

# Module 9: Product profiling and variety development



## Product profiling tools and Product concept

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# Unit 9 Objectives

- Understand the importance of product profiling in DLB: What are product profiles used for, and by whom?
- Understand the principles and best practices of developing product profiling in breeding for new variety
- Understand the three steps toward developing the product profile
- Understand the use, the function and position of the product profiling in new variety development

# Contents –Unit 9

1. Introduction to the basic concepts and rationale of product profiling
2. Principles and best practices of product profiling in demand led breeding
3. Similarities and differences between product concept, product profile and technical datasheet
4. Role of the breeder in product profile development
5. Benefits and challenges of developing a product profile in Demand-Led Approaches

# Opening Discussion

- What do you understand by the terms product profile, technical datasheet and product concept?
- Do you develop product profile in your breeding program? Why or why not? How do you proceed?
- How do you communicate about your new/promising varieties to non technical audiences?
- How do you set your breeding objectives
- What drive new variety development

# What drives a new variety development

**Market opportunity:** Definition of a problem, a market failure or a business opportunity that can be met by creating or finding a new improved variety.

- In possession of critical information collected, deep analysis, market research, and foresight and visioning to anticipate future problems and opportunities, such as those occurring with climate change, etc....

# Important facts about Product profile (PP) in new variety development

- A PP is one of 5 core components needed to create a development and commercialization strategy using DLB best practices that will deliver new improved varieties to farmers.
- PP are also a key driver for initiating trait discovery work and formulating an appropriate breeding strategy as part of the development and commercialization delivery stage plan

# Important facts about the Product profile (PP) in new variety development

- \* A breeding program that is seeking to deliver a portfolio of new varieties will require multiple PPs to drive their development and commercialization strategy.
- A group of clients may require a range of different varieties for their farming system, off-takers and markets. Each variety will have a different technical design and, therefore, will require a unique PP.

# Product Profile Vs Product Concept

## Product concept

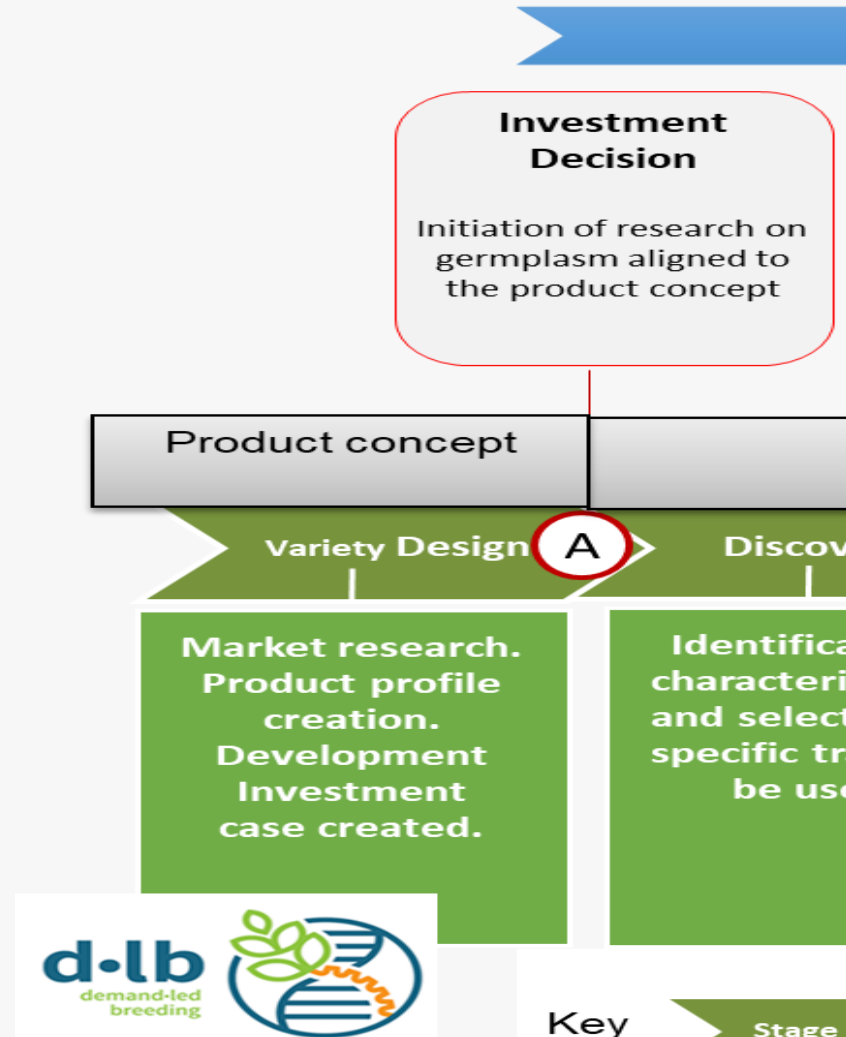
High level thought and strategic marketing to provide the best product possible to the customer

Include variety design and product profiling as “Ideotype”

## Product profile

Actual product/commodity on the market or developed or translated into breeding objectives

Seen as a key activity contributing to the product concept





# Product Profile: Definitions

- ❖ Product profile is a term that is used **ubiquitously** as:
  - \* Product description ( within Innovation circles)
  - \* Target product profiles, variety ideotypes and variety profiles (Practitioners)
  - \* Technical specification of a new variety designed to serve the needs and preferences of a specified group of clients/customers (Business of plant breeding)
- Product profiling: Term often used to describe the process used to create product profile

