UNIVERSIDAD NACIONAL DE COLOMBIA SEDE BOGOTÁ

FUNDACIÓN PRO DEL SURCO NARIÑO

McGill

Improving potato production for increased food security of indigenous communities in Colombia

Project Road Map
Overview

Teresa Mosquera Vásquez

IDRC CRDI Project supported by **International Development Research Centre -** www.idrc.ca Canada

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Third parties

UNB FREDERICTON

CENTRO INTERNACIONAL DE LA PAPA CIP

Collaborators

Universidad de Nariño

Nariño

Alcaldías municipales:

- Carlosama
- Cumbal
- Guachucal
- Pasto
- Túquerres

IDRC CRDI Project supported by **International Development Research Centre** - www.idrc.ca Canada

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Participant communities

- Carlosama Cuaspud*
- Cumbal: Cuetial*
- Guachucal: San Ramón Ipialpud and Colimba*
- Pasto: Rio Bobo and Jamondino
- Túquerres: Quebrada Oscura and San Carlos

IDRC CRDI Project supported by **International Development Research Centre -** www.idrc.ca Canada

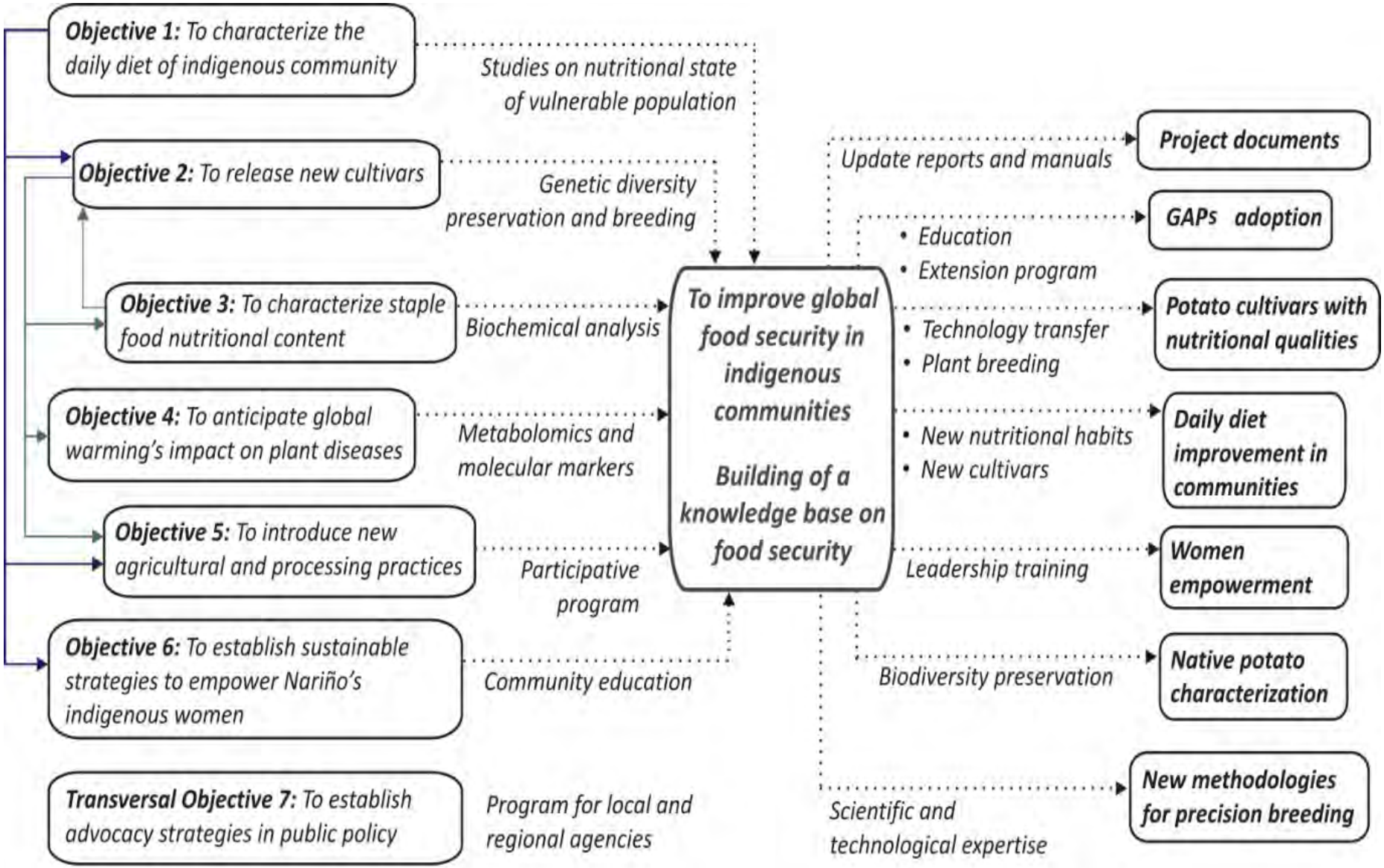


Figure 1. Project Flow Diagram

General objective

