

# ***Demand led plant variety design***

## **Workshop Report**

**Nairobi, May 15-16 2014**

### **Background**

A consultative workshop was held in Nairobi, Kenya on May 14-15, on the subject of “*Demand led plant variety design*”. The workshop was attended by some 35 participants, covering a spectrum of participants from the public and private sectors, and from national, regional, Pan African and international R&D agencies who support plant breeding for the development of new plant varieties in Africa.

The purpose of the workshop was to bring together leaders in plant breeding and crop improvement in Africa, in order share experiences in plant variety design, development and adoption, and address key issues to help shape and direct implementation of a new research project being developed by African and international partners. The proposed research will investigate in-depth, specific experiences in the adoption (or lack of adoption) of new plant varieties, and seeks to share best practices from both public and private sectors, through selected case studies; education, training and professional development; and through policy analysis, evidence based policy development and advocacy of new approaches to demand led R&D. The program for the workshop is attached (Annex A). A critical issues brief which summarised the main items to be discussed at the workshop was also prepared and circulated prior to the workshop (Annex B). The presentations made by participants at the workshop will be available initially at [www.syngetafoundation.org](http://www.syngetafoundation.org).

The consultative workshop in Nairobi was an initial step in launching the joint research project on *Demand led plant variety design*, which is being sponsored through a new Alliance on food security, formed by the Australian International Food Security Research Centre of the Australian International Agricultural Research Centre (AIFSRC/ACIAR), the Crawford Fund and the Syngenta Foundation for Sustainable Agriculture (SFSA). The new Alliance was formed through a Memorandum of Understanding that was formalised during the workshop. The consultative workshop was funded by ACIAR/AIFSC, through the University of Queensland Global Change Institute (UQGCI). The workshop was hosted in Nairobi by the Biosciences eastern and central Africa (BecA) Hub at the International Livestock Research Institute (ILRI). It was co-organised by BecA, the Crawford Fund, SFSA and UQGCI. The workshop co-organisers thank ACIAR/AIFSRC for their financial support for the workshop.

The main findings of the workshop and the next steps, as recommended by the workshop participants, are summarised below, for the three main issues of :

- Selection of case studies on plant variety adoption and plant breeding programs within which to test new approaches in demand led plant variety design;
- Education, training and professional development of plant breeders;
- Policy and institutional issues;

These findings and recommendations are now being pursued by the project’s joint leaders and co-sponsors in the finalization and implementation of the research project, in conjunction with partners in Africa, Australia and internationally.

## Summary of Workshop findings on 3 key issues

### Issue 1 Selection of crop variety case studies x countries x institutions

#### Discussion and decision points at workshop

- **Case study crop selection:** Examples of target crops within which to examine examples of rapid adoption or slow adoption of new varieties and reasons for rapid/slow adoption in particular cases;
- **Pilot plant breeding programs** within which to test demand led approaches to plant variety design
  - Crops x countries x institutions

### Summary of workshop findings on Issue 1

**Purpose:** The purpose of the case studies is to analyse the reasons for adoption (or non-adoption) of new plant varieties, so as to inform more demand led plant variety design in the future. The intention is to select a portfolio of crops with different profiles, and to see what are the lessons learned, within and between crops and across countries.

**Selection criteria:** Possible selection criteria to guide selection of crops/varieties for case studies:

- **Market demand for the crop** – is there a growing demand from consumers for this crops?
- **Multi-purpose crop** – does the crop have multipurpose uses for food, feed, fibre?
- **Breeding programs** – are their viable breeding programs that are generating new varieties?
- **History of varietal introductions** - is there a history of varietal introductions of the crop?
- **Multi country crop** – is the crop important in more than one country?
- **Food security and/or income generation crops** – include both types of in the portfolio of case studies;
- **Challenges in varietal introduction** – include some cases where there have been unsuccessful attempts to introduce new varieties
- **Engagement of the private sector and consumers** – include the views of the private sector and consumers in the case studies on varietal design and adoption.

### Identifying pilot plant breeding programs to test new approaches to demand led variety design

- Regarding identification of plant breeding programs with which to test demand led approaches to plant variety design, the view of the workshop participants was to invite plant breeders interested in trying new approaches to nominate their programs as willing to participate in pilot programs on demand led design;
- The pilot plant breeding programs are likely to emerge once the case studies on targeted crops have been selected.