# Uses of Product profiles: By whom and what for?

## ❖ Member of the PP design team

- \* To streamline the focus of their institutional breeding programs, priorities and deployment of resources

## ❖ Seed-scaling organizations and value chain representatives

- \* To communicate the target profile and seek their input, support and feedback during the breeding program and

- \* To estimate market share and pricing of the new variety

# Uses of Product profiles: By whom and what for?

## ❖ R&D Institution management

- \* For awareness about the new variety and for prioritizing use of resources

## ❖ Investors and donors

- \* To win financial support for the development of the new variety.
- \* Demonstrate and provides transparency to donors that their investment is carefully targeted to specific beneficiaries with products that will address clear business opportunities.

# Key elements to visualize in a Product profile

A well defined PP should enables the reader to **visualize three elements**:

## ❖ **Design team:**

- The leader and experts who create the product profile

## ❖ **Clients and markets:**

- Who the new variety has been designed for, their markets and farming system

## ❖ **New variety technical specification:**

- \* The technical features and comparative advantages of the new variety

# Key elements to visualize in a Product profile: Design Team

\* A leader/champion brings together a multidiscipline team of experts to gather information to create the new variety designs

\* Typically, the experts may include:

- Breeder - Agricultural economist - Market research specialist - Farmer representatives - Youth and gender expert - Value chain representative(s) - Private sector processing expert - Seeds systems expert - Climate change specialist - Agronomist - Plant pathologist - Entomologist - Food scientist - Public health/nutritionist - Expert in management of new variety development - Intellectual property expert - National country variety release/registration expert.

\* A Range of 5-9 experts with the relevant knowledge and skills to address the business opportunity and/or solve an identified problem is needed to create the PPs.

Product Profile design team

| Step 1                       |                          |  |
|------------------------------|--------------------------|--|
| PP Design Team Lead/Champion |                          | Teshale Mamo   |
|                              |                          | Alliance of Bioversity-CIAT, Tanzania                  |
| PP Design Team               |                          |  |
| Person                       | Area of Expertise        | Name of organization                                   |
| Teshale Mamo                 | Breeder                  | Alliance of Bioversity-CIAT, Tanzania                  |
| Jean Claude Rubyogo          | Seed systems             | Alliance of Bioversity-CIAT, Kenya                     |
| Shida Nestory                | Bean breeder             | Tanzania Agricultural Research Institute (TARI-Selian) |
| Edith Kadege                 | Seed systems             | TARI-Selian  |
| Upendo Titi                  | Socio-economist          | TARI-Selian  |
| Mary Mdachi                  | Nutritionist             | TARI-Selian  |
| Bayda                        | Domestic trader/exporter | BAYMAC company   |
| Esther Mushi                 | Bean processor           | JAGEF group  |

# Key elements to visualize in a Product profile: Clients and their markets

**A well defined PP aim to answer the following questions**

- ❖ Who the PP is designed to serve?
- ❖ In which country and region(s) are the clients located?
- ❖ What is the crop and how is it used?
- ❖ Which market and market segment is the variety designed for?
- ❖ What input, management and cropping system will the variety suit?
- ❖ Which variety or landrace is currently grown for this market segment and is targeted for replacement by the new variety?

# Key elements to visualize in a Product profile

## Clients and their markets

### Clients and markets

#### Step 2

##### Product profile descriptors

|                                       |   |
|---------------------------------------|---|
| Product profile name                  | Yellow dry bean   |
| Crop                                  | Common bean ( <i>Phaseolus vulgaris</i> L.)   |
| Country                               | Tanzania  |
| Geographic regions                    | Northern, Western and Southern highlands  |
| Market segment                        | New emerging market for yellow bean grain, with good taste and medium cooking time, grown at an altitude of 900–1800 m  |
| Name of target variety to be replaced | Selian 13<br><b>Strength:</b> Early maturing, medium cooking time, palatable with good taste<br><b>Weakness:</b> Low yielding, susceptible to anthracnose, angular leaf spot and bruchids |
| Date PP created                       | 07.07.2020  |

PP descriptors

##### Target client and use

|                                       |  |
|---------------------------------------|--|
| Value chain primary clients/customers | Farmers, traders, consumers (women and children)           |
| Market scale                          | Local, regional, national and international export markets |
| Use                                   | Grain and flour for food, haulms for animal feed           |
| Type of processing                    | Dried grain, pre-cooked beans                              |
| Market class                          | Yellow bean  |

Target client and use

##### Target crop producers and production system

|                                      |  |
|--------------------------------------|--|
| Number of farmers                    | 800,000–1,050,000                                  |
| % ratio: male to female farmers      | 50–60% male; 40–50% female                         |
| Production system                    | Open field   |
| Area of production system            | 200,000–338,000 ha                                 |
| Growth habit                         | Bush (determinate)                                 |
| Expected level of inputs             | Low – fertilizer, crop protection chemicals        |
| Typical yield range of target system | 0.5–0.8 t/ha (grain yield under farmer conditions) |
| Cropping system                      | Monocropping and intercropping with maize          |
| Mechanisation                        | Some mechanical threshing                          |
| Agroecological zone                  | Altitude 900–1800 m                                |
| Total seed market                    | 12,000–20,000 tonnes                               |

Target crop producers and production system

# Key elements to visualize in a Product profile

## Variety technical specification (VTS)

**A well defined PP aim to answer the following questions**

- What is the technical specification of the new variety?
- What are the clients and customers
- What are the purchasing drivers for clients?
- Which crop traits in the design respond to these drivers and therefore deliver benefits?
- What are the technical traits and features of the new variety?
- How important is each trait in terms of market demand from different groups of users such as women, men and youth?
- What is the target performance to be achieved for each trait?
- Which variety/landrace(s) grown is being targeted for replacement with the new improved variety?



