Gender & Breeding Initiative
CGIAR

A Practical Decision Checklist for Gender-responsive Plant and Animal Breeding.

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A Practical Decision Checklist for Gender-responsive Plant and Animal Breeding.

Topics

- Why was this tool developed and who is it for?
- Foundation for the Decision Checklist: stages in the breeding process
- Critical decisions for including gender in the breeding process
- Key results (milestones) in the Decision Checklist
- What do you need to try out the Decision Checklist?

Why was this tool developed and who is it for?

Needed: a practical way to do gender-responsive breeding.

Purpose of the Decision Checklist

Make sure relevant information about gender differences is systematically included in critical decisions made at key points in the breeding process

Relevant for:

- Breeding programs with poverty alleviation and development goals, using a demand oriented approach
- Plant and animal breeders, social scientists and GIS data analysts in International, CGIAR and National Research Programs and their partners

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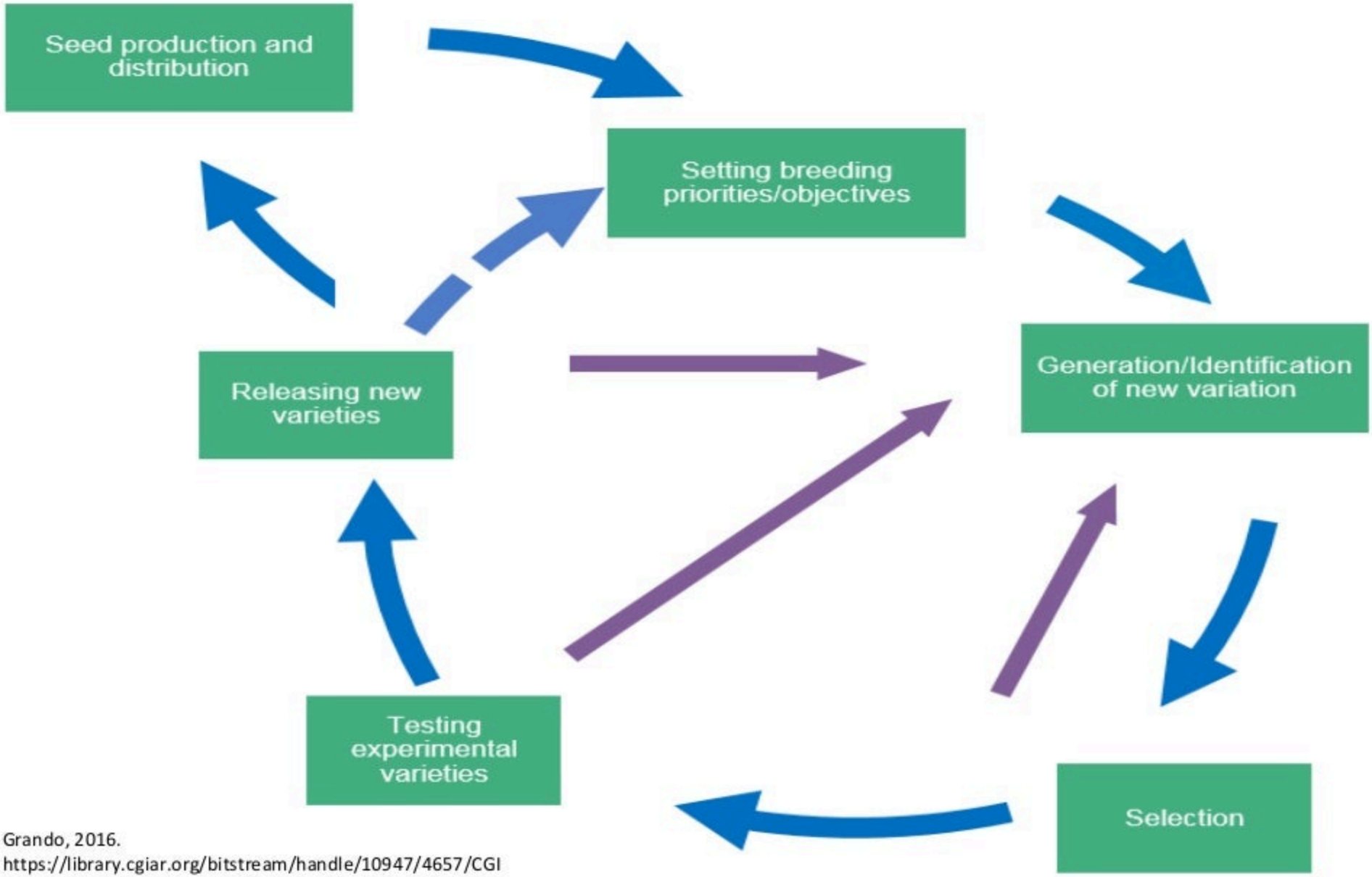
What is the Decision Checklist?

