CAULIFLOWER PILOT CASE

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Veglife Seed Company

Veglife seed company
Opolske, Poland
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Company profile

- Company name Veg-life Seed Company
- Vegetable Seed Company deals with Brassicas,Solanaceae and Fabaceae
- Founded in 2006
- A limited Liability company with four founding shareholders and open to potential investors to purchase shares
- Headquarter breeding and seed production farm location in Opolske, Poland

Mission

- To breed, produce and supply the European market with vegetable varieties tailored to all their needs

Vision

- To be a vegetable seed production leader in Europe with potential to expand to North America

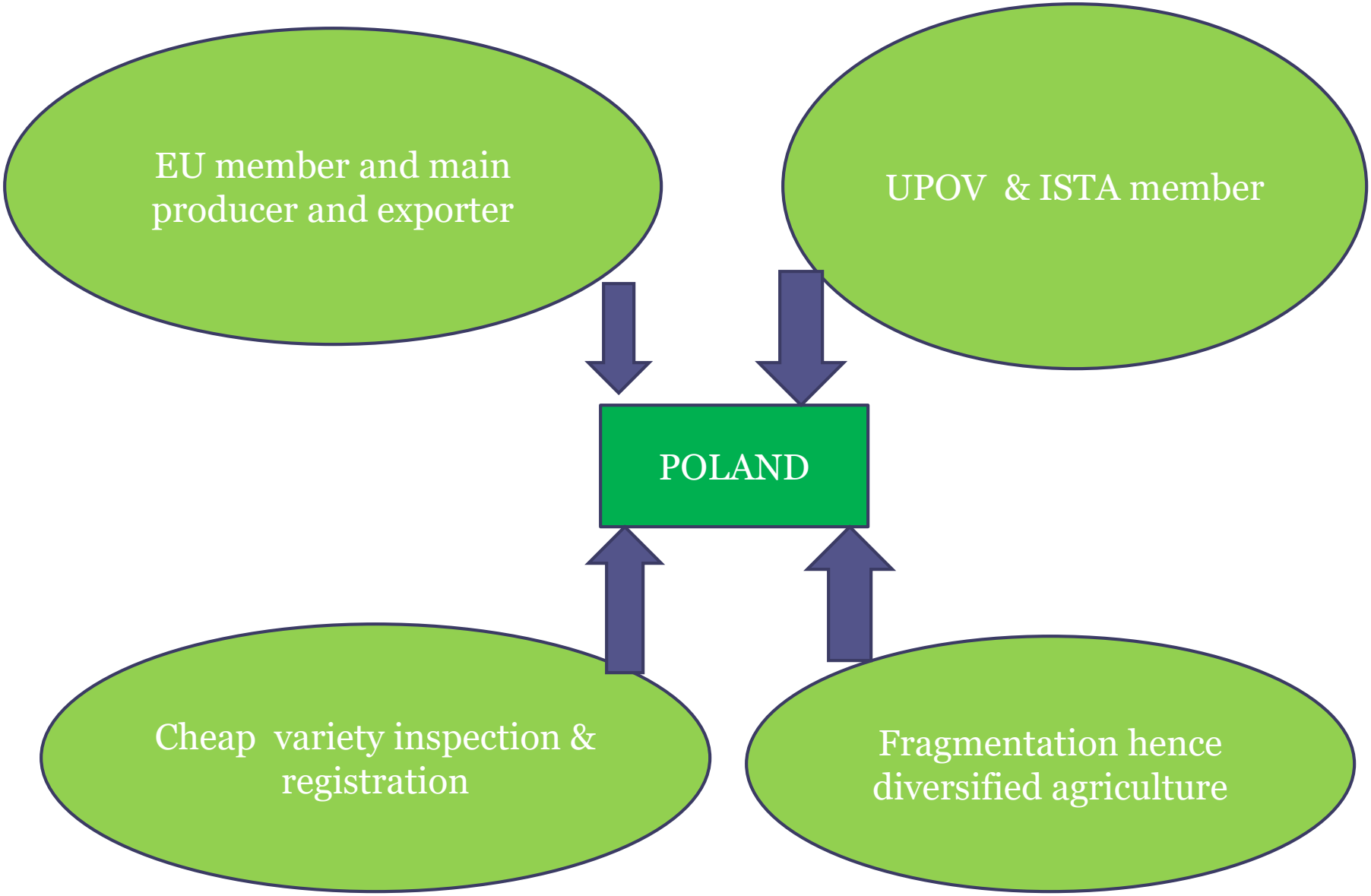
Deals with:

- Vegetable breeding and Seed production

Company assets

- 5 hectares of land
- 20 permanent employees
- Casuals hired depending on work and season
- 5 greenhouses
- Priva jutri jet feeding system with drip irrigation
- Farm machinery(tractors and planters)
- Seed processing factory
- Pure breeding lines of tomatoes,chillies,watermelons and peas

Why Poland?


EU member and main producer and exporter
UPOV & ISTA member
POLAND
Cheap variety inspection & registration
Fragmentation hence diversified agriculture