# Key elements to visualize in a Product profile

## Variety technical specification: Client/customer

These are the people that the variety has been specifically designed to serve and may include one or more of the following value chain actors:

- Farmer
- Transporter
- Processor
- Retailer
- Consumer
- Seed/vegetative material producer
- Seed distributors

| Variety technical specification |                                |                          |   |  |   |   |                           |  |
|---------------------------------|--------------------------------|--------------------------|---|--|---|---|---------------------------|--|
| Step 3                          |                                |                          |   |  |   |   |                           |  |
| Client/customer                 | Driver                         | Trait category           | Preference group:<br>Women (W)<br>Men (M)<br>Youth (Y)<br>W+M+Y (All) | Trait demand classification:<br>1. Essential/"must have"<br>2. Niche opportunity<br>3. Added-value<br>4. Winning trait | Target traits                             | Trait description (Quantitative measures)                                 | Name of benchmark variety | Performance required compared to benchmark variety <,=> etc. |
| Farmer                          | Productivity                   | Yield                    | All   | 1  | Grain yield                               | Dry grain weight > 2 t/ha   | Selian 13                 | >  |
|                                 |                                | Biotic stress resistance | All   | 1  | Angular leaf spot (ALS)                   | <3 (CIAT scale)   | Jesca                     | >  |
|                                 |                                |                          | All   | 1  | Anthracoze                                | <3 (CIAT scale)   | Selian 10                 | >  |
|                                 |                                | Abiotic stress tolerance | All   | 1  | Drought                                   | Medium tolerance – at flowering stage (terminal and intermittent drought) | Selian 12                 | >  |
|                                 | Biomass                        | All                      | 3   | Biomass  | Dry pods and stem                         | Jesca   | >                         |  |
|                                 | Crop management and harvesting | Plant architecture       | All   | 3  | Uniform flowering time                    | Terminal inflorescences flower at same time                               | Selian 13                 | >  |
|                                 | Market value and price         | Grain weight             | All   | 1  | Dry grain weight                          | Grain weight - bag of six buckets (approx 18 kg each)                     | Lyamungo 90               | >  |
| Crop duration                   |                                | All                      | 4   | Early maturing   | < 67 days                                 | Selian 13   | <                         |  |
| Consumer                        | Satisfaction                   | Taste                    | All   | 1  | Taste                                     | Palatability  | Selian 13                 | >  |
|                                 |                                | Appearance               | All   | 4  | Yellow colour                             | Uniform and attractive  | Selian 13                 | >  |
|                                 |                                | Nutrition                | W   | 1  | High grain micronutrient content (Zn, Fe) | Iron > 50 ppm, Zinc > 25 ppm  | RWR-21-54                 | >  |
|                                 |                                | Digestibility            | W   | 1  | Flatulence, soft seed coat after cooking  | Low gas production  | Selian 13                 | <  |
|                                 |                                | Food preparation         | W   | 1  | Cooking time                              | Less than 60 min in consumer conditions                                   | Selian 13                 | <  |
| Seed producer                   | Scalability and cost           | Seed genetic purity      | All   | 1  | Seed germination                          | > 97% viability and 99% uniformity  | Selian 13                 | >  |

# Key elements to visualize in a Product profile

## Variety technical specification: Drivers

For each value chain actors, drivers are the list of diverse factors that influence clients/customers and their purchasing decisions for the new variety.

These drivers are likely to be different for different actors and might include

- Productivity – food and feed
- Fodder/forage – biomass of crop
- Crop management and harvesting
- Market value and price
- Post-harvest storage
- Durability and cost
- Raw material quality specification
- Sales and profit
- Satisfaction
- Scalability and cost
- Variety identification

# Key elements to visualize in a Product profile

## Variety technical specification: Traits category

Traits are organised into trait categories to respond to the same client drivers and easier to visualize. Examples of categories of traits include:

- Yield, Biotic stress resistance, Abiotic stress tolerance
- Traits for animal feeding, (biomass, animal nutrition, palatability and digestibility)
- Plant architecture, Storage life, Retailer shelf-life, Variety identity traits
- Traits affecting market value and especially price
- Transportation (shape for container suitability and durability)
- Processing traits (milling, bread-making, brewing, paste, canning)
- Consumer traits (taste, appearance, shelf-life, nutrition, digestibility, food preparation)

# Key elements to visualize in a Product profile

## Variety technical specification: Preference group

- \* A preference group is a subset of existing client/customer groups that the variety has been specifically designed to serve.
- \* Example preference group for a trait preferred women, men, youth (men and women under the age of 30)
- \* Each trait is classified according to its expected influence on market demand.

