

# AN OVERVIEW: WHAT TO BREED FOR NEXT?

A study from the MPAB adoption team May 2021



# OVERVIEW

- Two linked studies. One looking forward, one looking backwards. Both to help think about “where do we go from here”.
- Study 1. **SHOULD GLDC INVEST IN BREEDING NOVEL FUNCTIONAL FOOD PROPERTIES IN MANDATE CROPS? AND WHAT ARE THE PATHWAYS, TRADE-OFFS AND ADDITIONAL INVESTMENTS FOR THIS OPPORTUNITY?**
- Study 2. **WHAT WERE THE DRIVERS OF 90+% ADOPTION OF CHICKPEA VARIETIES IN ANDHRA PRADESH, INDIA? WHAT ARE THE IMPLICATIONS FOR BREEDING CHOCIES AND PROMOTION STRATEGIES?**
- **Headlines: technology choices for the long term are subject to high degree of uncertainty due to the unpredictable nature of future opportunities and challenges. Need to avoid locking into a narrow set of technological options, Deliberately broadening portfolios and diversifying technological options. Not all demand led**

# Opportunities abound for functional foods.....

BUT HOW TO MOVE FORWARD? WHAT ARE PATHWAYS THAT LINK SMALLHOLDER FARMERS TO OPPORTUNITIES AND HOW FEASIBLE ARE THESE?

*Pathway 1. Crops already produced and consumed by the poor*

*Pathway 2. Create new domestic market opportunity*

*Pathway 3. Miracle crops for international markets*



*Improved nutrition can not always be reconciled with improved farm incomes.*



## PATHWAY 3. THE FALLACY OF MIRACLE NUTRITIONAL CROPS

- Global value chain will not preference the procurement of high value crops from small holders unless regulations and standards are in place to promote this (e.g. fair trade, provenance labeling etc )
- Farmers in the Global North have a comparative advantage in producing "miracle crops" e.g. quinoa
- International competition, fluctuating prices, and policy and regulatory shifts make this a risky strategy for smallholders



## PATHWAY 2 THE SCALE CHALLENGE OF PROMOTING NICHE PRODUCT

- Can create new high value market for smallholders
- Nutritional benefits often targeted at higher income groups, may not spill over to poor consumers unless specifically targeted

Introducing FFs in niche markets could be a pathway, but the potential to scale these niches remain uncertain.

Best left to local development agencies work on community scale initiatives




## PATHWAY I. A NO-REGRET STRATEGY

GLDC crops:

- already have a range of desirable nutritional properties
- are widely consumed by smallholders and poor consumers more generally.
- there are already domestic and, in some cases, established export markets for these crops.

A no-regrets strategy would be to further enhance the existing functional properties of these crops.





## HAS THE CGIAR GONE TOO FAR? WHY CHASING CURRENT OPPORTUNITIES MAY NOT ENSURE FUTURE IMPACTS

- Recent estimates of 10:1 return on investment in CGIAR technology (Alston et al. 2020); but impact pathways are diverse and the recipe for impact success remains elusive
- We looked at the impact success stories of 90+% adoption of chickpea (CP) varieties in Andhra Pradesh (AP) (Gumma et al. 2016)

### HOW DID THIS SUCCESS CAME ABOUT?

- **The accepted narrative of this success** is: A great variety was developed; it fitted farming system/ cropping patterns; collaboration with national RD and E organizing helped promote the variety; farmers highly appreciated the variety and helped spread it from farmer to farmer.
- We argue: the accepted narrative is not wrong, but it is **only a partial explanation** of the factors that lead to this success.