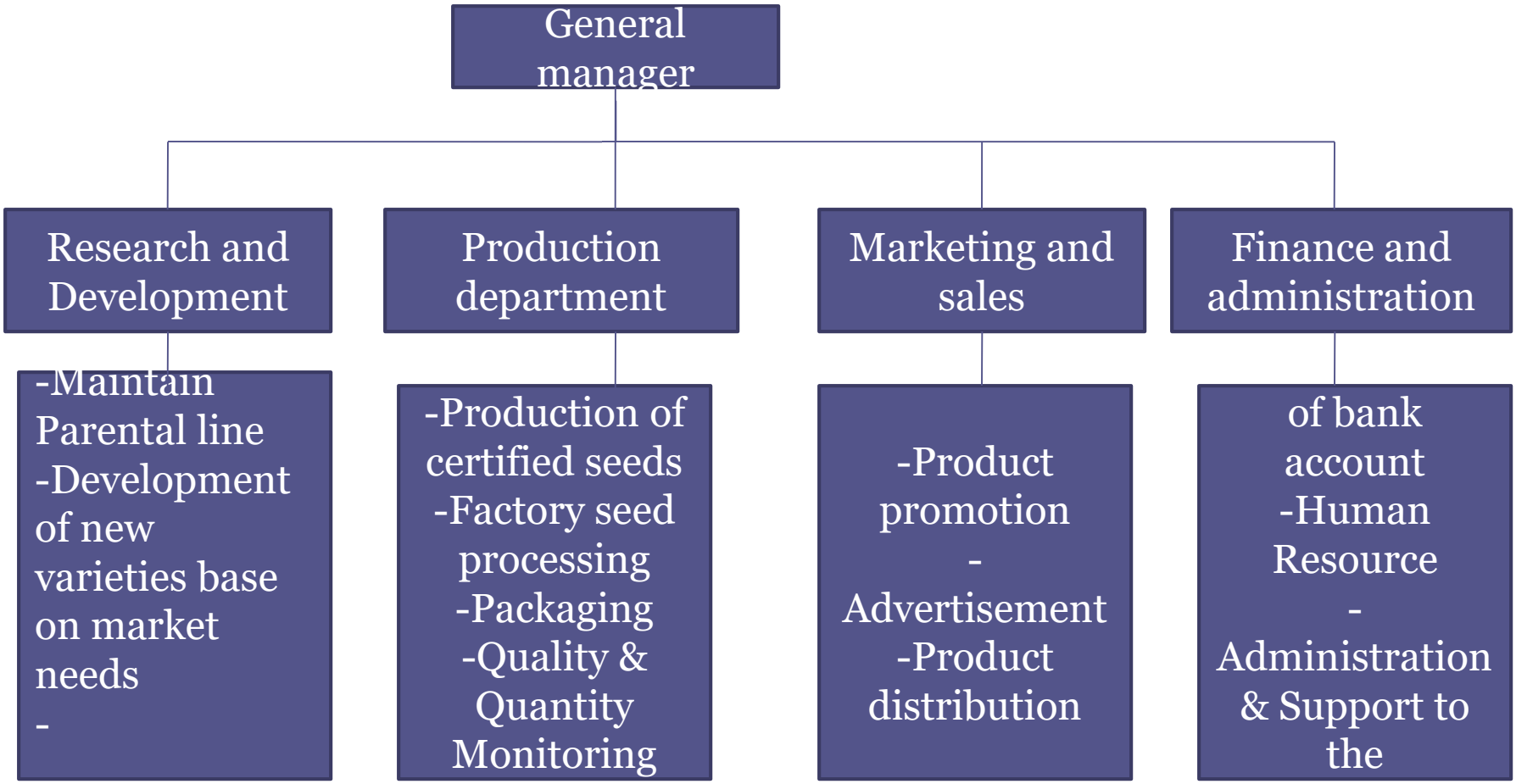
Seed production in Poland

- Seed cultivation area(including plants and vegetables) has increased by 48.4% since 2005 to 2014.((PIORiN)Agriculture and Food security in Poland ,2015)
- Farmers are already used to production of seeds as a business
- Contracting growers is easier.

Company staff

No	Role/responsibility	Required personnel
1	Breeders	3
2	Managing director	1
3	Heads of department	4
4	Agronomist	3
5	Marketing and public relations	4
6	Laboratory	3
7	Accounts and records	2

Organization and structure



Management roles

Manager-external employee

- Bouquet Fayiah .M.-Head of Production department (Masters in Mechanical engineering and Plant physiology)

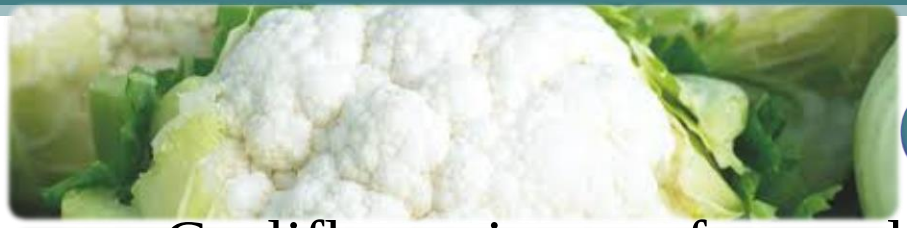
- Pacheco Juan-Head of Finance and Administration(Masters in Business Administration)

- Miguel Bracho-Head of Research and Development(Masters in Plant Breeding and Masters in

- Kyalo Dennis-Head of Marketing and Sales department(Masters in Enterprenuership,Masters in Economics

Means of Communication

Company website:www.veg-life.com
Company email: veglife60@gmail.com
Radio and television advertisement
Farmer extension and education



CAULIFLOWER

- Cauliflower is one of several vegetables in the species *Brassica oleracea*, in the family *Brassicaceae*.
- It is an annual plant that reproduces by seed.
- Typically, only the head of aborted floral meristems is eaten.

- *Leaves:* Surrounding the curd are ribbed, coarse green leaves that protect it from sunlight, impeding the development of chlorophyll.
- *Flowers:* The flowers are attached to a central stalk.
- *Seeds:* Seeds are head shaped also called a “curd”.

CLASSIFICATION

Scientific name: *Brassica oleracea* var. botrytis L.
Common names: Cauliflower
Family name: Brassicaceae (Cruciferae)

PRODUCTION AREAS IN EUROPE

Major cauliflower and broccoli growers are in Poland, Italy, France, and Spain

CULTIVARS OR VARIETIES

EARLY VARIETIES: Romanesco, Roscoff, Angers, Fremont, White Rock, Ravella and Alverda. Planted between June – July and harvested in September – October
LATEVARIETIES: snow crown, Snow peak, Erfurt, and Nomad planted in October – November and curds are available in February- March
Life cycle for seeds: Two growing seasons (bi-annual)

NUTRITIONAL COMPOSITION

Nutrition-wise, cauliflower is classified as a ‘superfood’, with good reasons:

- Veritable one-day multivitamin & mineral (Vit.-C, E, K) (Min. Fe, Ca, K, Mn,..
- Antioxidants (carotenoids and Manganese), dietary fiber, protein, low calories
- Anti-inflammatory Compounds (vitamin K) Gluten free, low fat and

CLIMATIC REQUIREMENTS

❖Growing temperatures:
Minimum 0 °C and maximum 30 °C, optimum between 15 and 22 °C.

❖Germination temperatures:
minimum 7 °C, maximum 27 °C and Optimum 29 °C

SOIL REQUIREMENTS

❖Neutral or slightly acid soil (pH 6,0 to 6,5), Normal soil pH in the range of 6,5 to 7,0,.

❖Well-drained, sandy loam soils - early varieties, loamy and clay loam soils for to late ones.

CULTIVATION PRACTICES

Suitable soils: All types of soils **Land preparation:** Deep ploughing followed by planting **Planting time:** May-June in nursery, June-July in field

Method of planting: Flat beds, **Spacing:** Early variety – Plant-Plant 60cm x 45cm

Late variety – Plant-Plant 45x45cm **Seed rate** for early crop is 600 to 750 gm and for late crop 400 to 500 gm /Ha

CAULIFLOWER PESTS AND DISEASES

VERTICILLIUM WILT

- Extensive leaf yellowing and senescing
- Typical vascular discoloration

STAPHYLINID BEETLE

- The beetles feed on cauliflower curds, making them brown and unmarketable
- Adults fly into crops, resulting in rapid and difficult to detect infestation

BACTERIAL ROT - HEAD

❖Infection occurs through injuries, with fungal growth further encouraged by warm, wet weather.

❖Symptoms may be observed in the field, they are commonly expressed after harvest.

WHITE MOULDE/ SCLEROTINIA

❖Found in decaying tissue in lower leaves, the fungus develops into a soft, wet rot covered with white, cottony fungal growth.