There are 4 trait classifications:

Essential/”must-have” trait, Niche opportunity trait, Added-value trait and Winning trait (see Figure 1)

# Traits Prioritization: The Underlining Principle

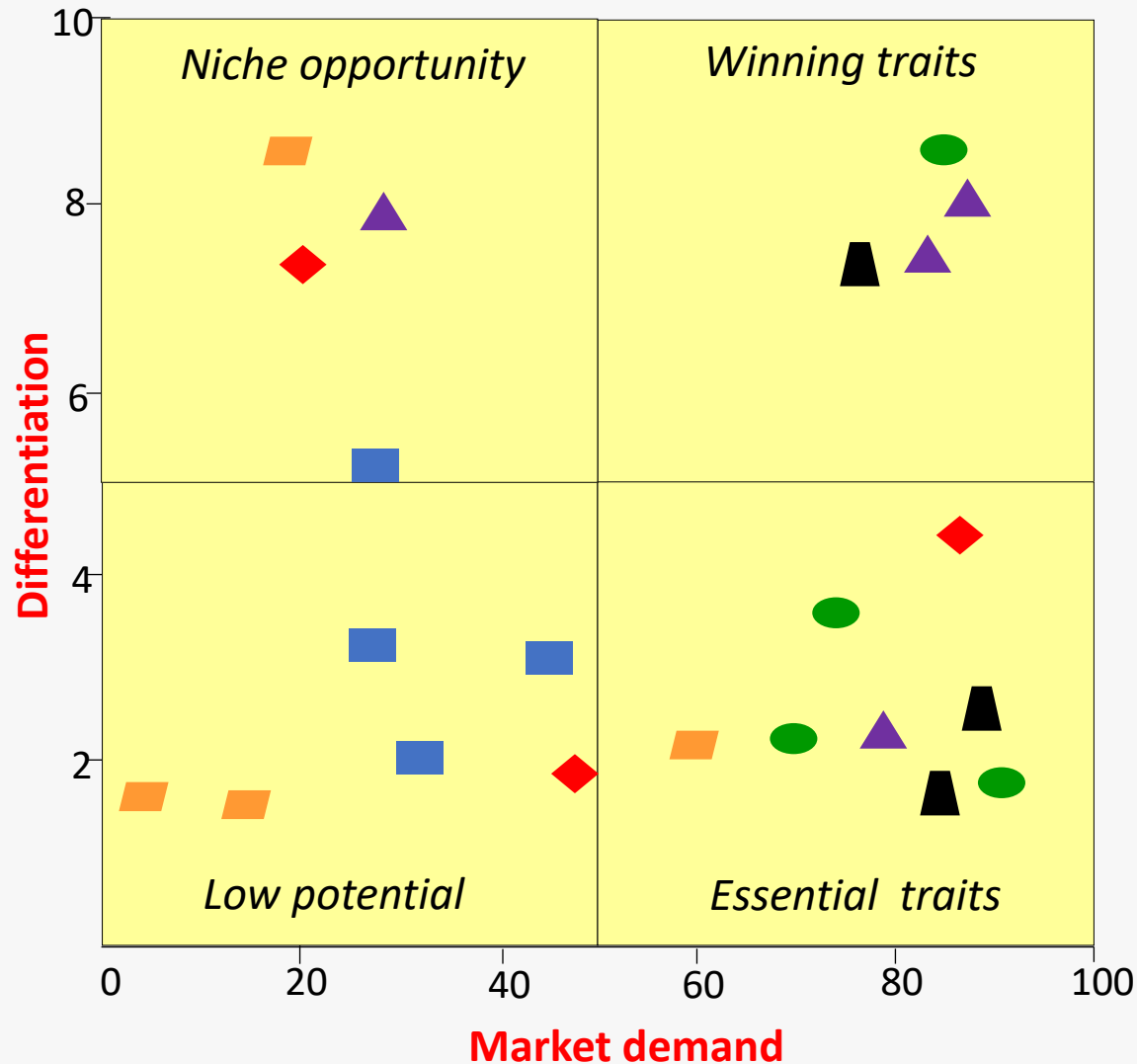
- **Market evaluation** for each trait has two dimensions

## 1. Differentiation

- Willingness to pay price premium
- Opportunity to grow market share

## 2. Market demand

- % growers/area that need this trait



## Technical issues & feasibility

1. Genetics
2. Regulation requirements
3. Costs/budget
4. Gender inclusion

- Yield
- ▭ Plant architecture
- ◆ Biotic stress
- ▲ Abiotic stress
- Crop handling
- ▲ Consumer preference

# Key elements to visualize in a Product profile

## VTS: Preference group/trait classification definition

### Essential/”must-have” trait

- \* Traits considered as a prerequisite in variety design for the variety to be used.
- \* Sometimes referred to as “must-have” trait.
  - This may be because all popular varieties contain this trait and expected within the market
  - An imperative of national release committees for variety approval.

### Niche opportunity trait

- \* Traits that provide a superior technical benefit over existing varieties and may command a price premium.
- \* However, the scale of users and market demand is likely to be limited due to specialized or limited market (e.g. malting barley).