- A list of 10 questions keyed to 7 critical decisions made at successive stages in the breeding process
- Outlines information on gender needed to inform each decision
- Flexible: start to use the Decision checklist any time in the breeding process
- Includes advice on monitoring effectiveness of use

Stages commonly used in breeding



Grando, 2016.
https://library.cgiar.org/bitstream/handle/10947/4657/CGIAR%20Gender%20Research%20Action%20Plan-Breeding_Brief4.pdf?sequence=5

Generic breeding stage gate plan

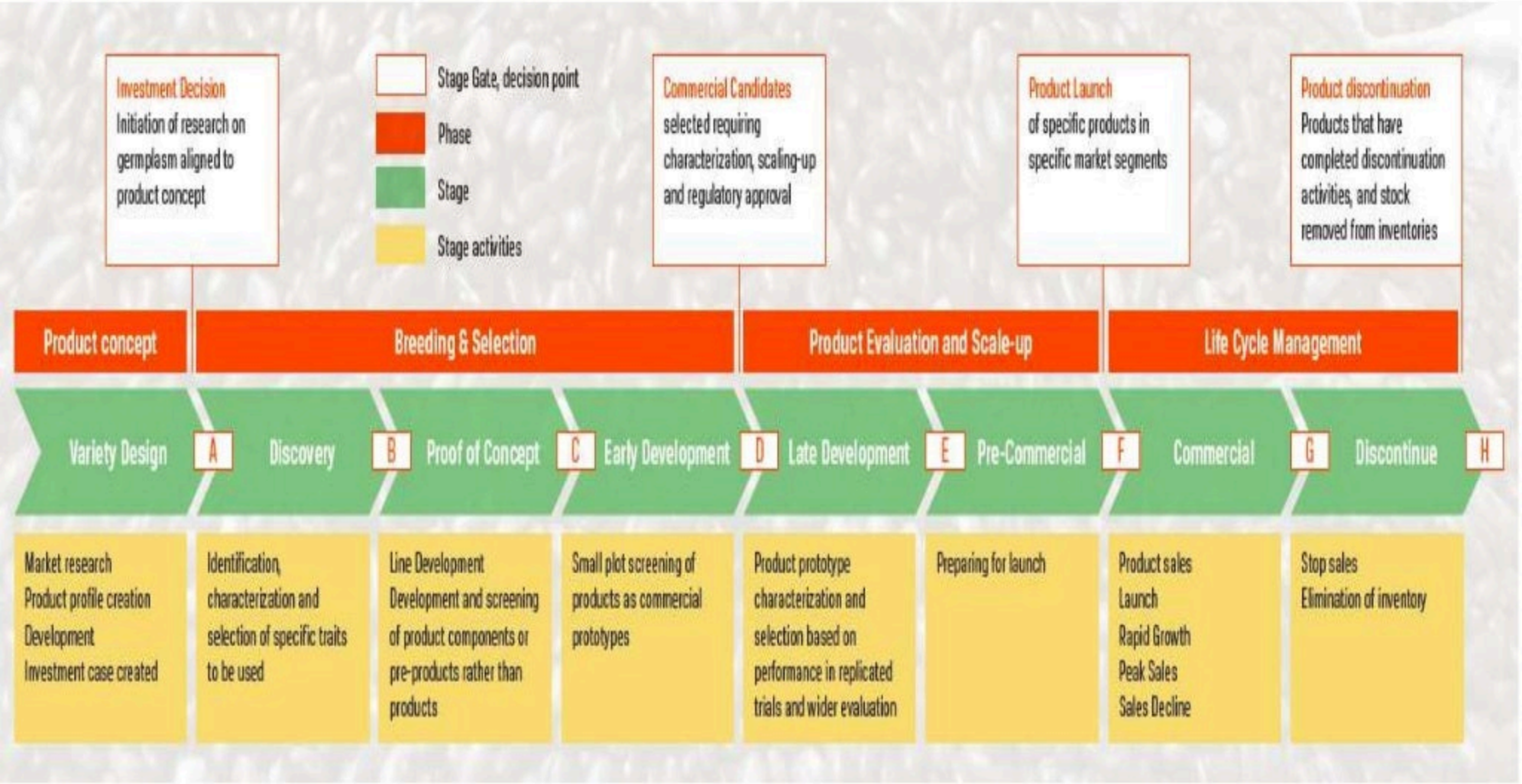


Figure 11. Generic plant breeding stage plan (Ragot et al. 2018)

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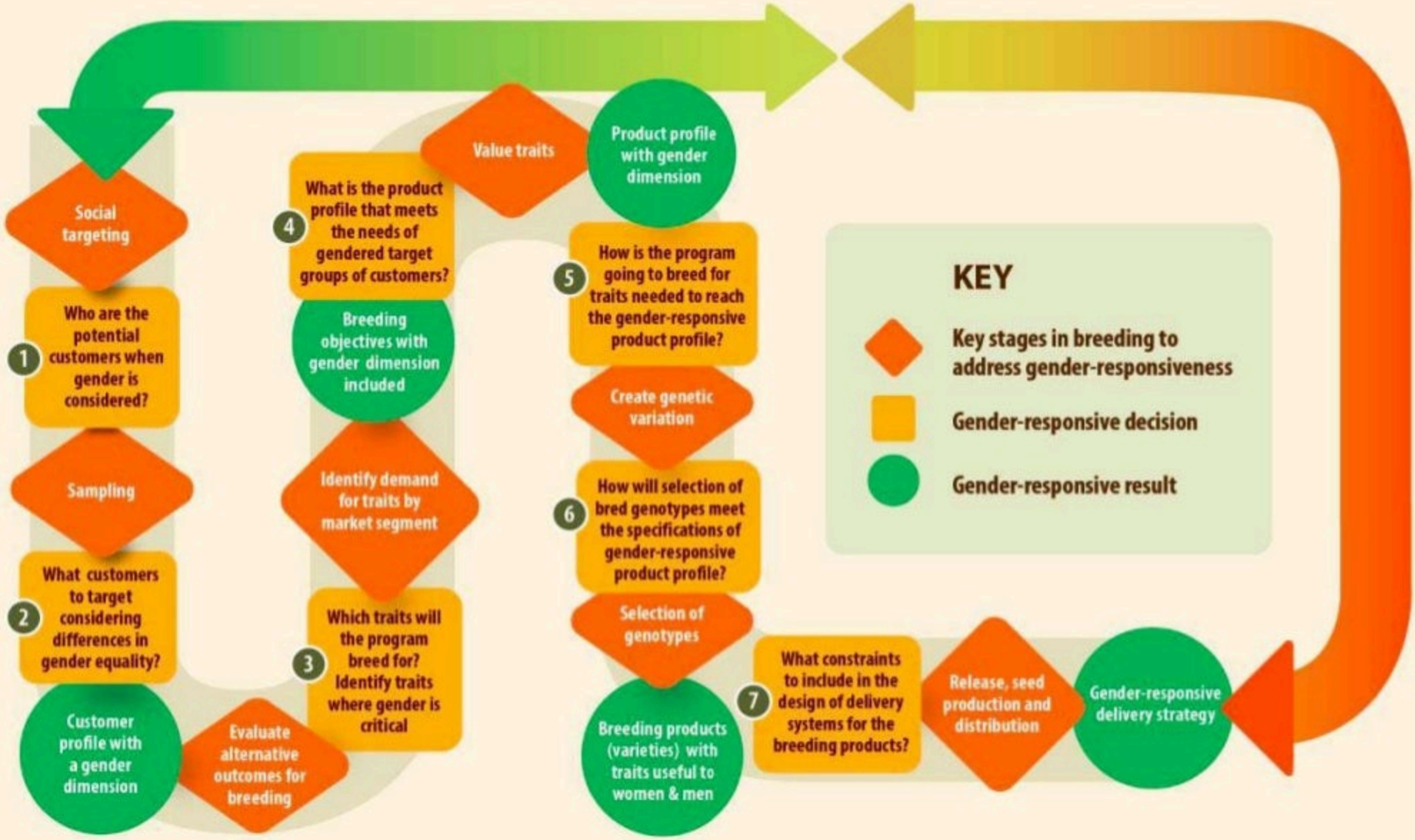
What are Key Decision Points for Considering Gender?