### Next steps on identification and commissioning of crop variety case studies (Issue 1)

- Select the priority crops, countries, and partner institutions for the portfolio of case studies, based on the long list identified at the workshop (see table 1 attached).
- Develop common Terms of reference to be used as a guide for all case studies, so as to obtain comparable data for cross country and cross commodity analysis
- Commission initial suite of case studies, with estimate of costs, deliverables and timelines

**Table 1 Range of crops/countries/regions for possible case studies on varietal design and adoption**

<b>Crop</b>	<b>Region/countries</b>	<b>Partner institutions</b>
<b>Cereals</b>		
Rice	East Africa /Kenya; Tanzania; Rwanda	AfricaRice; EAAPP (Tanzania); private sector (Rwanda)
Sorghum	East Africa /Sudan	ICRISAT
	West Africa	
<b>Legumes</b>		
Pigeon pea	East Africa/Kenya	University of Nairobi (UoN); ICRISAT; ACIAR/Univ. Qld
Soybean	South Africa	
<b>Root crops</b>		
Cassava	West Africa /Ghana East Africa /Tanzania, Uganda	Ghana (WAAPP)-West; IITA (East )
Sweet potato	Southern Africa /Mozambique	CI P
<b>Vegetables</b>		
Beans	East Africa /Kenya	UoN; CIAT
Tomato	West Africa /Ghana	World Vegetable centre

## **Issue 2 Education, training and professional development of plant breeders**

### **Discussion and decision points at workshop:**

- Scope, balance and content of courses and modules on demand led plant variety design
- Dissemination of course materials/modules for continuing professional development
- Master Classes in demand led plant variety design
- Potential partners in course/module design, dissemination, conduct of Master Classes and other means of continuing professional development of plant breeders

### **Summary of workshop findings on Issue 2**

#### **Scope**

- Education, training and professional development of plant breeders can usefully incorporate more market driven approaches to plant variety design;
- Professional development of plant breeders is considered to be one of the most important aspects of education and training in plant breeding, and which is under invested in Africa;
- Practical, “hands on” training that is linked to seed companies is considered very valuable;

#### **Adding value to existing educational programs through training modules**

- Developing new, focussed training modules on market driven approaches to plant variety design, in conjunction with existing, national and regional education programs for plant breeders is likely to be cost effective and efficient;
- Access and adapt existing training modules, including from private companies as available;
- Well designed and targeted modules can be made widely available for dissemination through existing education and training programs;
- Dissemination for professional development can be made through Master Classes and web based e-learning resources, for open access;
- Include private sector experiences in Africa and internationally in the development of the content of training modules and in their dissemination (e.g. in Master Classes);

#### **Potential partners within existing education, training and professional development programs**

- Regional education and training programs on plant breeding (e.g. ACCI- eastern and southern Africa; WACCI-West Africa); BecA; African Academy of Plant Breeders; universities; (important partners for module development on market driven approaches to plant variety design) ;
- RUFORUM – network of universities east Africa, which includes formal post graduate training of plant breeding; important for initial testing of training modules on market driven approaches;
- FARA as host of a new program on capacity strengthening in science and technology in Africa; also important for Africa-wide dissemination of training modules on market driven approaches;

#### **Next steps on education, training and professional development of plant breeders (Issue 2)**

- Constitute a small group amongst education and training institutions and other interested public and private sector partners, in Africa and internationally, to develop a training module on “Demand led approaches to plant variety design”; (2014)
- Test the training module within existing regional and national training programs for plant breeders; revise the module in the light of feedback received; (2015)
- Launch the training module at an initial Master Class for plant breeders, to be held in Africa in 2015; further refine the content after feedback from the Master Class of plant breeders;
- Roll out the training module for e-learning, on line, as open access material for plant breeders (2016).

### Issue 3 Policies and institutions

#### Discussion and decision points at workshop:

- Challenges of incorporating demand led approaches into R&D programs
- Balance of demand led vs technology driven approaches
- Policy implications of demand led approaches to new variety development
- Changing role of the private sector in the development and distribution of new varieties

#### Summary of workshop findings on Issue 3

The three elements to be addressed through the policy component are:

**Policy gaps:** Identify gaps that are constraining the use of more demand led approaches to R&D, in relation to the development of new high performing plant varieties;

**Policy analysis:** Analyse the policy gaps and generate evidence to inform decisions on new policies that will be more favourable to the adoption of market led, high performing plant varieties

**Policy advocacy:** Work with governments and other institutions to influence decisions by Ministers and other decisions makers on favouring more demand led approaches to variety design

Policy and institutional issues here are being considered through the lens of “*Demand led plant variety design*”, rather than a comprehensive view of all issues related to plant breeding in Africa. The following issues were identified as requiring analysis and action, in order to advance more demand led approaches to plant variety design, with the view to increasing adoption of new plant varieties that respond to changing market demands.