# Key elements to visualize in a Product profile

## VTS: Preference group/trait classification definition

### Added-value trait

- \* Trait that provides a special market quality over what is offered by alternative existing varieties.
- \* Provides additional value to either farmers or their buyers in the value chain.
- \* Trait providing recognized technical differentiation from what is currently available
  - e.g. production or processing benefits that have a monetary value.
- \* Would enable a new variety to gain market share from existing varieties and may command a small price premium.

# Key elements to visualize in a Product profile

## VTS: Preference group/trait classification definition

### Winning trait

- \* Has similarities to an added-value trait (both creates additional value). BUT with significant higher value (substantial economic or social benefit).
  - In most cases it expected to create high demand and take major market share from existing varieties.
- \* Is one which enables a variety to be highly differentiated from alternative varieties.
- \* Winning traits are not discovered often and usually bring innovation.
- \* Their uniqueness may catalyse the emergence of new markets.
  - A historical example is the semi-dwarf trait in wheat and rice that catalysed the Green Revolution.



# Key elements to visualize in a Product profile

## VTS: Target traits and Traits description

### Target traits

These are traits specific to the needs and preferences of the beneficiaries whom the variety is being designed to serve.

### Traits description

Provide more details about the trait and, where possible, some quantification of the performance of the trait required for common understanding: e.g.

- \* level of disease resistance,
- \* yield improvement in tonnes per ha,
- \* brix number for processed tomatoes.

# Key elements to visualize in a Product profile

## VTs: Name of benchmark and Performance required

- Each trait selected has a target performance that is seeking to achieve.
  - Performance is best demonstrated by comparison to a known variety or landrace called the benchmark variety.
  - Each trait has its own benchmark variety, which is identified by the name or code the variety is known by.
- \* Target performance required compared to the selected variety benchmark is :
- < (less than) the benchmark,
  - = (equal to) the benchmark or
  - > (greater than) the benchmark.

# Road Map to Developing the Product Profile: Understanding Clients and Their Needs

- Knowledge and methods acquisition to understand:
  - \* Crops and their uses
  - \* Clients, stakeholders and their value chains, their needs,
  - \* What clients prefer and are prepared to pay for in a new variety
- Conduct market research: through survey or market intelligence
- Identify markets and market segments

# Road Map to Developing the Product Profile: Understanding Clients and their Needs

## \* **Market research/intelligence:**

- Characterize existing varieties used by farmers
- Identify **current and future** properties important to clients and stakeholders along the value chain

## \* **Benchmarks setting** to meet client needs

## \* **Traits Prioritization** and making trade-off decisions

# Traits Prioritization: The Underlying Principle

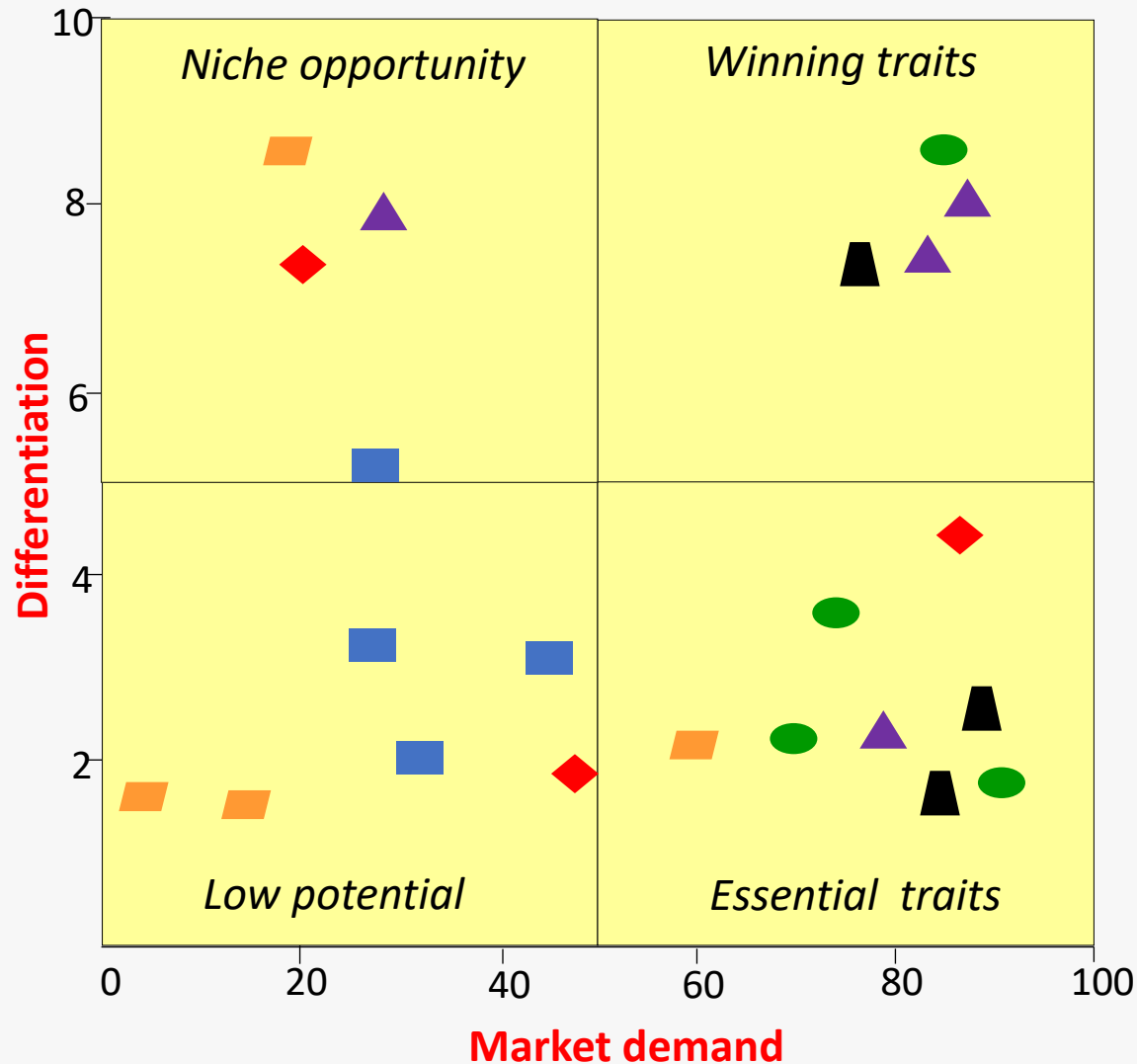
- **Market evaluation** for each trait has two dimensions