# A NEW NARRATIVE OF SUCCESS

- A success that that was 20—30 years in the making, underpinned by inspired/ lucky/ obvious breeding decision in the 1980s, when CP was a very minor crop in AP.
- The decline of CP production in Northern India; market signals (consumer demand); decline of traditional AP crops such as cotton, tobacco; droughts, labour scarcity, MGNREGS, etc. – these created an *opportunity space* that the new CP varieties equipped farmers to respond to.
- This scenario was critical to the spread of the technology, but could not have been predicted in advance; nor could it have been engineered.
  - [A similar pattern was seen in Myanmar, despite much weaker RD&E support in country]



# AGRI-FOOD SYSTEM: DYNAMICS AND UNCERTAINTY

- Uptake and spread of new varieties ultimately depends on how farmers interact with the technology and their behaviour and decision making.
- Their decision making is conditioned by factors not only at the scale of farm and farming system, but at the scale of the whole agri-food system, including the dynamics and uncertainty that these systems display.
  - Technical changes in North Indian agriculture interacted with markets and consumer demand to create an opportunity, other agri-food system forces playing out in AP (cotton, labour etc) made this opportunity attractive.
- New technologies can be targeted not merely at a suitable agro-ecological zone (AEZ), but also at appropriate *opportunity spaces*, which are characterized by market, institutional and other social and economic features.
- Searching for emerging opportunities within dynamic agri-food systems and supporting pathways which allow technical and other kinds of response that enable farmers to gain advantage from these dynamics, could accelerate impact performance.

**This needs to be underpinned by a menu of robust, effective technology options.**



## WHAT DID WE LEARN?

- The key is being prepared to **respond to context changes and opportunitites**, then getting the dissemination right
- Breeding is long-term process, that has to place speculative bets for future states:
  - **Product Profiles** attempt to anticipate these future states and respond to them; but any predictions are made under uncertainty.
  - If the expected scenarios do not materialize, products will not match.
- Changes in the context, which lead to completely novel windows of opportunity emerging, won't be served through this approach, meaning that those opportunities cannot be seized.

## WHAT DID WE LEARN?

- A broader set of basic material should be built, likely through 'core-like support' for breeding
- A more targeted set of likely products can be developed using the currently applied 'market facing' breeding and dissemination approach (e.g. market research and product profiles), but as part of a wider portfolio
- **Diversity** will be key to remain relevant, and hedge bets on future states
- Continuous context scanning and adjustments for future scenarios required
  - Tools for this: Strategic foresight, e.g. scenarios, Delphi, horizon scanning...



# HAS THE CGIAR GONE TOO FAR TOWARDS SERVICING TODAY'S DEMANDS?

- Breeding has gone through a number of phases with respect to demand orientation and accountability:
- **The early years (1970s+1980s):**
  - Science-led breeding – let a thousand flowers bloom. Long-term, risky, science-led inquiries
- **The dawn of impact scrutiny (1990)**
  - A mixed model of long-term risky science enquiries, increasingly tempered by loss of core funding, short-term projects and growing impact scrutiny
- **CRP phase (2010—One CGIAR):**
  - Breeding for specific market demands (Product Profiles and private sector business models)
  - Influence of Gates Foundation model of investment
  - Achieving impact at scale – systems approaches, scaling.

# QUESTIONS TO BE ANSWERED FOR THE POST-CRP PROGRAMMING

- Did the CGIAR move too far from long-term, risky research, with uncertain impacts, towards a private sector model?
- Was the success of the 1990s built upon having the right mix of approaches (and funding) to facilitate more agile responses to emerging opportunities, and being prepared for the unexpected?
- How do we get the right mix of (a) 'blue skies' breeding and (b) aligning to likely (and less likely) future states of the world (market, climate, ...)?
- Could such a strategy also be the key to serve a greater diversity of heterogeneous farming settings and aspirations?
- If the CGIAR becomes more like the private sector, who does the **risky research** that the poor need when unpredictable events disrupt the farming systems they rely on?

# WHERE DO WE GO FROM HERE?

- Foresight scenarios; horizon scanning; responsible research and innovation (RRI: anticipatory, inclusive, reflexive, responsive)
- “No-regrets” decisions: avoiding narrowing down and closing off options, or locking in technological pathways.
- Deliberately broadening portfolios and diversifying technological options – working to enrich opportunity landscapes.
  
- **Discussion points from last week**
- Who will pay for the underpinning research for the future which is less demand / market driven but helps with the widening of options?
- How do we get the message of this research to funder who seem to be going in the opposite direction?