#### ***Rapidly changing role of the private sector in Africa***

Private seed companies are the key players in the seed sector in Africa. This is increasingly so, for any crops that are grown commercially for sale, whether grown by small-scale growers, by small and medium sized enterprises (SMEs), or larger international companies who are increasingly investing in African agriculture. The seed companies are either African owned enterprises, or international companies, or partnerships between African companies and international commercial partners. The AGRA/PASS program is investing substantially in the development of the African seed sector. The development of the commercial seed sector complements the continuing public sector role in food security (subsistence) crops, which are often vegetatively propagated and hence more difficult to market seed commercially. National governments and international agencies, including the CGIAR play an important role in the development and dissemination of food security crops in Africa.

#### ***Public-private partnerships (PPPS)***

SFSA has considerable expertise in the implementation of public-private partnerships; and in the analysis of the factors that contribute to the success (or failure) of public/private partnerships. SFSA is willing to make this policy analysis available to the partners in the demand led variety design work.

#### ***Role of regulators***

Regulators play an important role in enabling the release of new plant varieties in a timely manner; or in constraining the release of promising new varieties. There are several agencies in each country that set regulatory policy, for both conventionally bred varieties and for genetically modified (GM) varieties. GM varieties need to go through another level of biosafety regulation, as well as the usual regulatory system for varietal registration, prior to release. The “varietal release” committee in each country are a critical point in determining the specifications and approving new varieties for release.

### **Seed supply**

Governments also determine seed policies that affect the supply of seed of new varieties, including the relative roles of the public and private sectors in seed supply, and the access and affordability of new seeds to farmers. Access to affordable, pre-season credit is also an important issue to enable small scale farmers to purchase seed on credit. In general, the private sector would prefer governments to liberalise their seed policies and enable earlier release of new varieties.

### **Gender considerations in variety design**

Gender preferences are important in determining the desirable traits of new crop varieties; this applies both to production traits (e.g. pest and diseases resistance; drought tolerance) and to post harvest traits (e.g. shelf life; cooking quality; colour and taste;) Gender preferences tend not to be addressed adequately in the design of new plant varieties; there are several instances where although a new variety performed well for yield and agronomic characteristics, it was not widely accepted because of its cooking quality was considered not to meet consumer preferences (e.g. rice; cassava)

### **Sustainable financing S&T in Africa**

The “*Science agenda for transforming agriculture in Africa*” (S3A) was developed through FARA, in conjunction with AU/NEPAD, the sub-regional organizations (ASARECA, CORAF) and partners in the CGIAR, for the African Union’s Year of Agriculture in 2014. The science agenda notes the importance of increasing the rates of adoption of high performing plant varieties in Africa beyond the current average of 30%; a more demand led approach to R&D in general and plant variety design in particular is likely to contribute to this target. Another important finding in the science agenda is its link to the Comprehensive African Agricultural Development Program (CAADP) in each country, and the need for national governments to invest in science technology, including in more demand led approaches to technology development that reflect changing market demands.

### **Policy forums**

There are a number of policy forums where it would be merit in getting the issues associated with “*Demand led plant variety design*” on the agenda, in order to raise awareness and propose new approaches to the development of new plant varieties in Africa. These policy platforms include:

- African Union’s “Year of Agriculture”, with a Summit of Heads of State in 2014
- G20 events in Australia, leading up to the G20 meeting in Brisbane in November 2014

### **Next steps; Issue 3 Policies and institutions**

- Convene a small policy contact group to elaborate further on the policy and institutional gaps that are critical to the adoption of a more demand led approach to plant variety design and that can be addressed over the course of the proposed project; these issues will be carried forward through policy analysis, advocacy and publications, with an array of partners within Africa and internationally;
- The policy and institutional issues will also be informed by the case studies undertaken on specific crops (Issues 1) and the education, training and professional development aspects (Issue 2);
- Ensure that the issues of “Demand led variety design” are included on various national, regional and international fora over the next three years of the proposed project, and beyond;
- Develop a project communications plan and communications products, including a web site, to raise the profile of “demand led” approaches to plant variety design and building on the momentum created through the discussions at this design workshop in Nairobi in May 2014.