## 1. Differentiation

- Willingness to pay price premium
- Opportunity to grow market share

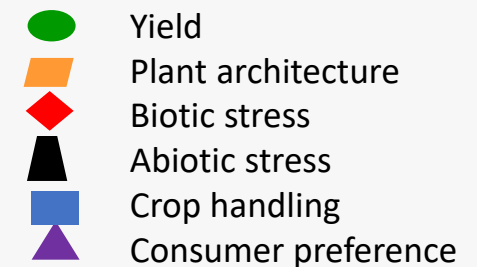
## 2. Market demand

- % growers/area that need this trait



## Technical issues & feasibility

1. Genetics
2. Regulation requirements
3. Costs/budget
4. Gender inclusion



# Road Map to Developing the Product Profile: Building the product development case

## Product investment case

This is the socio-economic business case that contains the benefits and costs of investing in the breeding program.

The product profile is not a business case. It is a key input to any new variety investment case. The design provides key technical assumptions about

- (i) who the variety is suitable for,
- (ii) how the variety can be used and
- (iii) its expected performance and benefits compared to other varieties.

The positioning and comparative benefits of the new variety are essential inputs required by business/development managers to be able to prepare commercial forecasts on market share and pricing in the investment case

# Role of the breeder

The breeder is the enabler, the champion coordinating and leading the product profile design team. Breeders and breeding program leaders develop the PPs:

- \* To communicate the targeted new varieties along with their technical performance
- \* To create breeding strategies and breeding goals to drive delivery of the new varieties
- \* To determine the traits and germplasm needed from available sources to deliver the target performance
- \* To validate the assumptions used in the design with value chain actors to ensure demand and support for new varieties to be developed and released.

# The Product profile tool is available online for use

## The product profile summary

- Prepared as a template that can be used to communicate the output from expert discussions on new variety design.
  - \* It has been crafted to record the outputs from any process of consultation involved in design of new varieties.
  - \*The template is available in both Excel and Word to aid sharing and communication of profiles amongst practitioners, managers, collaboration partners, donors and other investors

More details can be found at <https://www.demandledbreeding.org/product-profiles/practitioners-tool-kits>



# The Product profile tool is available online for use

## Creating product summaries – Practitioners' Guide

- A Practitioners' Guide is available as an accompanying document to help PP leaders/champions prepare quality product profile summaries.
- The guide provides a working explanation of the contents in each cell in the summary Excel template.
- The explanations can be accessed in Excel by hovering the mouse over the relevant cell, or viewed in the entire guide.