Decisions taken by breeders at different points in time (stages) of the breeding process to advance or discard a selection unit (plant, animal, progeny, progenitor, clone, experimental variety or breed)

From the identification of "ingredients" (parents to be crossed to generate genetic diversity, or segregating genetic material containing genetic diversity) to the delivery of market-ready products.

Flowchart of critical decision points for gender-responsive breeding



Decisions in the Checklist for Gender-responsive Plant and Animal Breeding

Decision 1: Who are the potential customers for breeding when gender is considered?

Decision 2: What customers to target?

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Who are the customers? Segmentation

Divides a given population of intended growers or livestock keepers into distinct, homogeneous segments or groups of customers.

Each segment has similar demographic characteristics, socio-agro-ecological constraints and behavioural patterns (e.g. with respect to technology choice).

A segment or customer group expresses a distinct, unique demand for desirable attributes of a crop or animal.

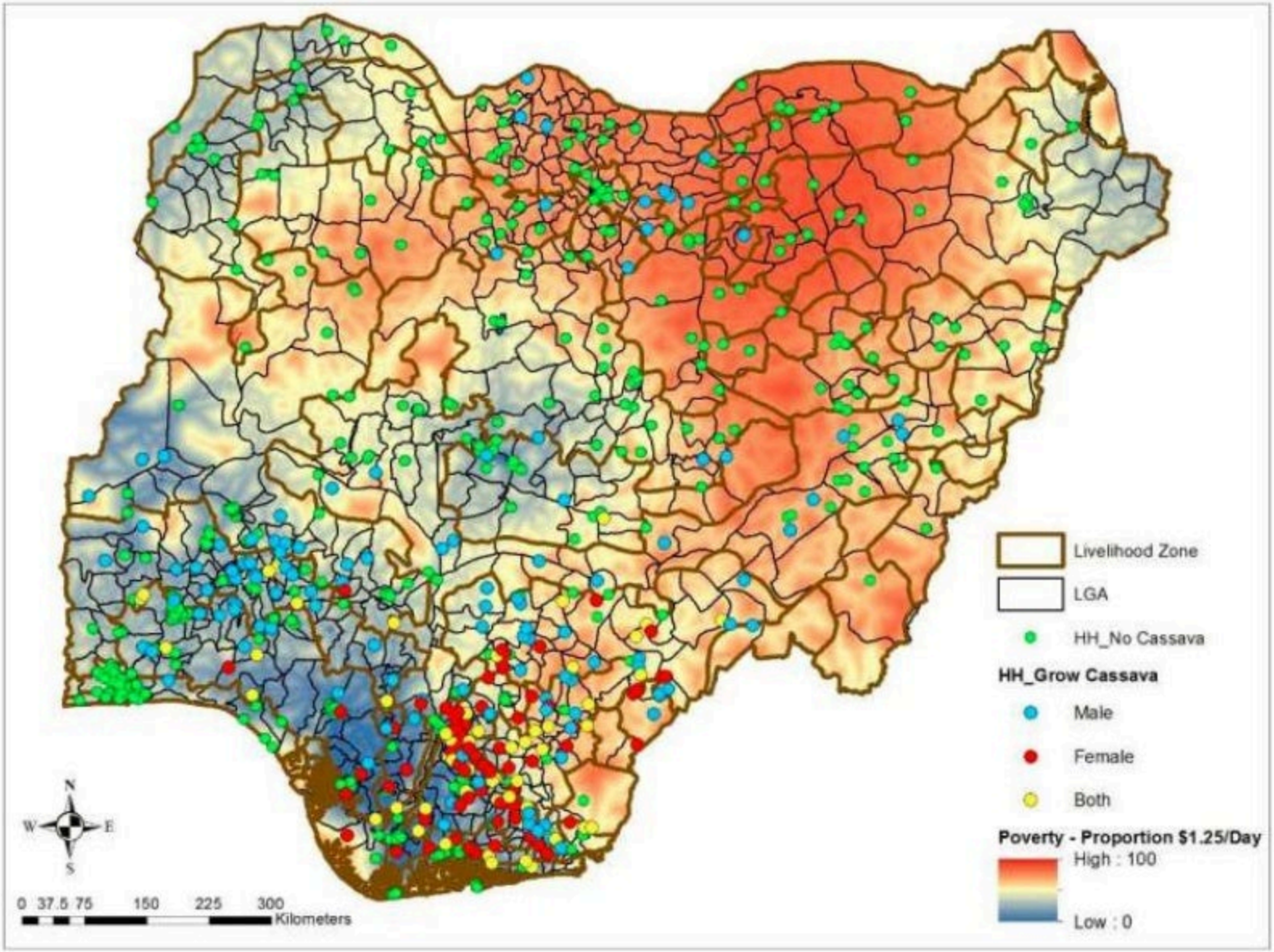
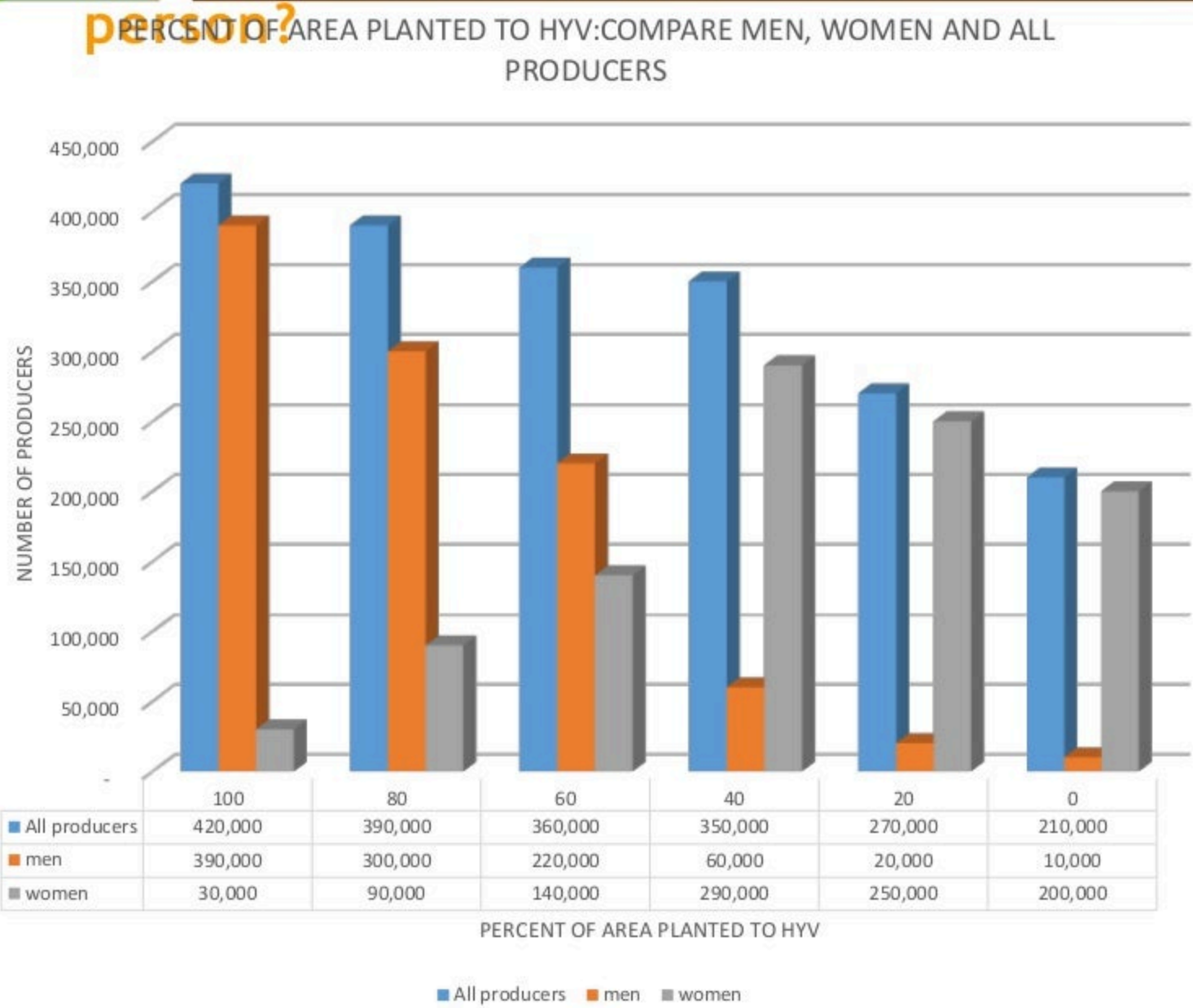


