbalho • MeM: o grande diferencial para as fases iniciais do cultivo de camarão • Produção em escala influencia a aquicultura? • MPA cria grupo de trabalho e já estabelece prioridades



AQUAPONIA:

uma alternativa de diversificação na aquicultura

Por:

Maurício Gustavo Coelho Emerenciano, PhD ^{1,2}

mauricioemerenciano@hotmail.com

Giovanni Lemos de Mello, PhD ¹

Sara Mello Pinho ¹

Diego Molinari ¹

Marcos Nicolás Blum ³

¹ Laboratório de Aquicultura (LAQ), Universidade do Estado de Santa Catarina (UDESC), campus CERES, Laguna-SC

² Programa de Pós-Graduação em Zootecnia – CEO/UDESC campus Chapecó-SC

³ Aquaconsult (blum.aqi@gmail.com)

Thanks to...

Funds:




Partners:



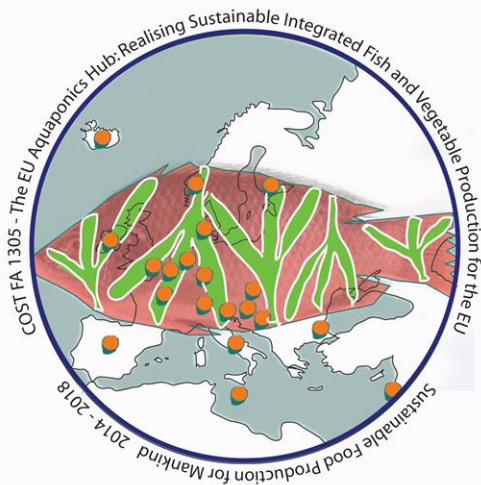
Laboratório Atlântico S

Our Team (LAQ/UEDESC STaFF):





Thank you very much!



Email: mauricioemerencionao@hotmail.com