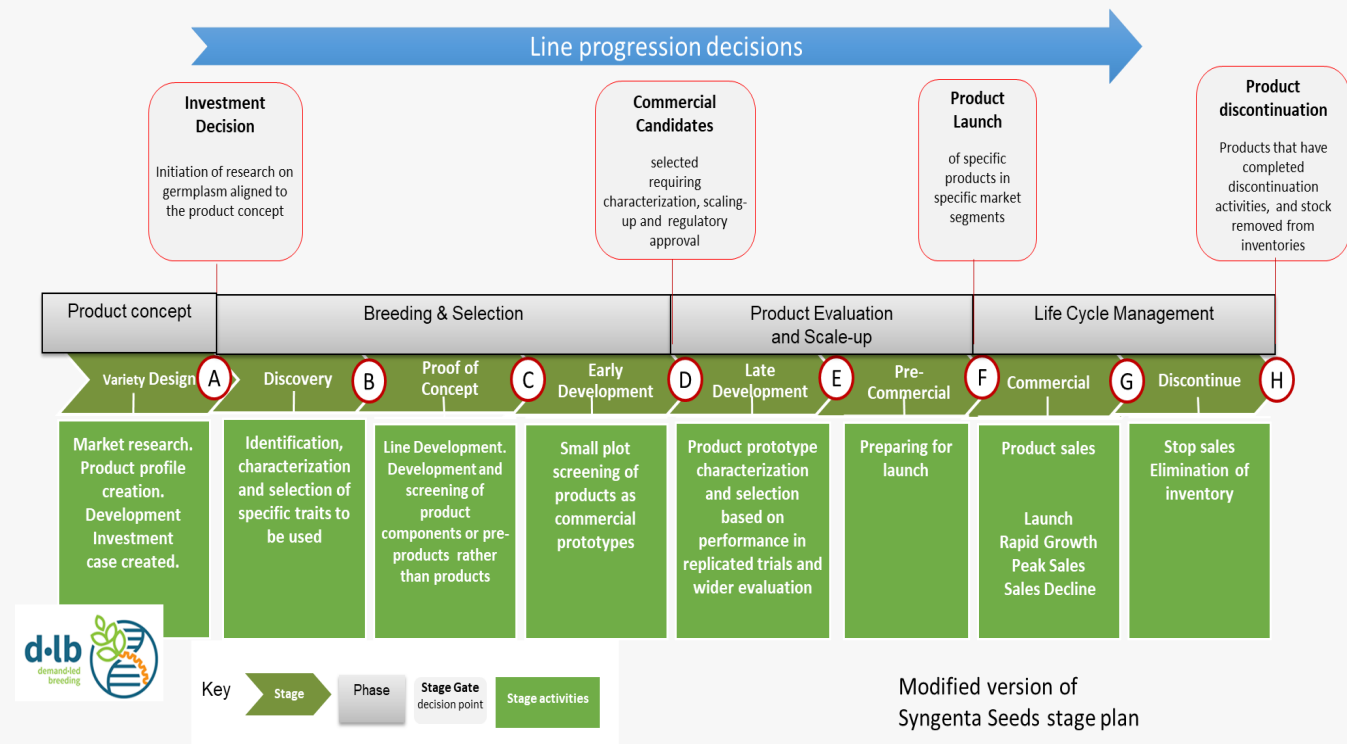
More details can be found at <https://www.demandledbreeding.org/product-profiles/practitioners-guide>

# Where Heading to After Developing the PP?

- Translate the PP into a practical breeding program with clear goals, objectives and activities

\*Stage gate system

- Monitoring, learning and evaluation throughout the variety development and deployment
- Update of the PP if need be

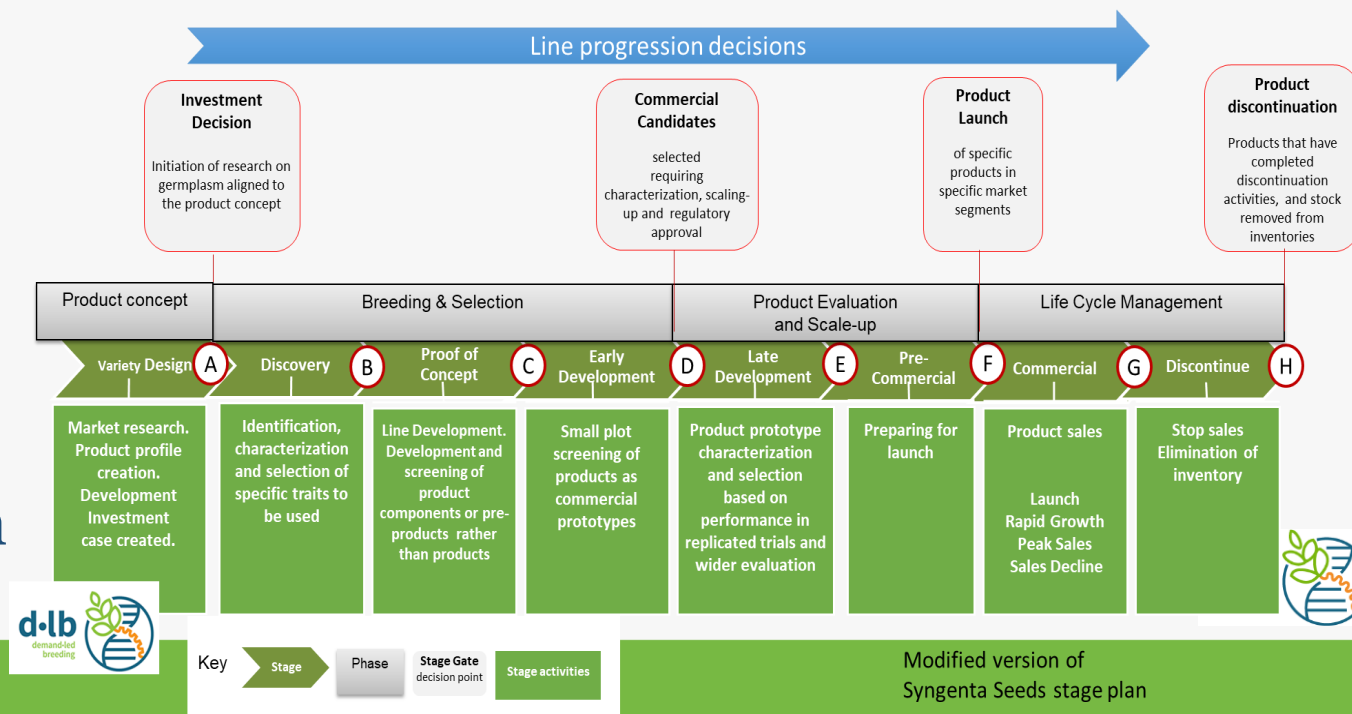


# Where Heading to After Developing the PP?

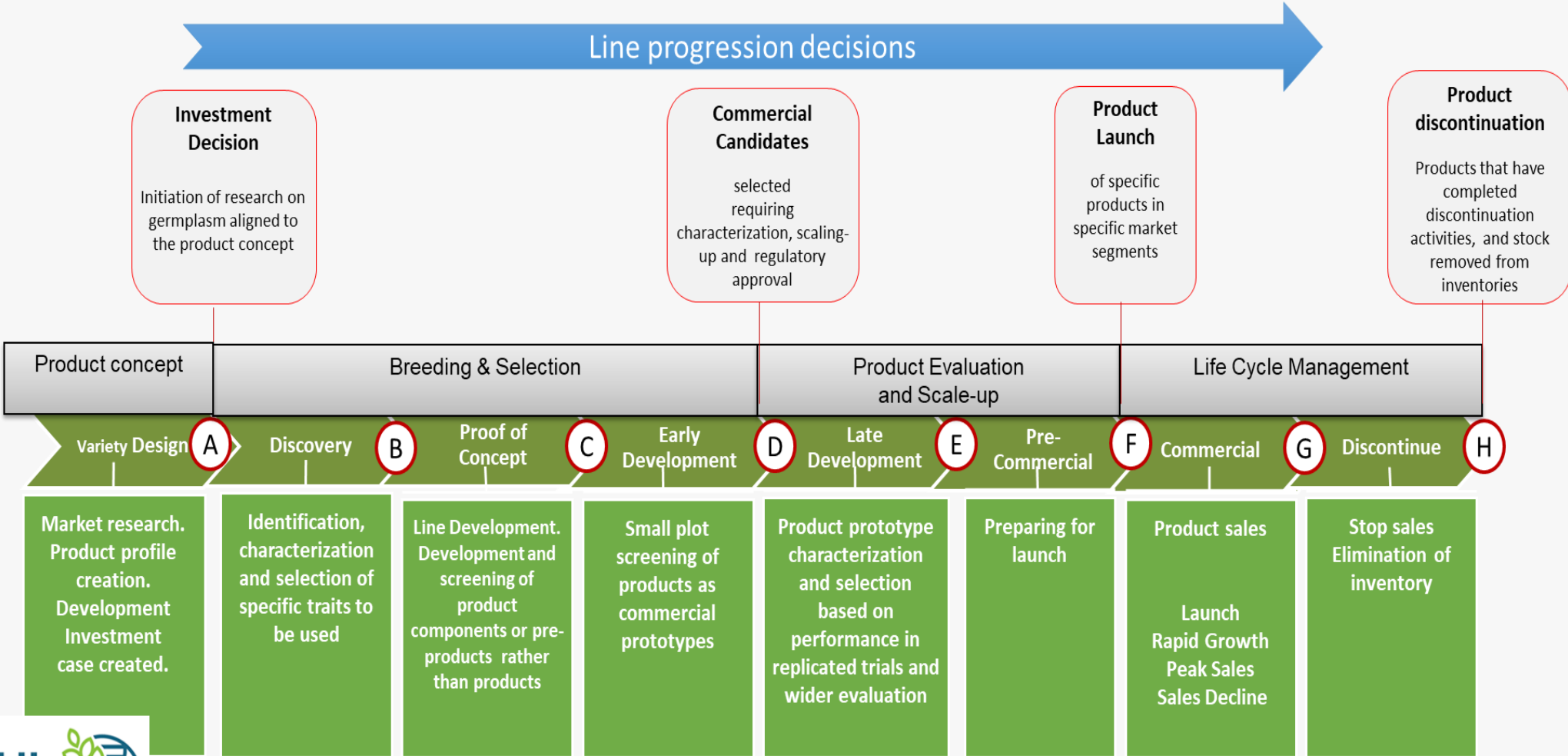
## Development and commercialization stage plan

- This is the activity plan required to create, register, scale and distribute the new variety
- Organization of the entire work program into defined phases and a timetable.
- Each phase is separated by a decision gate where key managers, scientists and stakeholders decide whether there is enough quality data to make an informed decision on whether specific germplasm should progress to the next stage.

• PPs are important drivers for the discovery and selection of traits that comprise the breeding strategy and the breeding program that is implemented as part of the stage plan



# Where Heading to After Developing the PP? Development and commercialization stage plan



# Where Heading to After Developing the PP?

## Build the new variety performance technical datasheet

- \* This is the document that communicates the actual technical performance of the new variety and how it compares with existing varieties and choices available for clients.
- It communicates actual rather than aspirational targets for performance that are shown in the product profile.
- There are a range of types of datasheets that contain differing amounts of granularity and emphases that are tailored for different audiences, e.g. seed scalers, farmers, processors and clients in the value chain.

# Concluding remarks:

## DLB Product Profile has dual purpose objectives

PP not only an input to drive breeding programs BUT ALSO a planning and communication tool to search for suitable varieties from other sources or countries

Actual Concept translated into **breeding objectives** (several PPs)



\* Technical specification of a **new variety** using a detailed set of technical attributes with quantitative measures and qualitative descriptions

\* Depends on **trait prioritization** and **external/technical performance standards**

Communication tool for technical and non-technical audiences to win their support



\* Key actors of value chain

\* R&D managers

\* Investors

# Feedback/Evaluation

- What is new?
- What did you learn?
- What do you foresee as a challenge?

# Acknowledgements

# THANK YOU