1 To improve global food security in indigenous communities by selection of potato cultivars with high yield and nutritional qualities to improve their daily diet, to empower women 2 as axes of the family, to adopt new nutritional habits and to develop participative research 3 on Good Agricultural and Postharvest Practices.

Meaning

- ***To improve global food security in indigenous communities*** means that **change** will occur if communities are willing, know how and have the means to do it.

- ***To empower women as axes of the family*** means that women decisions are strategic to **change** food security and nutrition habits.

- ***Participative research on Good Agricultural and Postharvest Practices*** means that **change** will occur when producers decide to do it.

Success

Our success depends on community commitment and appropriation of project activities and results

A non explicit objective

To introduce Colombian researchers to international academic communities, so we can deal most effectively with Colombian problems.

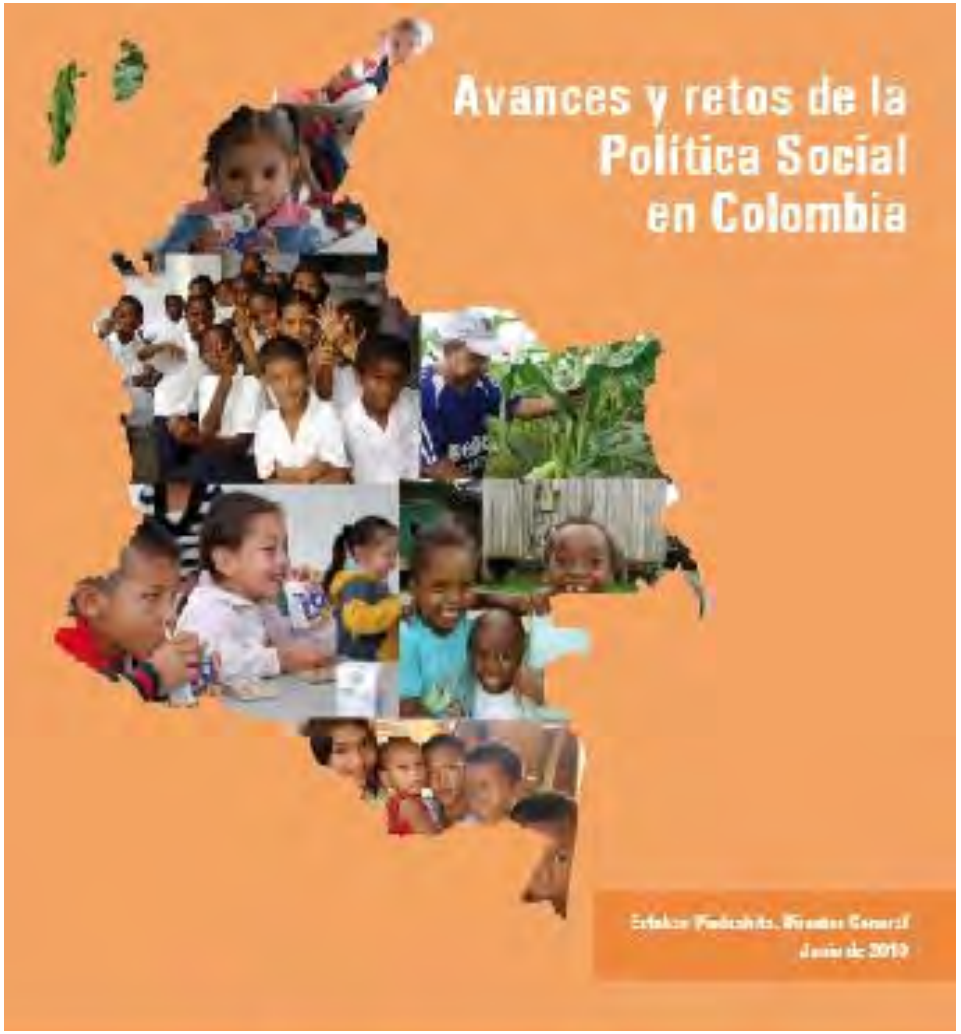
A non explicit objective

This objective is developed by working together to get the objective of the project trough research:

- Nutritional value
- Genomic
- Metabolomic
- Breeding
- Social studies

are media to interchange knowledge and experience with McGill and New Brunswick universities and International Potato Center (CIP).

An explicit objective



To escalate project in such a way that research methodologies and results are useful for public policies.

Conclusion of objectives analysis

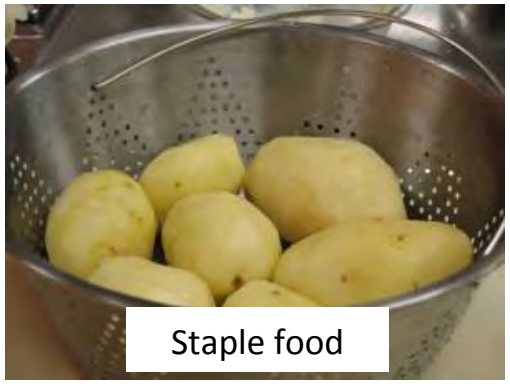
Our real objectives are changing behavior:

- Communities
- Researchers
- Institutions

Strategies

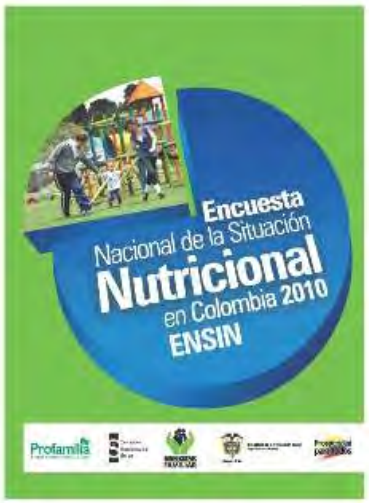
- Working with communities and authorities.
- Introducing Colombian researchers to international academic communities.

Why potato?