❖All parts of the plant may be affected

RICINESS

❖Curds are small and uneven. Individual parts of the florets elongate and separate, making them appear somewhat like grains of rice

❖Riciness is associated with high temperatures

OTHER PESTS AND DISEASES OF CAULIFLOWER:

The pests such as Diamond Back Moth (DBM), Plutella xylostella, Tobacco caterpillar -Spodoptera litura, Leaf webber -Crocidolomia binotalis, stem borer Hellula undalis, Aphid, Brevicornea brassicae, Mustard aphid, Lipaphis erisimi and Painted bugs, Bagrada cruciferarum are the important pests of cauliflower in other parts of EUROPE

Project Timeline

1. Market study
2. Germplasm recollection
3. Breeding program
4. Seed production
5. Commercialization

Market study

- Cauliflower is a traditional European crop present in Europe and also widespread in Asia.
- Cauliflower data can be found but is sometimes merged with brocolli data hence difficult to estimate the market accurately

Seed Market Focus

- Target seed markets are Italy, Spain,France and Poland.(both for local consumption and export to EU).
- Spain,mostly Cauliflower grown is for export.

Italy

- Largest producer in Europe
- Accounts for 26% of total European production
- 5th largest Cauliflower producer worldwide
- Annual production of 405,053 tonnes per year
- Major producing regions Silicy,Campania,Lazio,Apulia ,Veneto and Marche.
- Mainly for domestic consumption.

Spain

- 2nd largest producer in Europe
- Accounts for 17% European production
- Production area has increased in Spain from 31,204 hectares in 2011 to 33,198 hectares in 2014(FAOSTATS 2011 &2014)
- Most of the Cauliflower grown in Spain is for export into the European Union.(they prefer to eat broccoli!) 😪
- Mainly grown in Andalusia,Murcia,La Rioja and the Valencian community.

France

France produces 326,355 tonnes grown in an area of 20,010 hectares. Production in Brittany(80% of production)

- Production mainly for the domestic market.Half of production is for export mainly in Europe .

Major importers of French Cauliflower

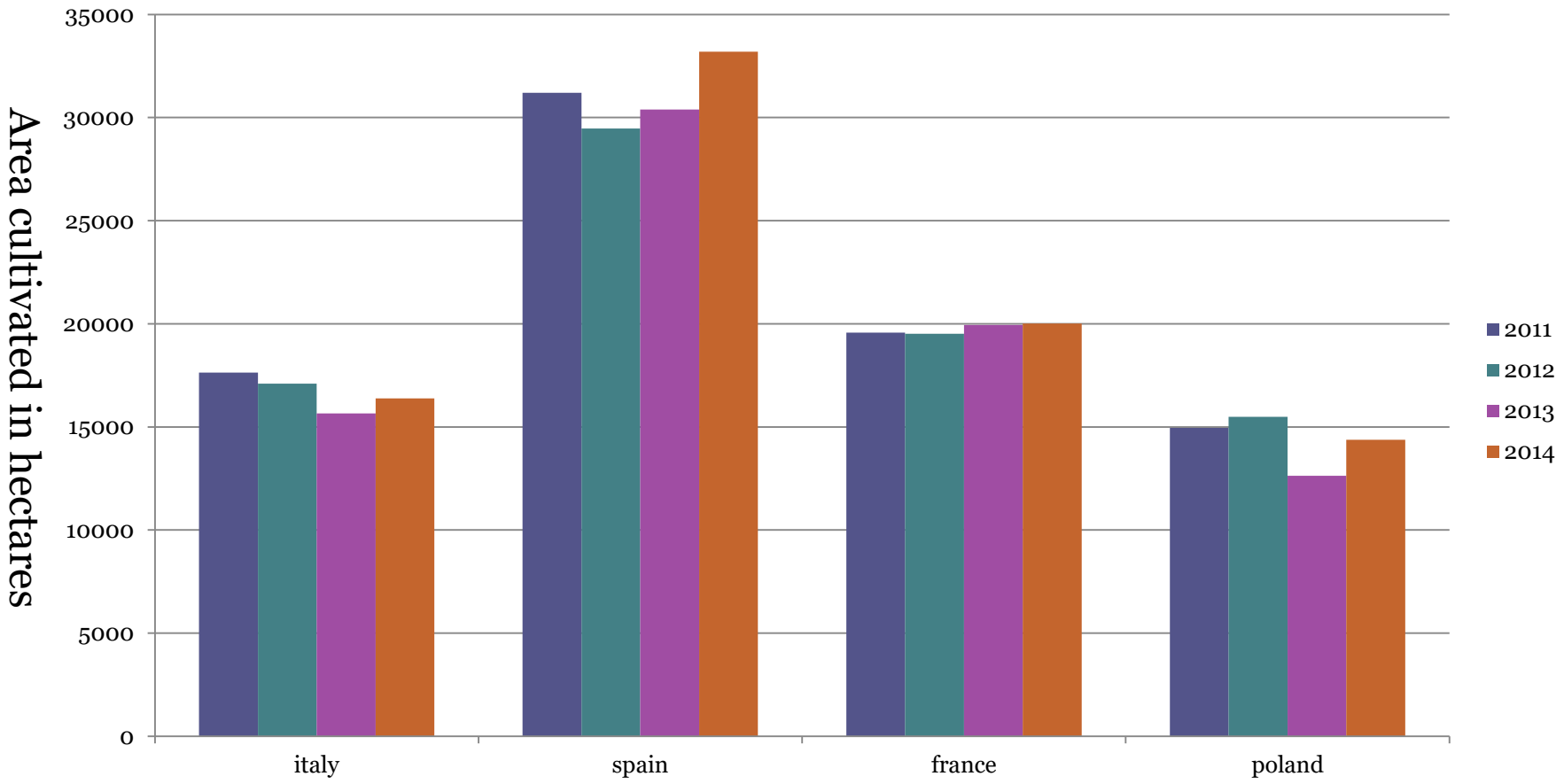
country	Amount in tonnes
Germany	57000
Netherlands	26000
UK	21000
Italy	8000

Poland

- 4th largest cauliflower producer in Europe
- 8th in production worldwide
- Accounts for 12% of total European production
- Cultivation on between 9-12 thousand hectares
- Cultivation regions(Lesser Poland,Mazovian,Lublin and Vovoideships
- Production for both local market and export