Figure 10. Sex of cassava plot managers using LSMA-ISA panel wave 3 data (2015–2016) for **Nigeria** overlaid with cassava harvest area and livelihood zone data from SPAM and FEWS NET, respectively. Cassava plot-manager information for each household is mapped using household geocoordinates. **Source**: Orr et al. 2018

What is the target?
A trait? A preference? Or a type of person?



	100	80	60	40	20	0
All producers	420,000	390,000	360,000	350,000	270,000	210,000
men	390,000	300,000	220,000	60,000	20,000	10,000
women	30,000	90,000	140,000	290,000	250,000	200,000

When we target a trait,
- we target a preference
  <u>and</u>
- we prioritize a group of users.

Development goals determine targets.

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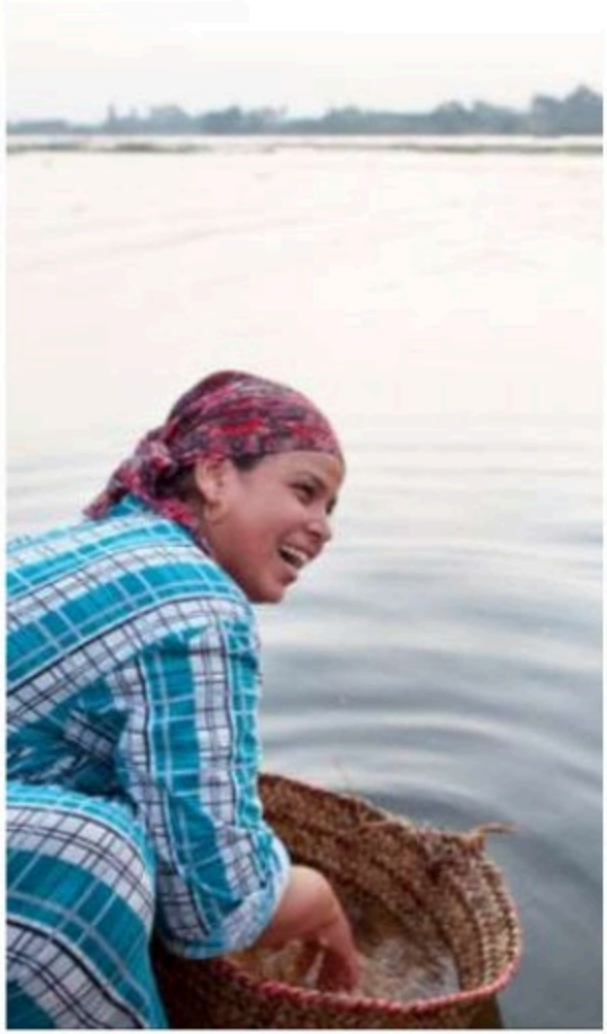
Which customers will breeding target?



Targeting needs to be the result of dialogue between breeders and social scientists to decide what breeding priorities are both technically feasible and socially desirable.

Targeting selects the population segments that meet the programs' development objectives, are big enough to justify the investment, and whose trait preferences are feasible for breeding

A target segment may be male, female or mixed male and female, depending on the importance of gender differences for demand

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CHECKLIST RESULT: GENDER RESPONSIVE CUSTOMER PROFILE

A customer profile describes a group of users with common characteristics that shape a unique, homogeneous demand and set of preferences.

- Describes the demographic, behavioral and geographic attributes of the group taking gender into account to define common needs, opportunities, constraints, and demand for use of actual or future breeding products.
- When targeting shows gender differences are not important to demand, then the customer profile will include male and female users with common constraints and interests.
- Simply disaggregating a target segment into male and female users is not useful for producing a gender-differentiated customer profile. It's essential to understand <u>why</u> gender is associated with different trait preferences.

Decisions in the Checklist for Gender-responsive Plant and Animal Breeding

Decision 3: Which trait preferences could the program potentially breed for?