## Annex A

### Consultative meeting on “Demand led plant variety design” Nairobi Kenya May 14-15 2014 Provisional Program

#### Tuesday May 13

Participants arrive in Nairobi; transfer from JKIA Airport to Windsor Hotel

**Workshop “meet and greet” desk open in hotel lobby from 11 am** – Participants please deliver a copy of any ppt slides to be presented during the workshop to the welcome committee (Dr Vivienne Anthony)

#### Wednesday May 14 (DAY 1)

##### 0830-1030 **Session 1 Opening Session: Introduction to demand led plant variety design**

**Chair** Dr Appolinaire Djikeng BecA-ILRI Hub Director

0845- 0930 **Welcome to participants** - Dr Appolinaire Djikeng BecA-ILRI Hub Director (5 mins)

**Opening remarks** – Dr Yemi Akinbamijo Executive Director Forum of Agricultural Research in Africa (FARA) (10-15 mins)

**Opening remarks by co-sponsors** (5 mins each)

- Ms Mellissa Wood – Director Australian International Food Security Research Centre
- Dr Denis Blight – CEO Crawford Fund Australia
- Dr Vivienne Anthony – Senior Advisor, Syngenta Foundation for Sustainable Agriculture

##### 0930- 1000 **Introduction to workshop and concepts of “Demand led plant variety design”**

- Concepts of “Demand led plant variety design” – Dr Vivienne Anthony SFSA
- Context and expectations of consultative workshop – Dr Gabrielle Persley Crawford Fund

##### 1000-1030 **Plenary discussion of concepts and context of “Demand led plant variety design”**

##### 1030-1100 *Coffee/tea break*

##### 1100-1300 **Session 2 Sharing experiences of plant variety development and adoption**

**Chair** Dr Appolinaire Djikeng BecA-ILRI Hub Director

**Co Chair** Dr Dan Kiambi Executive Director African Biodiversity Conservation and Innovations Centre (ABCIC)

- Examples will be presented on the development and introduction of new plant varieties coming from national, regional and international breeding programs in Africa; and from private companies.

The examples of new crop varieties to be considered as potential case studies on design and adoption include:

- What are the key characteristics of the crop variety that farmers, processors or consumers want that is driving demand? Why is this variety preferred and how is it different from other varieties?
- Who decided the design and the traits to be targeted in plant breeding?
- How do you know rapid adoption is occurring?
- How has rapid adoption taken place? The timeframe and who has made it happen? Please consider all players and their involvement e.g. breeders, seed production and scale up, extension services and variety promotion, seed organisations, variety registration officials, processors and food companies.

Alternatively, examples may be of new varieties where high adoption has not occurred, such as:

- The variety has very good properties that are in demand by farmers, processors or consumers but only low adoption has occurred. What are the barriers to adoption, and the change management that is required?
- Other examples where perhaps varietal registration and release took place but the variety lacked a critical characteristic or other facet that did not attract farmers to use it. What learning is there for new variety design in future?

##### 1300-1400

*Lunch at Windsor Hotel*

### **1400-1530 Session 3 Implications of demand led approaches to new varietal design**

**Chair Dr Appolinaire Djikeng BecA-ILRI Hub Director**

**Co Chair Dr Gabrielle Persley Crawford Fund/University of Queensland Global Change Institute**

1400-1415 Introduction to best practices from the private sector in plant varietal design - Dr Vivienne Anthony

#### **14 15-1500 Discussion in small groups on examples presented in Session 3 on new varietal development**

**Points for discussion in small groups and recommendations from groups to plenary session on:**

- **Case study crop selection:** Examples of target crops within which to examine examples of rapid adoption or slow adoption of new varieties and reasons for rapid/slow adoption in particular cases;
  
- **Pilot plant breeding programs** within which to test demand led approaches to plant variety design
  - Crops x countries x institutions

1500-15 30 Report back to Plenary session after small group discussion, on above 2 topics

**1530-1600                      Tea/coffee break**

### **1600- 1730    Session 4 Overview of education, training and professional development of plant breeders**

**Chair: Dr Walter Alhassan (SFSA)**

**Co-Chair Ms Melanie King University of Queensland Global Change Institute**

**Current approaches, gaps and needs in relation to education and training, with contributions from:**

- ACCI – Africa Centre for Crop Improvement
- WACCI, West African Centre for Crop Improvement
- RUFORUM
- BecA/ILRI Hub Africa Biosciences Challenge Fund
- Private sector approaches to professional development of plant breeders