Staple food

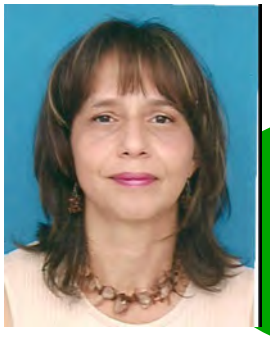

biodiversity


Income




Late blight resistance

Participative research experience



1. Food security and nutrition

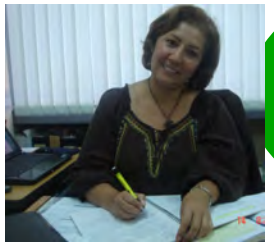
2. Potato breeding

6. Family roles and gender

Subprojects

3. Nutritional quality value

5. Educational program - ECAs

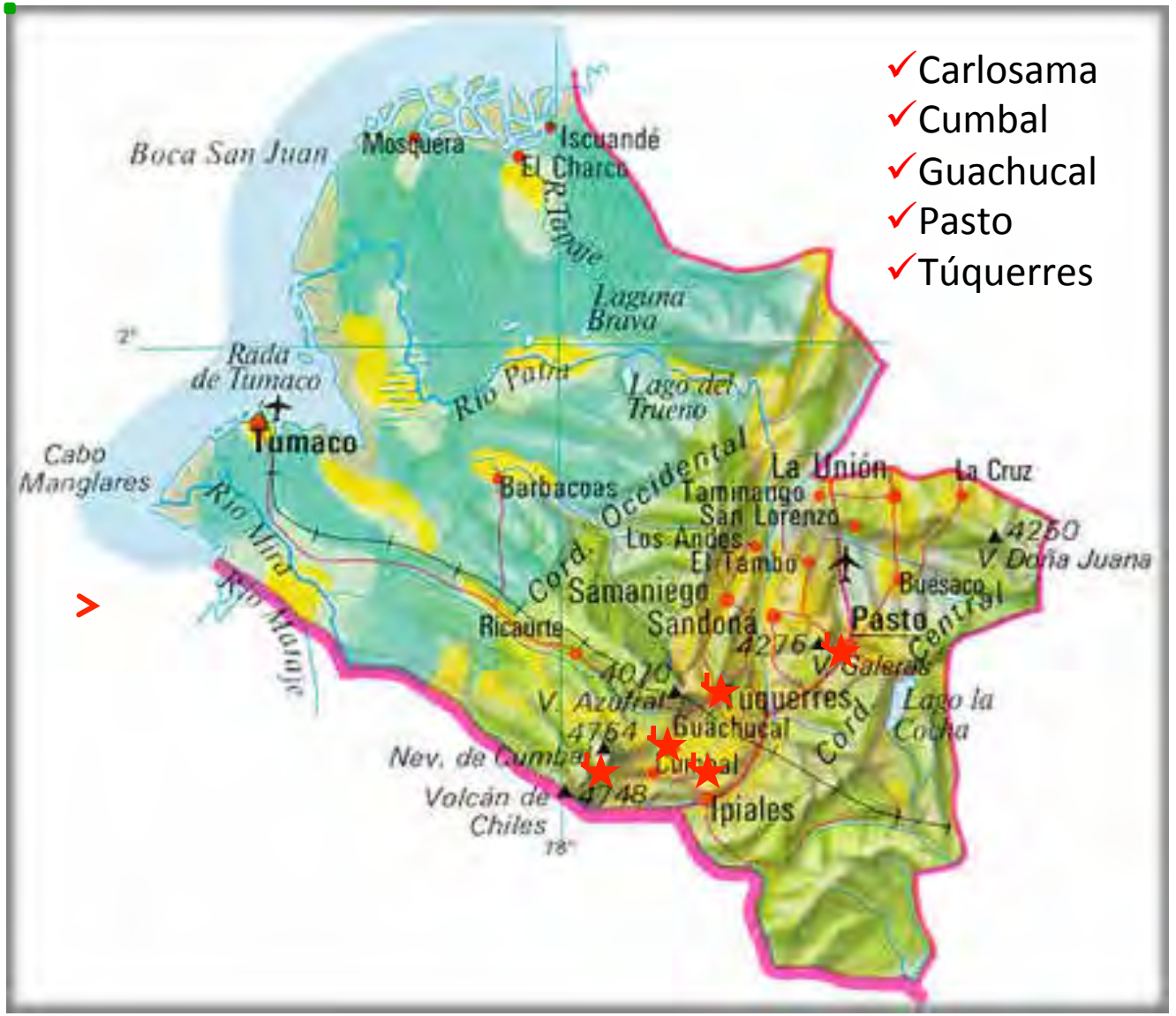


4. Genomics and metabolomics

Working with communities and authorities

- Agricultural extension education
- Local authorities participation
- Research on food security and nutrition
- Women's leadership on food security and nutrition
- Family roles regarding nutrition

Working with communities and authorities



- ✓Carlosama
- ✓Cumbal
- ✓Guachucal
- ✓Pasto
- ✓Túquerres

Working with communities and authorities

- Agricultural extension education
- Local authorities participation
- Research on food security and nutrition
- Women's leadership on food security and nutrition
- Family roles regarding nutrition

Working with communities and authorities

Education

each community will held two 10 months ECA:

- **First one:** authorities involvement, to select communities, to get confidence for working together, to get agreements regarding changes and methodologies. Learning to learn together.
- **Second one:** to gain in autonomy and capabilities to deal with agricultural and market problems and opportunities and to take political decisions and concern to support food security programs.

Working with communities and authorities

Education

Participative research:

- Selection of new cultivars
- Good Agricultural Practices
- Environmental protection

Working with communities and authorities

- Agricultural extension education
- Local authorities participation
- Research on food security and nutrition
- Women's leadership on food security and nutrition
- Family roles regarding nutrition

Strategies on community work

Local authorities participation

- identify local authorities related with project objectives,
- inform local authorities about the Project,
- invite local authorities to participate in Project development,
- involve technical personnel in Project activities,
- give to local authorities project results and methodologies.

Working with communities and authorities

- Agricultural extension education
- Local authorities participation
- Research on food security and nutrition
- Women's leadership on food security and nutrition
- Family roles regarding nutrition

Working with communities and authorities

Gender and nutrition

- **Research:**

  - ✓ Informing and getting authorization from local authorities
  - ✓ Selection of homes
  - ✓ Identifying women leaders
  - ✓ Informed consent
  - ✓ Gaining confidence
  - ✓ Dialogue of knowledge
  - ✓ Information gathering
  - ✓ Receiving information from other subprojects
  - ✓ Analysis of the information
  - ✓ Return of information
  - ✓ Presenting results and methodologies to local and national specialized authorities and academics

Working with communities and authorities

Food security and nutrition

- **Women's leadership**:
  - ✓ Call
  - ✓ Selection
  - ✓ Training in nutrition
  - ✓ Training in dialogue with own community and municipal and then regional officials to gain in autonomy.

Working with communities and authorities

- Agricultural extension education
- Local authorities participation
- Research on food security and nutrition
- Women's leadership on food security and nutrition
- Family roles regarding nutrition

Working with communities and authorities

Family roles regarding nutrition

- Selection of homes
- Informed consent
- Gaining confidence
- Focus groups
- Dialogue of knowledge
- Information gathering
- Analysis and return
- Incorporation of strategies to work with women leaders
- Deliver results to specialized authorities and academics

Introducing Colombian researchers to international academic communities

- Breeding and biodiversity preservation
- Nutritional analysis
- Genomic
- Metabolomic
- Rural development

Introducing Colombian researchers to international academic communities

Potato breeding

First cycle:

- Selecting places for trials.
- Establishing trials with community participation in ECAs.
- Selection of 12 elite clones with community participation.

Second cycle:

- Same procedure for selecting three clones for registration.
- Trials to test CIP potatoes
- Presenting information to ICA for registration.

People sowing breeding essays in Nariño

S. phureja (advanced clones)

Potato breeding

Third cycle: registration trials. Multiplication plots to grow mini tubers. Delivering mini tubers to community. Testing CIP cultivars.

- Registering best clones

Biodiversity preservation

S. phureja

Looking for native potatoes:

- ✓ Informed consent
- ✓ Building potatoes passport
- ✓ Sowing samples of native potatoes
- ✓ Gathering of information
- ✓ Giving back potatoes to community and to National Germplasm Bank.

Nutritional analysis

- Adjust required methodologies for evaluating the content of different nutrients in potato (*Solanum phureja*) Andigenum group.
- Proximal analysis of 202 clones

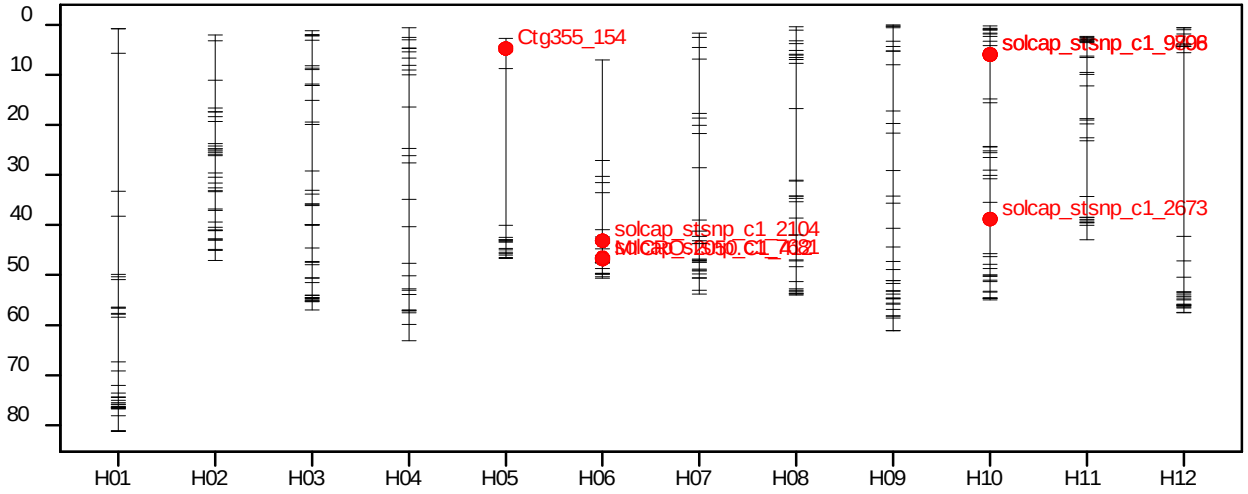
  - Determine the concentration of iron, phosphorous, potassium, magnesium, aluminum, calcium and zinc in Colombian native potatoes
  - Determine the total and individual content of antioxidant compounds: carotenoids, anthocyanins, phenolic and ascorbic acid in cultivars

Genomics for resistance

Sporulation surrounds lesion area in initial infection state

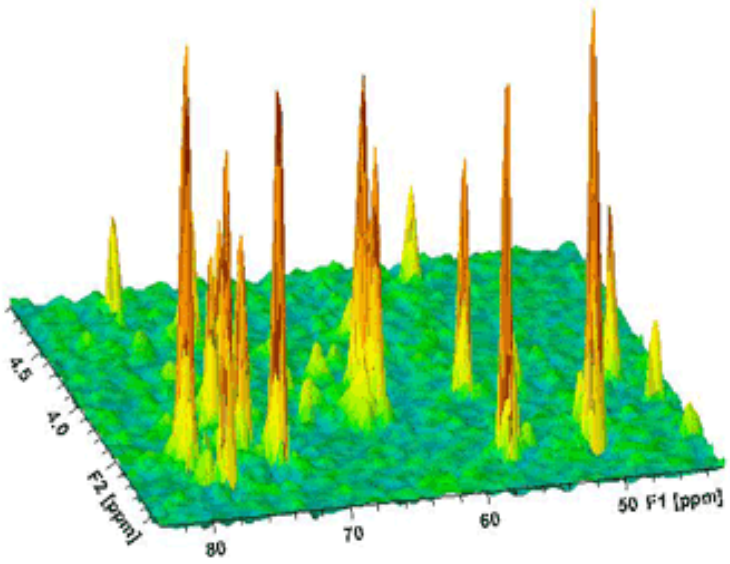
Sporulation is not on leaflets in advanced infection states

Sporulation is present on stem lesions



Introducing Colombian researchers to international academic communities

metabolomics - biomarkers



Identify potato clones with broad genetic resistance based on metabolomics and molecular technologies

Subproject Relationships

1. Food consumption and diet
2. Potato breeding
3. Nutritional quality value
4. Genomics and metabolomics
5. Educational program - ECAs
6. Family roles and gender

Daily nutrition

- Information on pattern of consumption of families (3)
- Support in programming activities regarding FSN in ECAs (5)
- Interchange of information for family sampling and information regarding FSN in family (6)

Subproject Relationships

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Multiplication support

Potato breeding:

- Tubers for multiplication support (100 advanced clones and progenitors)
- Best potato tubers for experiment about incidence of potato consumption (1 and 3)
- Tubers for studying nutritional quality (3)
- Advanced clones for studying resistance to late blight using metabolomics and genomics approach (4)
- Advanced clones to participative research in ECAs (5)
- Mini tubers for communities ECAs (5)

Subproject Relationships

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Multiplication support

Subproject Relationships

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Nutritional quality value:

- Information about nutritional composition (1, 2)
- Information about nutritional composition (4)
- Exchange information with CIP

1. Food consumption and diet

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Educational program:

- Time in ECAs´program for FSN and women´s leadership (1, 6)
- Coordination with communities to develop potato breeding program (2)
- Introduce native growers to potato breeding program regarding biodiversity (2)
- Introduce FSN and women´s leadership programs to communities and local authorities (1,6)

Subproject Relationships

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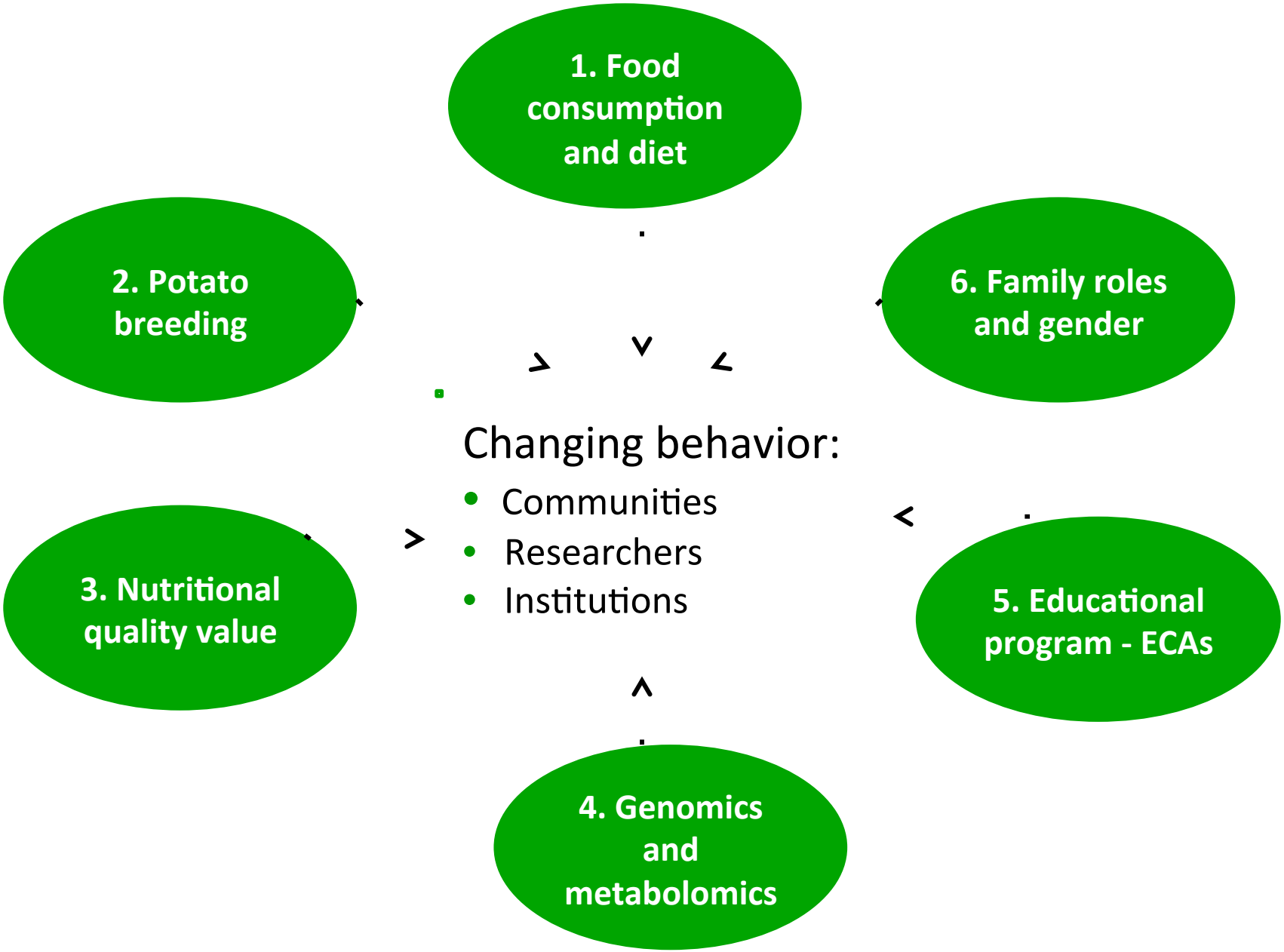
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Changing behavior:
Communities
Researchers
Institutions
3. Nutritional quality value
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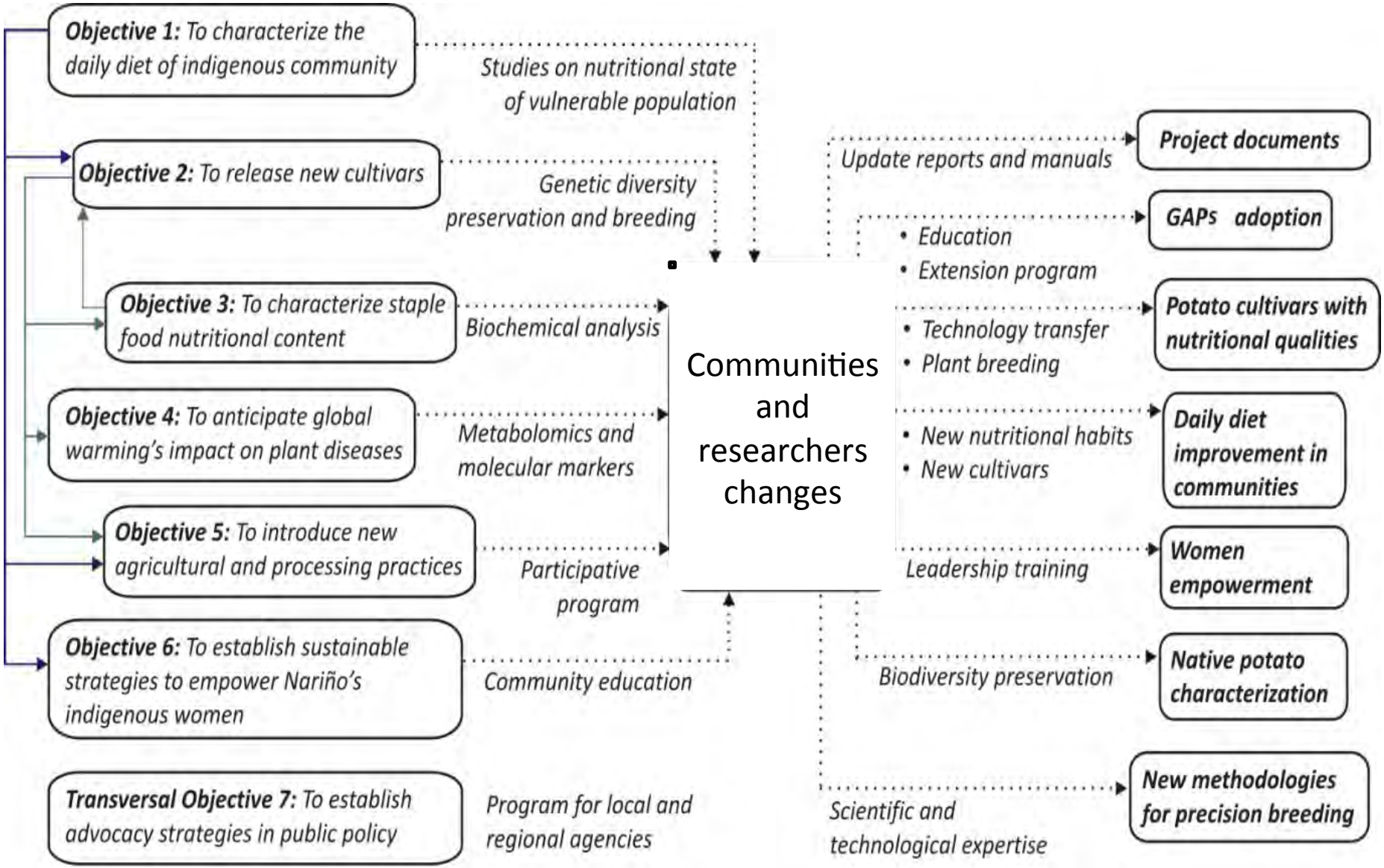

Figure 1. Project Flow Diagram

Thanks for your attention

Potato germplasm	Origin	Genotype sets	Total genotypes planted in Obonuco and UNC	Objectives 2 and 3					Objective 4		
				Participatory breeding research	Nutrition UNC AAFC	Nutrition CIP	NIRS analysis CIP	Functional food McGill	Field evaluation late blight	Molecular analysis Late blight AAFC UNC	Metabolomics Late blight McGill
Indigenous	Nariño	A	30		30	20	10	10	30	30	8
Advances clones	UNC	B	100	12	30	30	70	12	30	30	12
Micronutrient dence	CIP	C	10		10			5			
S. phureja	Colombia	D	104		104	36	68	10	104	104	15
Comercial	Colombia	E	10		10	5		5	5	5	5
Late blight resistant*	CIP	F	10						10	10	10
Progenitors**	CIP and UNC	G	18		18	9	9				
Germplasm***	CIP germplasm	H					80				
Total			**282**	**12**	**202**	**100**	**237**	**42**	**179**	**179**	**50**

* Genotypes to be evaluated in La Unión-Antioquia; ** Progenitors used to get advanced clones; *** Germplasm to be planted and evaluated in CIP

Please note: The number of genotypes overlap, because subsets are used for different components or trait evaluation.