Decision 4: What is the product profile or package of traits that best meets the needs of a given target group

Agronomic Performance

- Yield in range of agro-ecological climates
- Yield in nutrient poor soils
- Resistance to abiotic stresses – drought, heat, flooding, rain, wind and lodging
- Responsiveness to fertilizer or low inputs
- Responsiveness to crop protection inputs
- Resistance to priority list of pests and disease, genetic diversity and resilience
- Water usage
- Performance to crop rotation
- Germination time and length of growth cycle
- Plant architecture and space
- Ease of harvesting
- Postharvest storage life
- Genetic diversity and durability to varying biotic and abiotic stresses
- Quality and yield of plant biomass as animal fodder

Examples of attributes in demand by growers

Source: Ragot et al. 2018

Decisions in the Checklist for Gender-responsive Plant and Animal Breeding

Decision 3: Which trait preferences could the program potentially breed for?

At this stage there are lists of desired attributes and customer demands. Not all are technically feasible or economically impactful enough for breeding to address.

- Breeding feasibility has to be assessed including costs and heritability of desired traits.
- Technical measurement is required to identify the properties of plants or animals that users refer to as, for example, "chewy" or "drought-tolerant" or "easy to peel. "
- Ex-ante analysis is needed of potential impact with a gender dimension

This involves identifying the socially impactful gender-responsive traits and evaluating whether they are technically doable for breeding, as well as the cost and how long it will take.

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CHECKLIST RESULT: BREEDING GOALS WITH GENDER INCLUDED

Package (wish-list) of desirable traits with actionable breeding steps.

Set of attributes defined that could be selected as priorities of the breeding process, in view of existing knowledge, experience, and germplasm.

For each attribute, a quantified description of the desired technical outcome and social impact (maximization or minimization, specific level—to be reached and maintained) and a rank or priority are assigned.

This is the foundation for deciding on a final

Product Profile

Example of a breeders' product profile for pearl millet based on opinion of expert breeders.

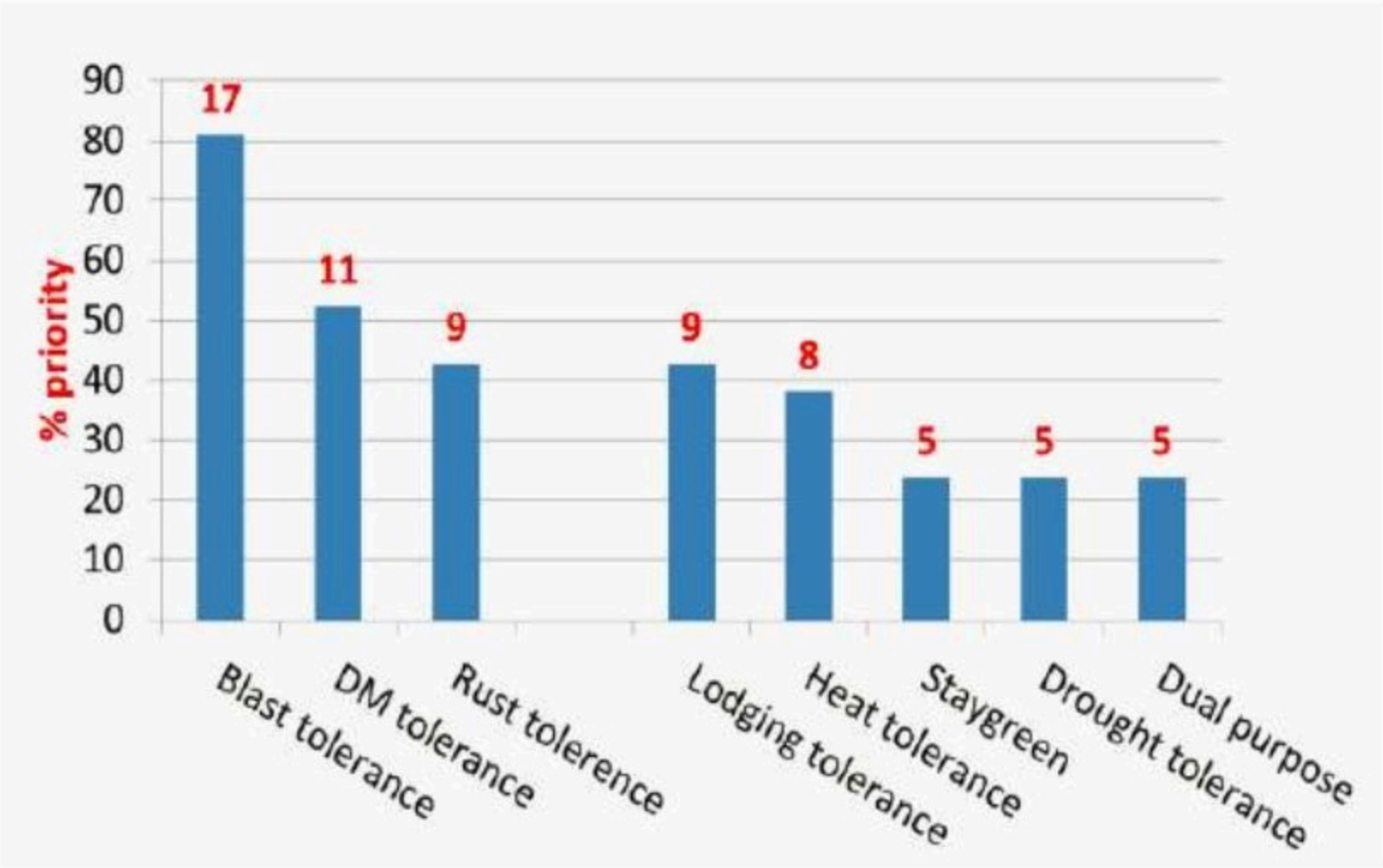

Figure 5. Long-term product profile for pearl millet hybrids for ICRISAT's PMHPRC, consolidated across all market segments.(Ragot et al. 2018)

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GENDER RESPONSIVE PRODUCT PROFILE

A gender-responsive product profile for a breeding program includes a set of targeted, heritable traits that a new crop variety or animal breed must have to satisfy an economically or culturally important customer demand.

Traits must have a specific level defined e.g. for yield; for disease tolerance; for a desired quality attribute.

Based on:

- sound knowledge of differences in demand from men and women users
- assessed for expected impact of traits on the welfare of gender-differentiated target segments.

Decisions in the Checklist for Gender-responsive Plant and Animal Breeding

Decision 5: How is the program going to breed for the traits needed to reach the gender-responsive product profile?

Decision 6: How will selection of bred genotypes meet the specifications of the gender-responsive product profile?

Decisions in the Checklist for Gender-responsive Plant and Animal Breeding

DECISIONS 5 AND 6: PRODUCT ADVANCEMENT

The traits in the final Product Profile represent breeding priorities on which breeding commits to deliver improvement within a certain time frame.

Their number is constrained and they will be a small subset of traits identified in the broader picture of socio-economic demand.

The Product Profile with gender included, supplies criteria for evaluation of of bred genotypes based on trait preferences of different customers.

Reference to the product profile incorporates gender considerations into product advancement until release.

Decisions in the Checklist for Gender-responsive Plant and Animal Breeding

Decision 7: What constraints to include in the design of delivery systems for the breeding products?

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Decision Checklist Milestones: Gender-responsive results

- **Customer profiles** that have explicit gender dimensions
- **Breeding goals** that draw on gender-responsive customer profiles and consider impacts on gender equity from breeding programs

- **Product profiles** that have unambiguous gender dimensions
- **Breeding products** (improved varieties or animal breeds) that incorporate genetic traits useful both to women and men

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Two most important benefits of using the decision checklist

1. Gender issues are not overlooked, and the standard of "do no harm" is routinely assessed in a breeding program

2. Adoption will increase because breeding responds to demand from well-defined customer groups with products relevant to their needs

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What do you need to try out the checklist?

Multidisciplinary Teamwork for evidence-based dialogue between breeders and social scientists

Capacity for use of mixed (quantitative and qualitative) methods among the socioeconomic research team members

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What do you need to try out the checklist?

A Breeding Decision Plan:

Use the Checklist to plan who to involve, when, and what information to consider for a given breeding decision.

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What do you need to try out the checklist?

Data:

Use of datasets that give the program information about the importance of target groups at a geographically and economically significant scale.

Link information about trait preferences from small-scale studies to large-scale datasets.

Further develop compatible crop and socioeconomic databases to enable the representative social targeting analysis needed (see also GBI Working Document #1)

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Want to know more?

www.rtb.cgiar.org/gender-breeding-initiative