**1900 -2100                      *Informal reception/dinner for participants and guests, Windsor Hotel***



## **Thursday May 15 DAY 2**

### **0830 – 1030 Session 5 Implications of demand led approaches for education, training and professional development of plant breeders**

**Chair: Dr Walter Alhassan (SFSA)**  
**Co Chair Dr Denis Blight Crawford Fund**

#### **0830 -0930 Small group discussions on: Implications of demand led approaches for education and training of plant breeders in Africa; and possible topics for inclusion in future education and training programs**

##### **Points for discussion and recommendation to plenary on:**

- Scope, balance and content of courses and modules on demand led plant variety design
- Dissemination of course materials/modules for continuing professional development
- Master Classes in demand led plant variety design
- Potential partners in course/module design, dissemination, conduct of Master Classes and other means of continuing professional development of plant breeders

**0945-1030** Report back to Plenary session after small group discussion, on above topics

**1030-1100 Coffee/tea break**

### **1100-1300 Session 6 Implications of demand led approaches on policies and institutions**

**Chair Dr Marcel Mwalozi AU/NEPAD**

#### **1100-1230 Issues to be addressed by contributions from pan African and sub regional organisations, and by private sector seed companies on:**

- Challenges of incorporating demand led approaches into R&D programs
- Balance of demand led vs technology driven approaches
- Policy implications of demand led approaches to new variety development
- Changing role of the private sector in the development and distribution of new varieties

##### **Contributions by:**

- AU/NEPAD
- FARA
- ASARECA
- CORAF
- AGRA /PASS
- Private seed and processing companies (3 companies
  - AFRISAM, Tanzania
  - East-West Seeds, Kenya
  - Njoro Canning Factory, Kenya

**1230-1300 Plenary discussion** on implications of demand led approaches to policies and institutions

**1300-1400 Lunch**

## **1400-1600 Session 7 – Summary and Next steps**

**Chair Dr Appolinaire Djikeng**

**Co Chair Dr Gabrielle Persley**

### **Summary of decisions on demand led approaches to plant variety design (as discussed in workshop sessions above)**

#### **Issue 1: Incorporating demand led approaches into breeding programs for new varieties**

- Target crops for case studies of adoption/non adoption of new varieties
- Pilot plant breeding programs to test new approaches
- Synthesis of lessons learned

#### **Issue 2 – Education, training and professional development of plant breeders**

- Content of courses/curriculum to be developed on demand led plant variety design
- Source of materials to be used/adapted in future courses – modules, formal post graduate training, professional development courses
- Key partners

#### **Issue 3 Policy, institutions and communications**

- Policy and institutional issues to be addressed on demand led plant variety design
- Communications and dissemination strategies
- Key partners

#### **Closing remarks**

Dr Denis Blight – on behalf of international participants

Dr Yemi Akinbamijo – on behalf of African participants

## Annex B

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### ***Demand led plant variety design***

**Summary of Critical Issues to guide discussions at**

**Consultative Workshop, Windsor Hotel, Nairobi**

**May 14-15 2014**

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## Issue 1 Demand led approaches for plant variety design examples

### ➤ Examples of plant variety development and adoption

Examples of the development and introduction of new plant varieties coming from national, regional and international breeding programs in Africa; and from private companies:

The examples of new crop varieties to be considered as potential case studies on design and adoption include:

- What are the key characteristics of the crop variety that farmers, processors or consumers want that is driving demand? Why is this variety preferred and how is it different from other varieties?
- Who decided the design and the traits to be targeted in plant breeding?
- How do you know rapid adoption is occurring?
- How has rapid adoption taken place? The timeframe and who has made it happen? Please consider all players and their involvement e.g. breeders, seed production and scale up, extension services and variety promotion, seed organisations, variety registration officials, processors and food companies.

Alternatively, examples may be of new varieties where high adoption has not occurred, such as:

- The variety has very good properties that are in demand by farmers, processors or consumers but only low adoption has occurred. What are the barriers to adoption, and the change management that is required?
- Other examples where perhaps varietal registration and release took place but the variety lacked a critical characteristic or other facet that did not attract farmers to use it. What learning is there for new variety design in future?

### Decision points

- **Case study crop selection:** