

Participatory research for organic agriculture: the case of Brassica plant breeding in Brittany

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INRAE
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Online Postgraduate course

**Participatory Plant Breeding & Resilient
Seed Systems:**

**Options for Stakeholder Engagement and Benefit
Sharing**

30 November – 4 December 2020



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DYNAVERSITY

Content

1. General context and objectives
2. One example: creation of the « bricoli »
3. Evolution of the collective organisation, emergence of the Community Seed banks of Kaol kozh
4. Activities of Kaol kozh, the seed association which had emerged from participatory researches

Some words about Brittany in France

- North of Brittany, specialized in vegetable production and mainly cauliflowers.
- The oceanic climate allows cauliflower/cabbage production in autumn, winter and spring.
- Since the end of the 19th century, Brittany has developed this production
 - which increased mainly since 1960
 - and then, at the end of the eighties, when the F1 hybrid types were generalized.



Brittany and organic farming

- Even if Brittany underwent a great intensification of its agriculture in the second half of the 20th century, this region of France was involved in organic agriculture very early.
- With 2,730 farms involved in organic production, **8% of Breton farms are organic**
- Main activity of Breton organic farms (on 01.01.18): dairy cattle: 771 (28%), **vegetables: 655 (24%)**

The beginnings in the years 2000

In Europe, when the EU Regulation 1452/2003 requiring the use of organic seed for planting went into force, organic seed professionals were not ready to fulfil the demand.

- In Brittany, a group of organic farmers and their organisations started to meet with researchers and to build Participatory Plant Breeding projects.
- for the Brassica species, most modern varieties did not fit to the principles of Organic Agriculture.



Modern Brassica varieties: for uniformity and stability



- Most seed companies have based the creation of F1 hybrid varieties of Brassicas (cauliflower, cabbage, broccoli...)
- The seed companies are mostly using the cytoplasmic male sterility (CMS) obtained from *Ogura radish*.

The recent selection of cauliflowers in Brittany

Before 1980

Step 1 "Population improvement"

- mass selection and on farm seed production

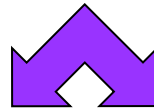
After 1980

Step 2 "Creation of homogeneous varieties"

- creation of F1 hybrid varieties

21st century

Step 3 : two opposite trends



« modern varieties with
biotechnologies »

Professional selection - mostly large
international groups

« open pollinated populations »

Farmer and professional selection -
local or independent structures

Genetic resources evaluation

Breton Brassica landraces stored in 1983 at INRA, thanks to an European program supported by ECP-GR (*European Cooperative Program for Crop Genetic and Resources Networks*).



Evaluation of landraces of autumn and winter cauliflowers, and some local cabbages

- from Genebanks INRA Rennes
- from HRI Wellesbourne (UK), CGN Wageningen (NL), GEVES (France), and breeders



2000 – 2020 : All Brassica actions

Evaluation of local genetic resources

- Re-Discovering of our patrimony
- Exploring other forms/landraces of Brassica

Selection and adaption of landraces from genebanks

- Modifying few characters (colors, size, earliness, homogeneity)

Creation of new types

- The “bricoli” of Kaol kozh

White breton cauliflower



Cabbage of Lorient



Di Jesi Cauliflower



Cape broccoli



Bricoli



The “bricoli”

The idea: a good broccoli easily recognizable for organic farmers and consumers

Should associate:

- ✓ Good taste of sprouting broccoli
- ✓ Easy to harvest
- ✓ Good local adaptation
- ✓ And specific color

Ten years selection

Begun with SOLIBAM (EU project)

And was finalized by one farmer of Kaol kozh during DIVERSIFOOD



LES PARENTS



Brocoli à jets
'Di Cicco'

For the good
taste

Pomme ronde et verte
'Marathon'
'Samson'



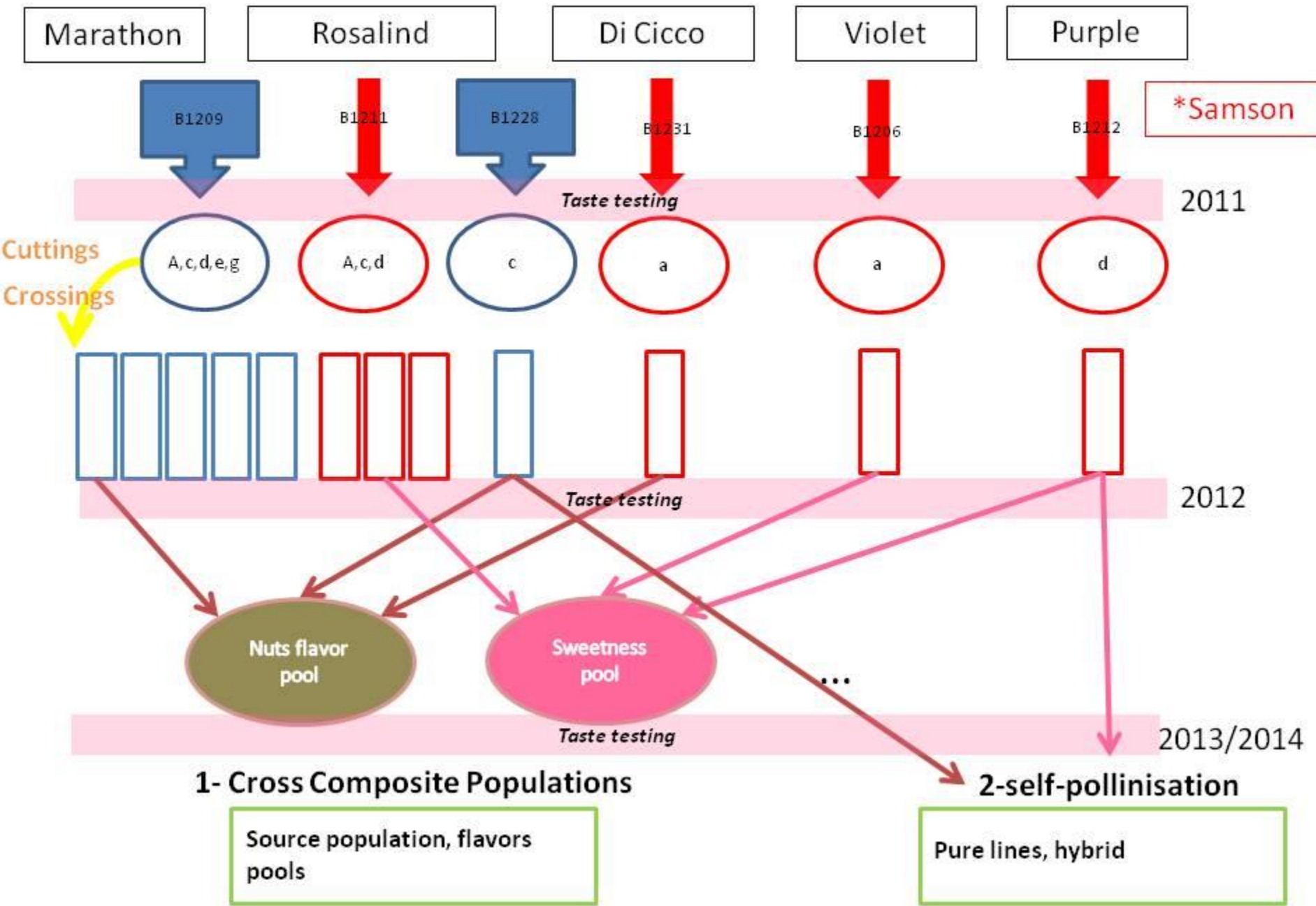
For the shape





Pomme ronde et violette
'Purple cape'
'Rosalind'
'Viola'

For the nice
colour

SOLIBAM Breeding strategy: Brocoli



PhD Camille Vindras

N° ordre :2014-34
 N° Série : C-116

THESE / AGRO CAMPUS OUEST

Sous le label de l'Université Européenne de Bretagne
pour obtenir le diplôme de :

DOCTEUR DE L'INSTITUT SUPERIEUR DES SCIENCES AGRONOMIQUES, AGRO-ALIMENTAIRES, HORTICOLES ET DU PAYSAGE

Spécialité : « Nom de la spécialité »
Ecole Doctorale : « VIE AGRO SANTE »

présentée par :


« CAMILLE VINDRAS-FOUILLET »

EVALUATION DE LA QUALITE SENSORIELLE DE PRODUITS POUR LA SELECTION PARTICIPATIVE EN AGRICULTURE BIOLOGIQUE : CAS DU BLE ET DU BROCOLI

soutenue le 17 décembre 2014 devant la commission d'Examen

Composition du jury :

Directrice de thèse Rapporteurs Examineurs	Véronique CHABLE Laurent HAZARD Giovanni DINELLI Maria MANZANARES-DAULEUX François HUSSON Estelle MASSON Bruno TAUPIER-LETAGE	Ingénieur de recherche (INRA) Directeur de recherche (INRA) Professeur (Université de Bologne) Professeur (AGRO CAMPUS OUEST) Professeur (AGRO CAMPUS OUEST) Maître de conférences (UBO) Ingénieur agronome (ITAB)
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TECHNICAL
BOOKLETS

Recommended
tests

How to prepare
the samples

How to analyze
the results







TASTING GUIDE :

Tools to integrate organoleptic quality criteria
in breeding programs

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Taste testing

2013/2014

1- Cross Composite Populations

2-self-pollinisation

Source population, flavors pools

Pure lines, hybrid

Plouescat – West Brittany

Chavagne – East Brittany

Eyragues – South of France

On-farm breeding



2015 and 16



No seeds at Jean-Martial farm

Mass selection



2014

Gautier Semences:

trials with 4 lines and 15 F1 Hybrids

No more news for the seed company



2019



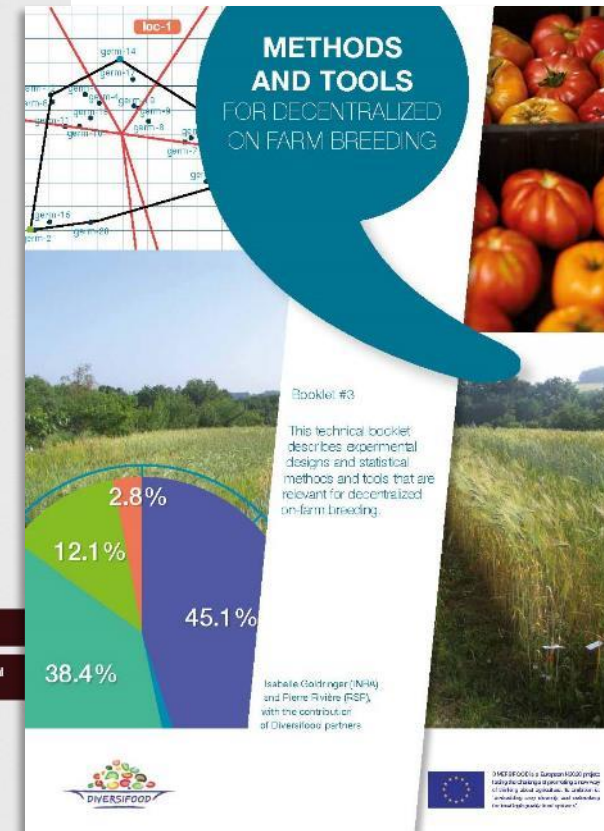
Creation of the "bricoli" at René Léa's farm
Sold on farm and for restaurants

DIVERSIFOOD - New approaches of plant breeding for diversified farming system

➔ Experimenting tools from fields to products



New approaches of plant breeding for diversity and sustainable farming system



Collective organisation

- From the PAIS (Plateforme Agrobiologique d'Initiative Bio Bretagne à Suscinio)
- to the Maisons de Semences Paysannes (Community seed banks)



Une maison pour les semences à Roscoff



Roscoff, une pépinière et Maison des Semences de l'association KAOL KOZEH associées pour la création de la Maison des Semences Paysannes à Roscoff.

L'association KAOL KOZEH (vieux choux en breton et bien commun en russe) porte un de légumes méconnus du grand public : choux de Lorient, de Plougon ou Racalos de Rennes, véritable trésor pour Kaol Kozeh mais aussi pour la ville de Roscoff. Ainsi, en 2019, la première



The PAIS

Plateforme Agrobiologique
d'Initiative Bio Bretagne à Suscinio



- Created in 2000
- First PBB program in 2001 for organic cabbages and cauliflowers in 2001.
- The aim was to include all concerned actors (farmers, processors, traders, trainers, researchers...) in defining the objectives and the means to reach them.



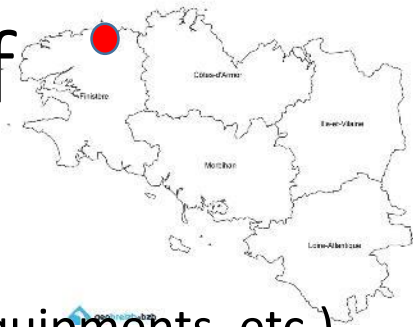
6 hectares of open field
and 800 m² of plastic greenhouse



Creation of Kaol kozh in 2007



Maison des semences in Roscoff (Community seed banks)



- A **professional** meeting point (access to seeds and technical equipments, etc.)
- A **training center** on seeds production and organic practices (for gardeners and professionals) with meeting room, practical work room, practical workshops
- A **varietal trials** and **seed production** area
- A **showcase garden** for the large public (with production of vegetables and their se aromatic plants, flowers, and sensory testing)
- A shop to buy peasant seeds for gardeners
- A **documentary center**, with access to various resources (books, DVDs, etc.) on peasant seeds
- Events throughout the year:
 - plant fair, farmers market,
 - art exhibitions,
 - open houses, seed barter,
 - Peasant Seeds festival ...
- A simple restaurant with local products from farmers' seeds



<https://www.roscoff-tourisme.com/fr/a-voir-a-faire/visites-et-decouvertes/a-visiter/la-maison-des-semences-kaol-kozh/>

Kaol kozh, the association that cultivates as formerly



ouest
france



Recherche : ville, actualité, fait divers...

Abonnez-vous



Se connecter



Réservé
aux abonnés

Roscoff. Kaol Kozh, l'association qui cultive comme avant

Kaol Kozh a obtenu un emplacement à Roscoff (Finistère) en juin 2019. Depuis, le jardin s'épanouit à vue d'œil, et abrite des légumes de tous les horizons.





DIVERSIFOOD and DYNAVERSITY

Manual 1

Community Seed Banks

Establishment, management and governance



DYNAVERSITY

2020: the PAIS has been recently closed

pressreader

Se connecter

Langue et région

France (Français) >

Pour Vous

Fil d'actualités

En Manchette

Conseillé

Politique

Économie

Technologie

Santé

Sport

Sciences

Résultats de recherche

Le Télégramme - Morlaix

Initiative Bio Bretagne ferme sa station de Suscinio

Initiative Bio Bretagne (IBB) a voté la fermeture de la plateforme agrobiologique de Suscinio au 31 décembre 2020.

18 sept. 2020 [+5 plus](#)

Créée il y a 20 ans, la plateforme agrobiologique d'Initiative Bio Bretagne (IBB) de Suscinio (PAIS), à Morlaix, a été initiée par la volonté

politique d'indépendance des producteurs de légumes bretons en matière d'expérimentation 100 % biologique. Au fil des ans, la PAIS a été reconnue au niveau national, sans toutefois parvenir à trouver sa place technique au niveau régional. Ces deux dernières années, la fragilité de ses financements s'est accentuée, et en particulier suite au redressement judiciaire de l'Institut

technique de l'agriculture biologique, partenaire pilote sur plusieurs projets. De plus, malgré les sollicitations d'IBB, les organisations de producteurs se sont éloignées de leur outil, ce qui a fini de cristalliser la situation.

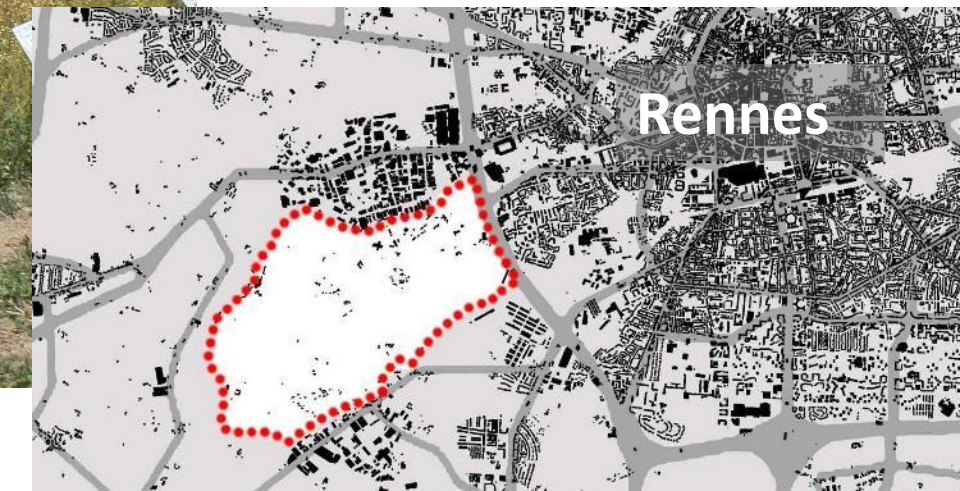
Une décision unanime, prise avec « beaucoup de regrets » Lors de la journée « Goûtez la recherche en bio

Second Maison des semences in Rennes



An ancient farm in the Prevalaye in
Rennes (South West)

There in
2021



And then at the same place, a « Maison du vivant »

- **For our INRAE team** (cultivated biodiversity and participatory research)
- Local link between the projects: “Prévalaye”, Kaol kozh and other initiatives
- Actions from local to international, to support the enlargement of cultivated diversity stored in genebanks
- Scientific and cultural animation for a holistic approach to organic food systems
- An anchoring in a territory of sciences renewed by the citizens for a collective project



Brassica breeding in a network of Kaol Kozh





In Brittany (France) since 2007

Kaol
Kozh

Association KAOL KOZH

Un patrimoine vivant, les semences en héritage

A living patrimony,
seeds as a heritage



The members



About 200 members
All forms of marketing are represented

What are doing Kaol Kozh ?

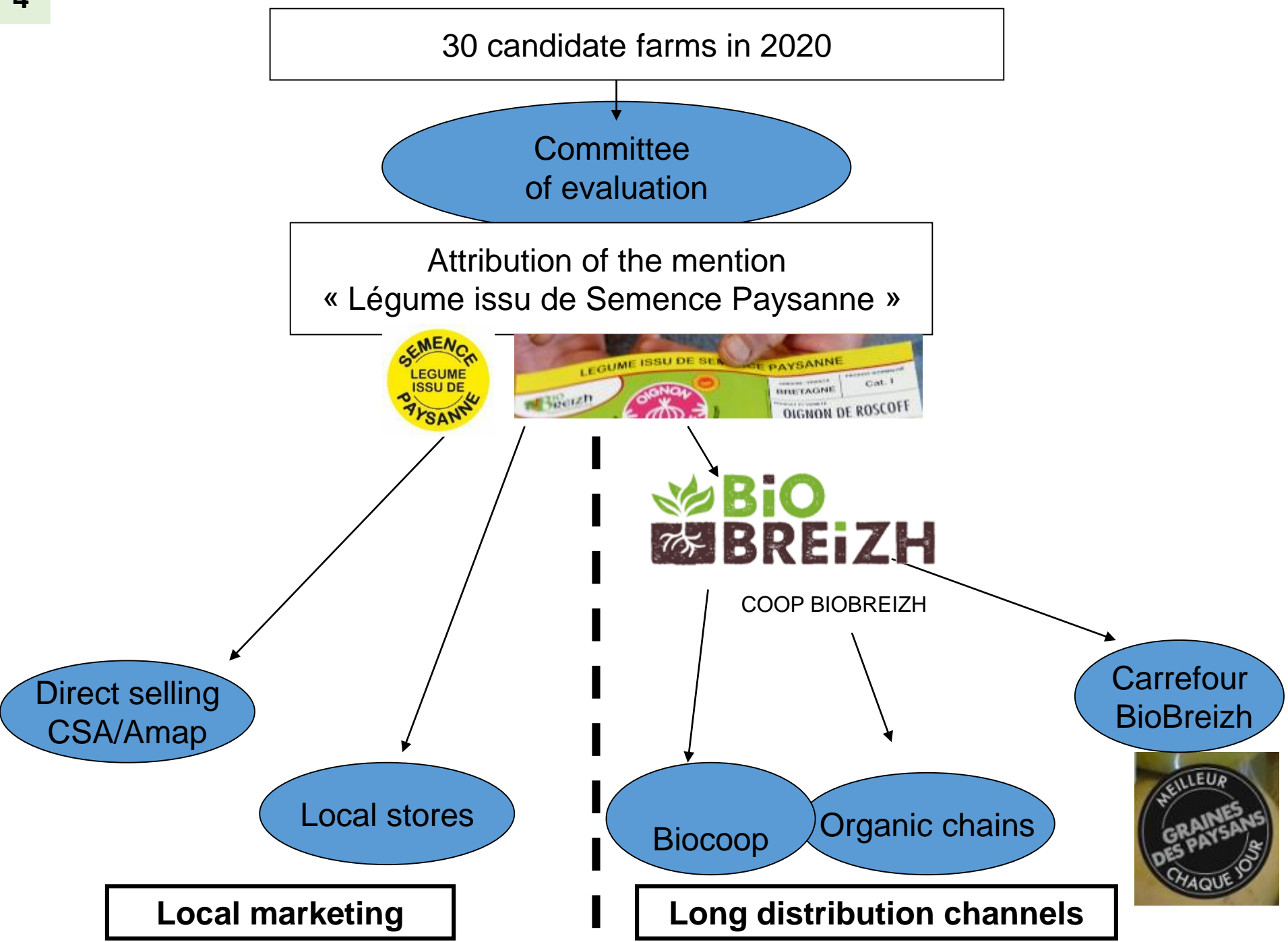
- Management of the mention/label « Légume issu de Semence Paysanne » (*Vegetable from peasant seed*)
- Experimentation
- Multiplication and dissemination of seeds
- Looking for adapted machinery and sharing equipment
- Training and communication
- Setting of collective places for our « Community Seed Banks »



Kaol Kozh is managing a mention « Légume issu de Semence Paysanne »



**Vegetable grown from
peasant seed**



Experimentation, plant breeding and seed production on several species over whole Brittany



An increasing network of farms/gardens for experimentation

- 13 farmers who hosted trials in 2018
- About ten species tested
- From simple characterization to "comparative" testing
- Cabbage, beans, tomatoes, parsnip, zucchini, turnip
- 150 populations observed



Brassica, example 1: Exploring a collection at Chavagne

- From INRA genebank: a collection of best open pollinated varieties from the 70's stored in 1983
- A collection of 65 cultivars, very diverse and original





Pointed head
Savoy cabbage



Large stalks
kale (similar
to chard)



Chou de Pontoise



Baccalan cabbage of Rennes

- Choice of original 7 cultivars adapted to local production
- Collective organization for the first multiplication before mass selection
- Multiplication based on 30 to 50 plants on 7 farms,
- Then mass selection to adapt to new environments and for quality



Now, two exploitation channels:

- Pontoise cabbage sold by Agrosemens, a small scale seed company (Artisan semencier)
- And circulation within KK members and other vegetable growers



Early cabbages
(bacalans, douarnenez...)

Brassica, example 2:

Chou de Lorient (Lorient cabbage)



- Plant breeding to modify the size of a traditional cabbage “Chou de Lorient”
- formerly used to supply, in winter, the sauerkraut manufacturers of Alsace: it is a large cabbage
- some farmers succeeded to reduce its size to be sold to families to be cooked or in salads,
- it is softer and sweeter than many other cabbages on the markets.
- To reach these aims, farmers use mass selection, directly in traditional cultivars

A mass selection

- 15 to 30 plants
- Seed production in plastic greenhouses
- Re-plantation from field to greenhouse after selection OR production of cuttings on mother plants



Our participatory research: plants farmers and researchers together



sharing objectives, actions and making
evolve our respective organisations
since 2000