Poland vegetable market report,2014

European cauliflower production

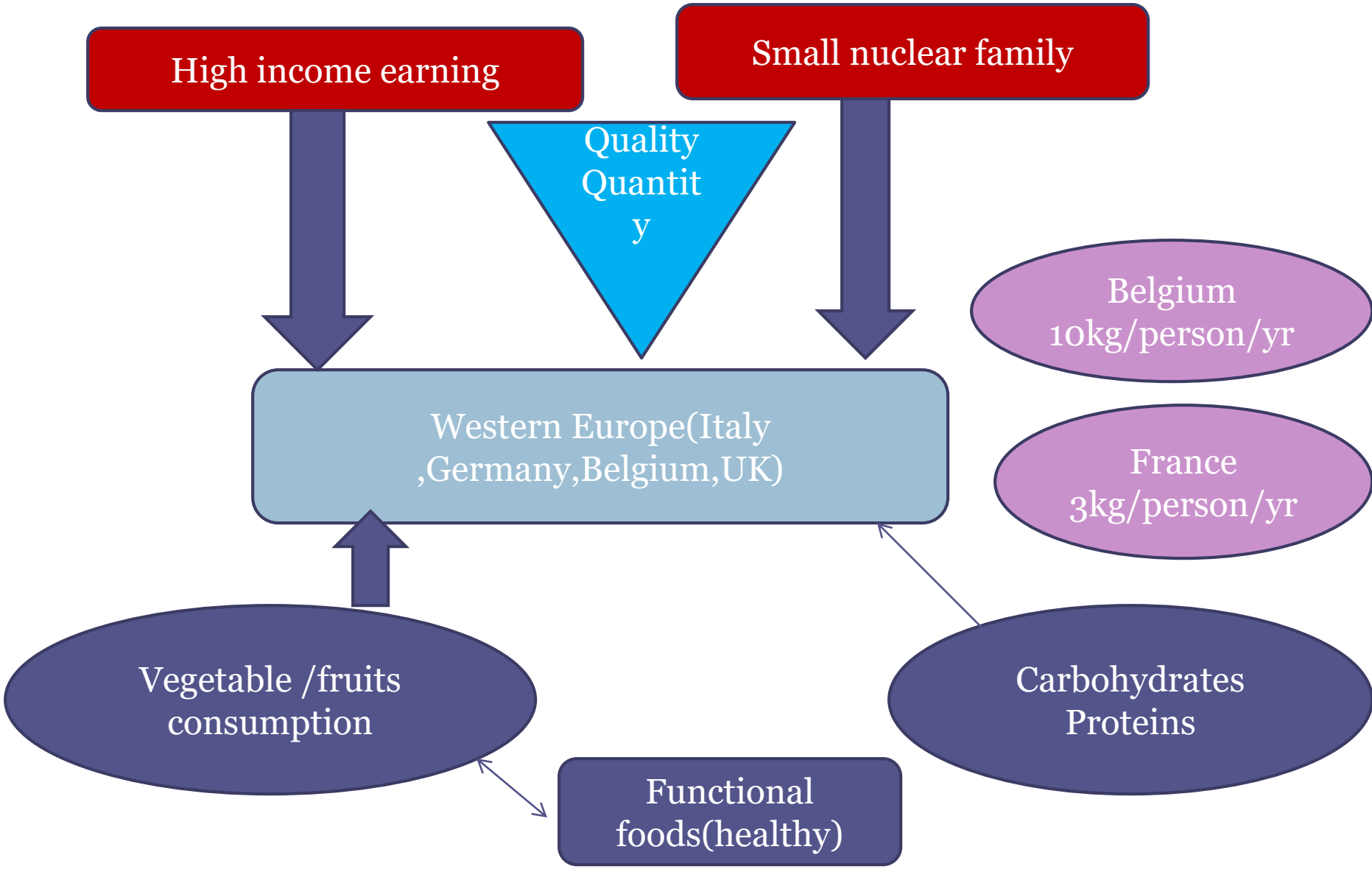


Produce Market focus

Country	Quantity(tonnes)	Value(millions)
United Kingdom	183.47	217.2M
Germany	66.621	75.8M
France	45.578	60.9M
Netherlands	40.104	46.9M
Russia	29.855	38.4M
Belgium	28.626	33M

- FAOstats data

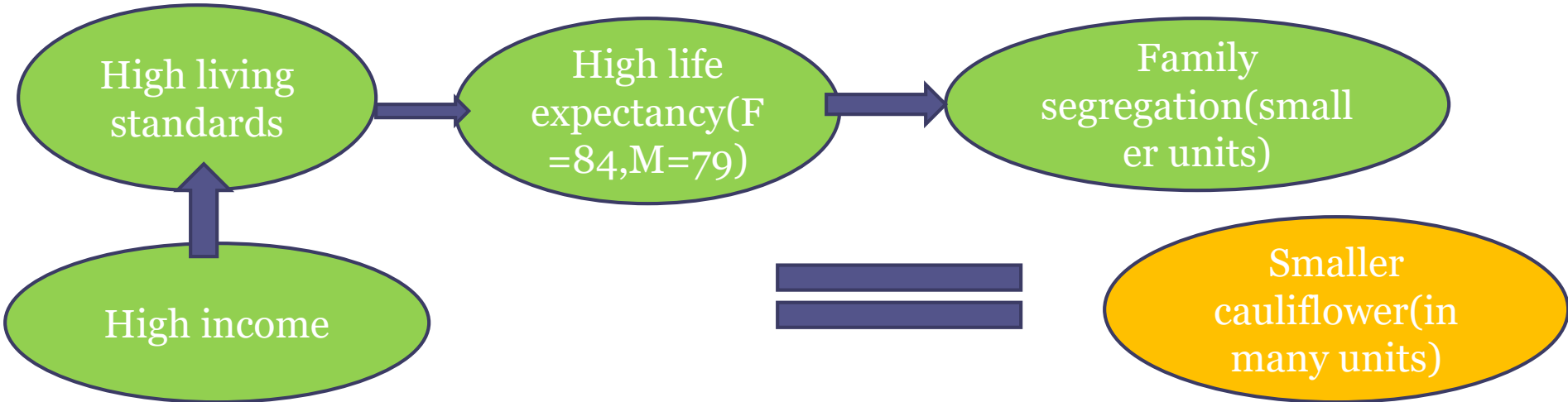
European Feeding habits



Demographics of the market

	%annual growth	2010	2013 population	2014 population
Belgium	0.38	9.6 million	11,1million	11.2million
France	0.42	64.6 million	65.5million	65.8million
UK	0.70	62.9million	63.9million	64.3million
Italy	1.84	59.0million	59.6million	60,7million
Germany	0.30	80.2million	80.5 million	80.7million

Eurostats



FAMILY SIZE CAULIFLOWER TAILOR-MADE FOR EUROPE?

Current varieties in the market

Family size

- Excess for the family(left overs)?
- Filling the trash bag?
- Tasteless!

- ✓Just enough for each meal
- ✓Better taste/aroma
- ✓Always fresh from grocery!

Farmer??

Closer spacing/high density=high yield

Competitor analysis

H M Clause
Syngenta
W Legutko

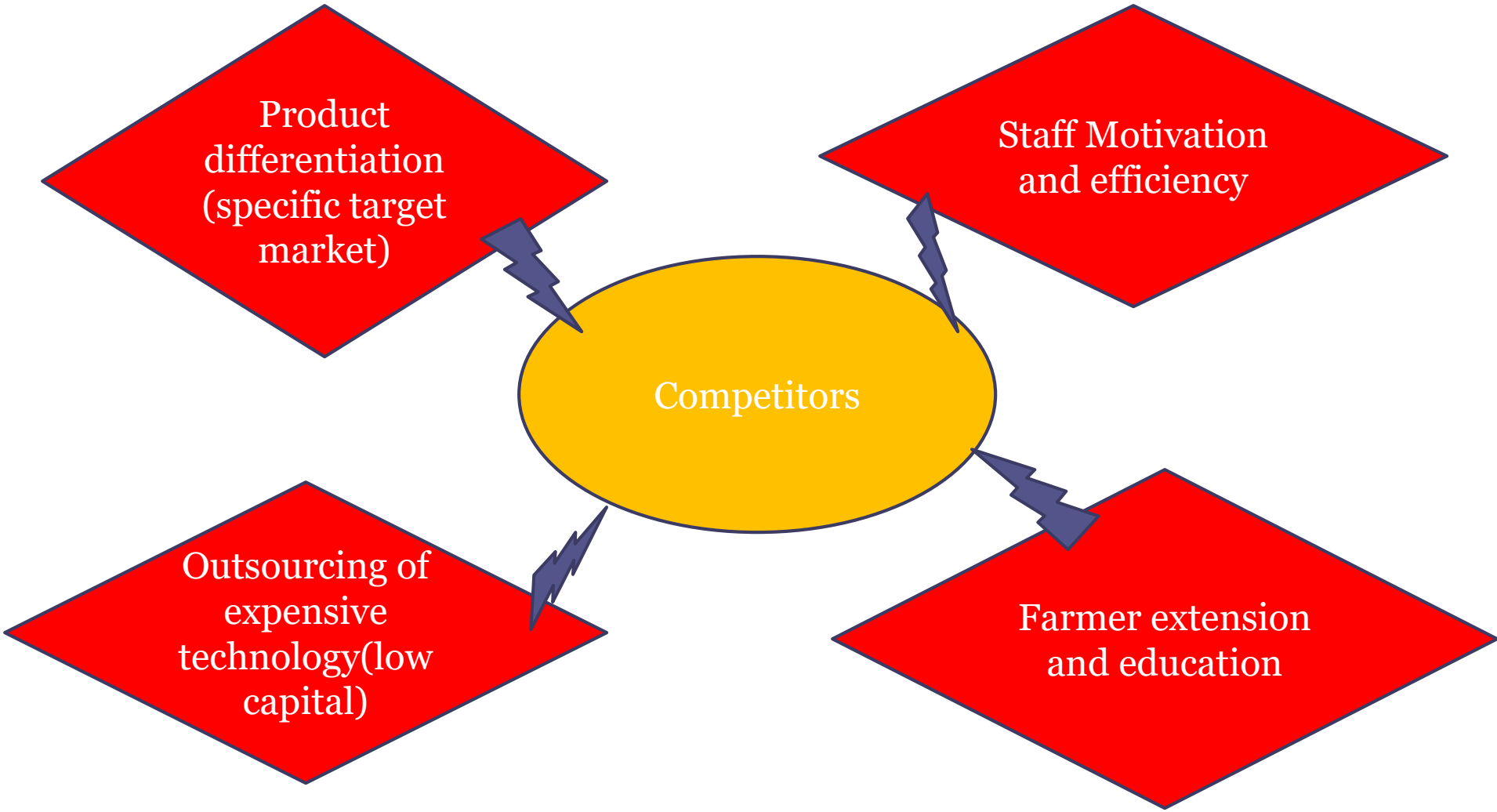
Meo-voto

Vilmorin
Sakata
Monsanto

variety	Units of seed sales	Price(euros)
Snow hybrid	1 gram/seeds(250)	1.82 euros
Romanesco	1 gram/seeds(200)	1.77 euros
Silicia viollette	1Gram/seeds(200)	1.36 euros

Price range of curds(1.4-2.6 Euros/kg)

Competition strategy



Goal and Objectives

- Goal
  - Breed a cauliflower variety with smaller curds that have improved taste.

- Objectives
  - To breed a cauliflower plant that produces a curd of a size between 12 to 17 cm in diameter.
  - To breed a cauliflower plant that produces a curd which tastes is better than the average cauliflower curd currently in the market.
  - To obtain the definite variety within the next 6 to 8 years.
  - Commercialize the product in the European market

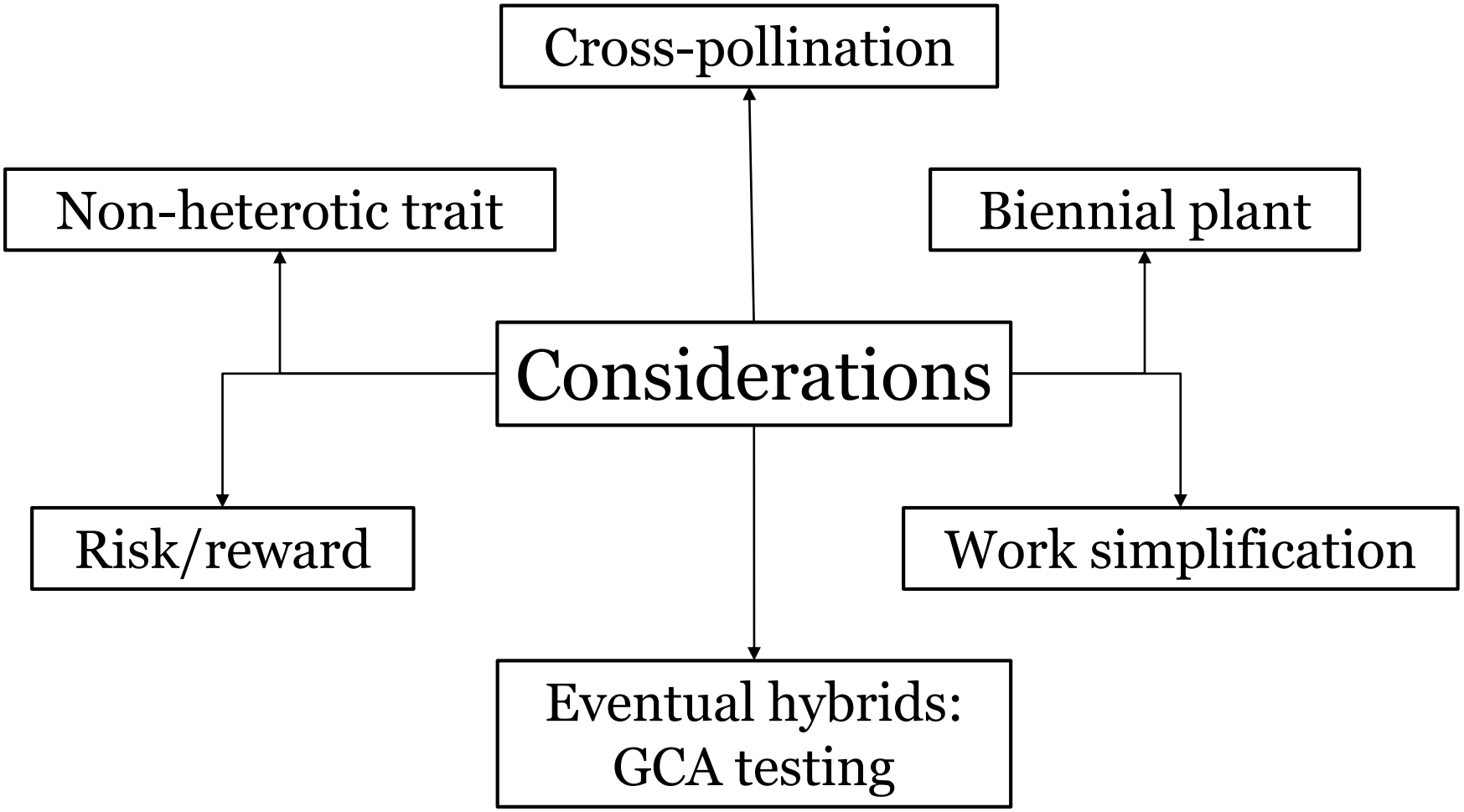
Germplasm collection

Possible sources are:
- ❖USDA Germplasm banks
- ❖COMAV Valencia
- ❖Growers landraces

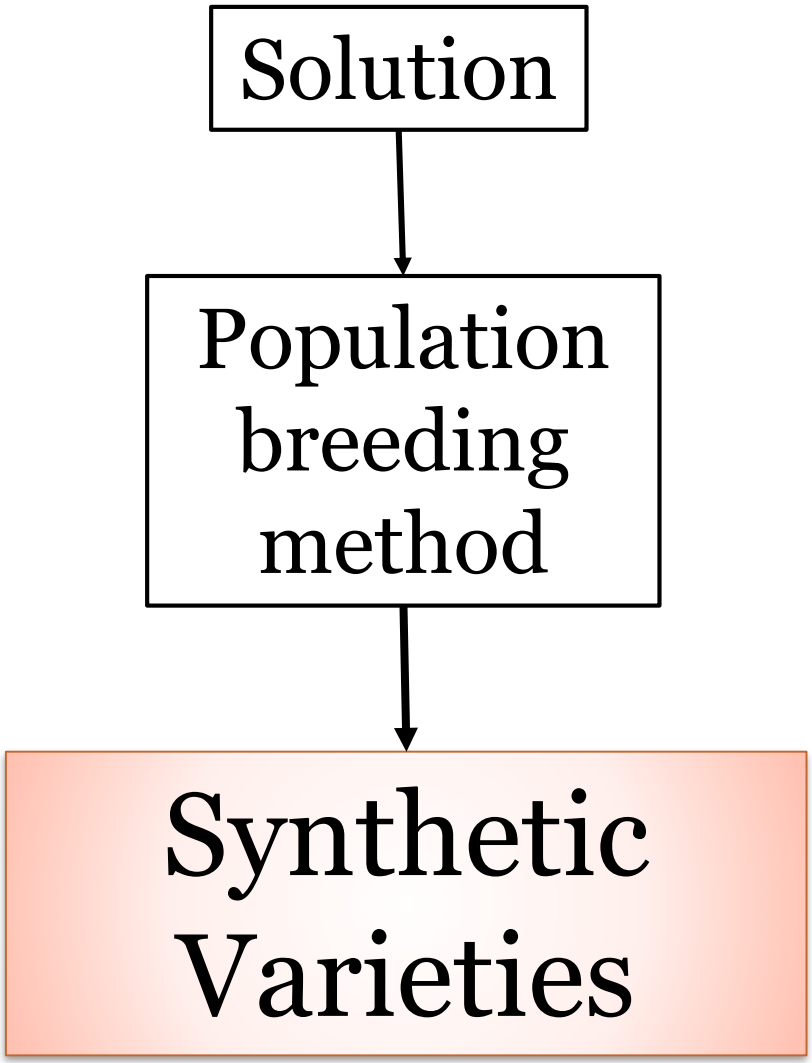
Plant identification	Variety name	Country of origin
PI 284594	Stor Dansk	Sweden
PI 208474	Ve de Slez	Netherlands
PI 662517	Dominant	Denmark
PI 385953	Patna Early	Kenya
PI 204764	D'alger	France
PI 462221	Romanesco	Italy
PI 343479	Cambridge dwarf	Russia
PI 209757	Dry weather	Netherlands
PI 244833	Orion	District of columbia
PI 204780	Merveille de toutes saison	France

Breeding methodology

Cauliflower Breeding

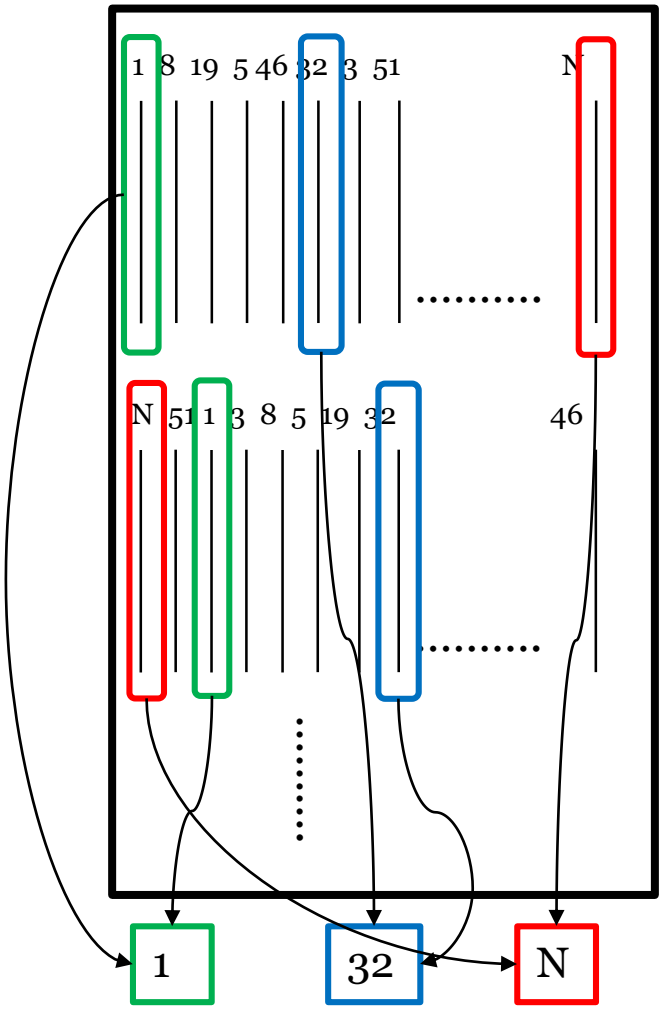


Cauliflower Breeding

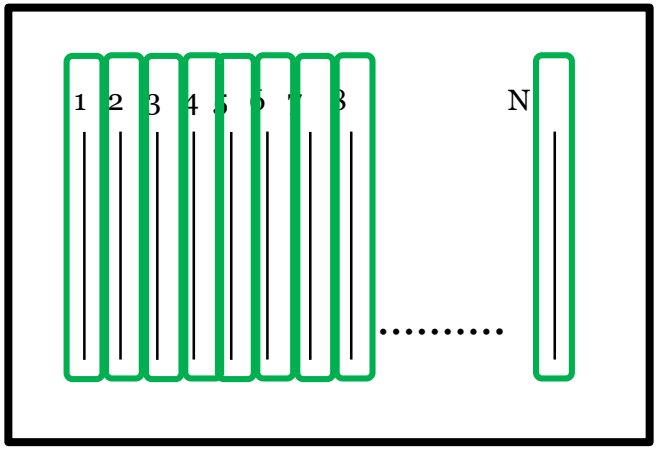


Years 1-3: 2017-2019

Polycross Field

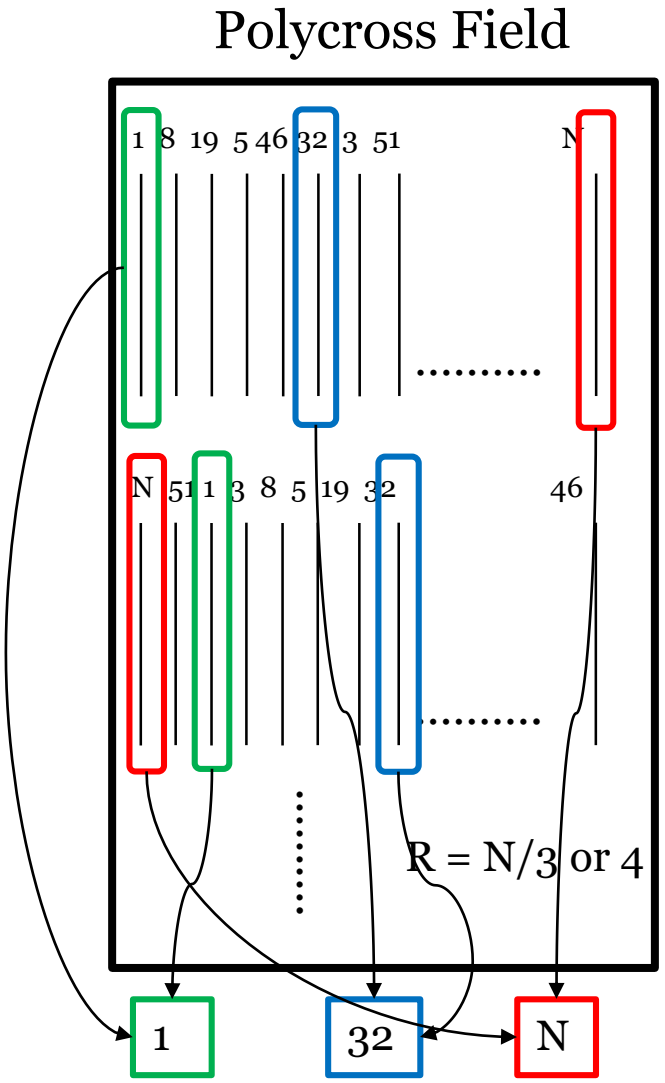


Replication Field



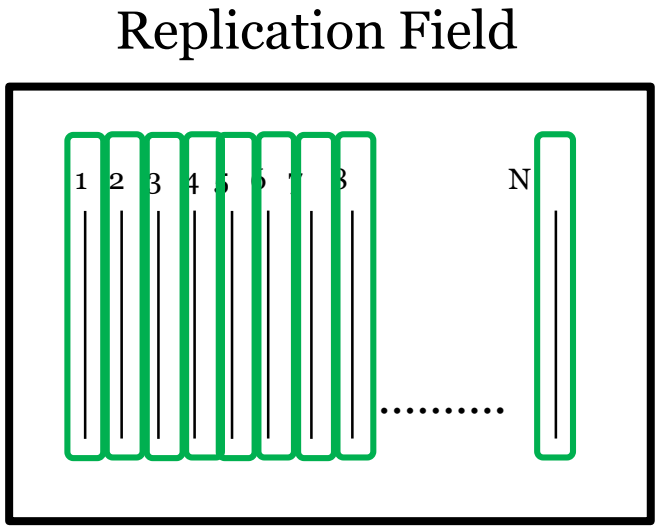
R = N/3 or 4

Years 1-3: 2017-2019



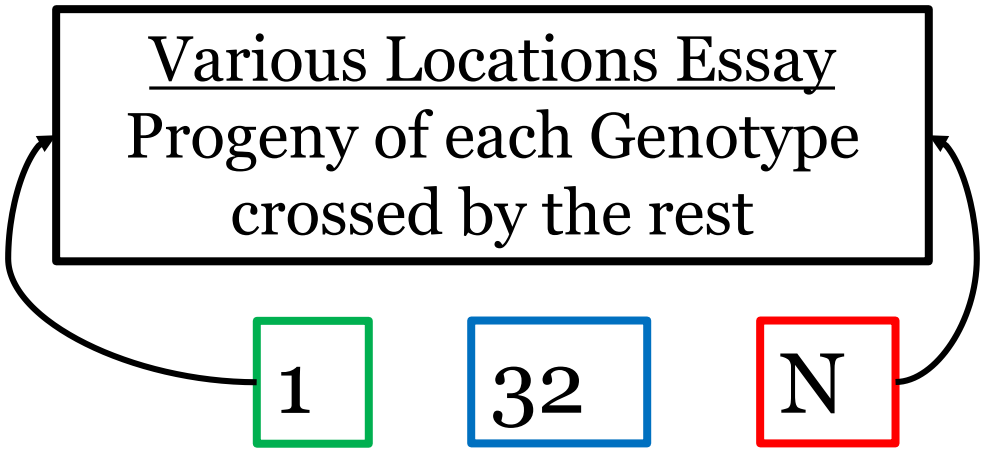
- Independent sowing: one variety per row [Summer 2017]
- Variety position within repetition must be randomized
- Repetition equal to N (number of varieties at the beginning of the Project) divided by 3 or 4
- Introduce pollinating insects
- Allow to cross-pollinate
- Reap seeds from each variety and from each repetition and mix equitatively. [2019]

Years 1-3: 2017-2019



- Field at least 1,5 Km away from the polycross field
- Seed production to continue developing the project.
- Every variety must be replicated in isolation: net cabin

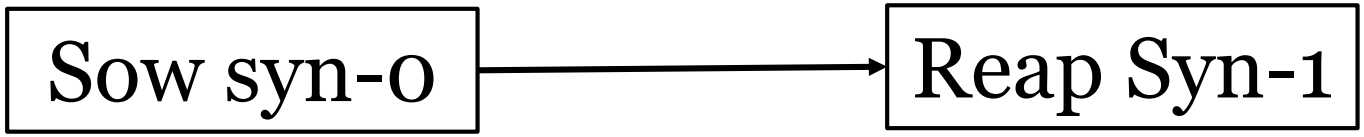
Years 3-4: 2019-2020



- Evaluation
  - Curd size
  - Taste
- GCA testing
- Selection of highest GCA scoring varieties

- Equitative mix of every selected line's seeds
- Seeds to be mixed come from the **REPLICATION FIELD**.
- Syn-0 population

Years 4-6: 2020-2022



Years 6-8: 2022-2024

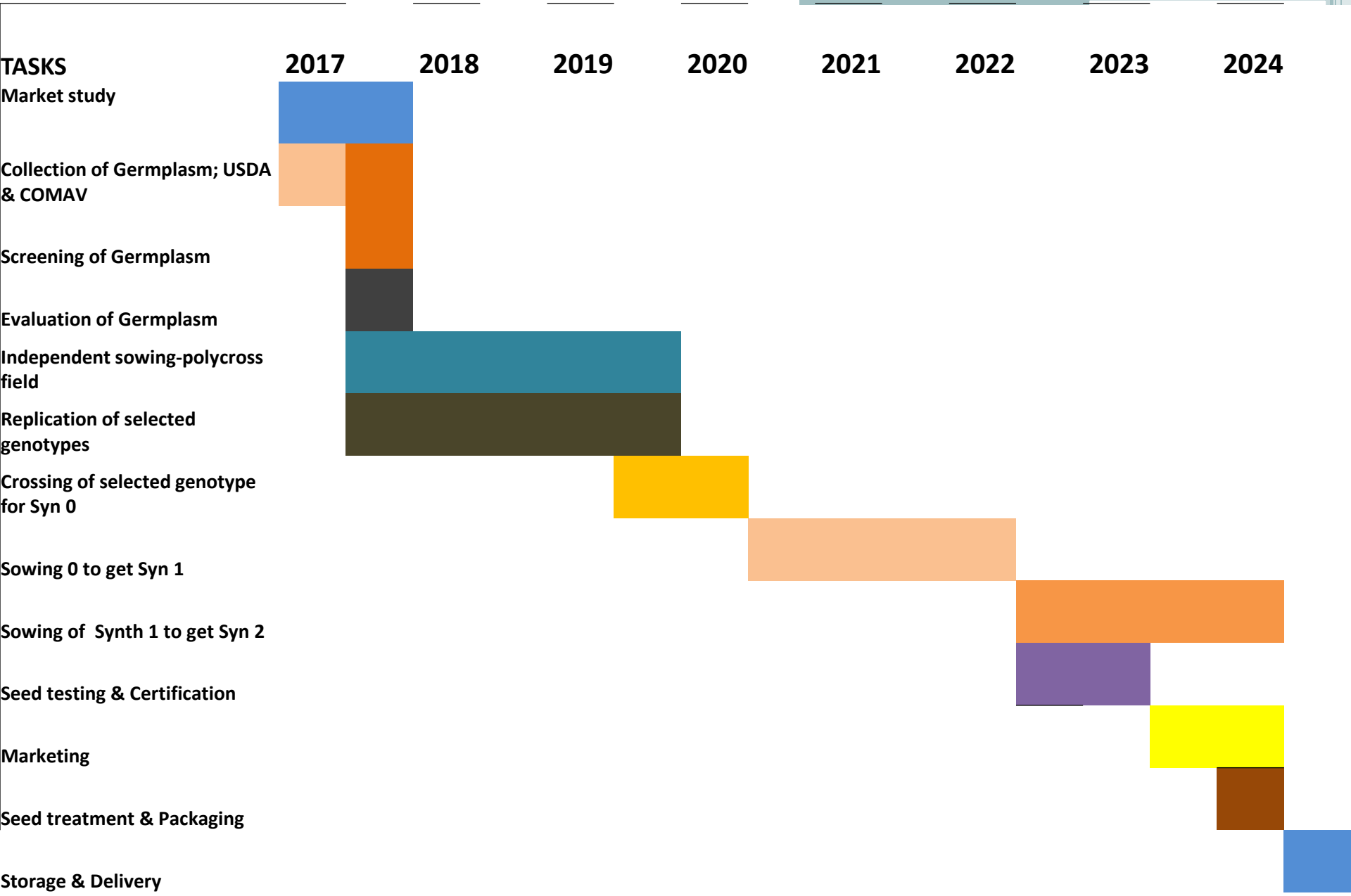
Syn-2 seeds can be commercialized

BUDGET FROM 2017-2028

year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
salaries	204000	204000	204000	204000	204000	204000	204000	204000	204000	204000	204000	204000
fertilizers&pesticides	8000	85000	87000	89000	91000	93000						
electricity&water		8000	82000	83000	8400	7000	5000	2000	2000	2000	2000	1000
variety registration & evaluation						10000	10000					
commun.&travel costs	3000	2800	2700	2600	2500	3200	3200	1000	1200	1100	1000	500
Laboratory costs		3000	3200	3300	3400	3100	2000					
Seed packaging								60000		60000		
other expenses		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
contigency	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1000
sales and marketing							10000	20000	5000	4000	2000	1000
total expenses	217000	305800	381900	384900	312300	323300	237200	290000	215200	274100	212000	208500
total revenue								450000	675000	900000	916200	1125000
profit/loss	-217000	-305800	-381900	-384900	-312300	-323300	-237200	160000	459800	625900	704200	916500
Return on investment	-217000	-522800	907700	-1292600	-1604900	-1928200	-2165400	-2005400	-1545600	-919700	-215500	701000

Return on Investment

- Spacing new variety 30cm by 45cm
- Cultivation area of 10 hectares
- Plant population 7,407,405 plants
- Seed yield per plant= 30 seeds
- Total expected seed yield 222,222,220 seeds(622,222grams=622.2kg) production 2024&2026
- 1000 seeds weigh 2.8grammes
- Total packets processed=6,536packets containing 34000 seeds
- Price per packet=450 euros


TASKS
2017
2018
2019
2020
2021
2022
2023
2024
Market study
Collection of Germplasm; USDA & COMAV
Screening of Germplasm
Evaluation of Germplasm
Independent sowing-polycross field
Replication of selected genotypes
Crossing of selected genotype for Syn 0
Sowing 0 to get Syn 1
Sowing of Synth 1 to get Syn 2
Seed testing & Certification
Marketing
Seed treatment & Packaging
Storage & Delivery

SWOT ANALYSIS

Strengths
- Big room for improvement on taste
- Motivated, Innovative and skilled breeding team

Weaknesses
- Lack of sufficient funds
- Long lead time and payback

Opportunities
- Creation of a new market sector for the small but high income earning family sector
- Possibility of future collaborations with other institutions
- Room for further study on effect of curd size on post harvest browning of cauliflower curds

Threats
- Weather uncertainty with regards to crop requirements
- Competitors-may launch similar or substitute varieties
- Evolution of future eating habits and hence changes in the future market

References

- CABI Crop Protection Compendium. (2008). Brassica oleracea datasheet. Available at: http://www.cabi.org/cpc/datasheet/10102. [Accessed 10 November 14]. *Paid subscription required*.

  Delahaut, K. A. & Newenhouse, A. C. (1997). Growing Broccoli, Cauliflower, Cabbage and other Cole crops in Wisconsin. A Guide for Fresh-Market Growers. University of Wisconsin Cooperative Extension. Available at: http://learningstore.uwex.edu/assets/…. [Accessed 10 November 14]. *Free to access*.

  Jett, J. (1996). Growing Cauliflower. Cooperative Extension Service, West Virginia UniversityCenter for Extension and Continuing Education. Available at: http://www.wvu.edu/~agexten/hortcult/…. [Accessed 10 November 14]. *Free to access*.

  Rimmer, S. R., Shattuck, V. I. Buchwaldt, L. (Eds) (2007). Compendium of Brassica Diseases. American Phytopathological Society Press. Available at: http://www.apsnet.org/apsstore/shopap…. *Available for purchase from APS Press*.
- http://www.cauliflowerrecipes.co.uk 2017
- **Ontario Ministry of Agriculture, Food and Rural Affairs, 2016**
- Eurostats database
- FAostats database
- Germplasm databases:
- https://www.comav.upv.es/index.php/databasesgermplasm/databases/genebank-database
- https://npgsweb.ars-grin.gov/gringlobal/search.aspx?
- http://www.arr.gov.pl/data/00321/rynek_warzyw_w_polsce_en.pdf

THANK YOU!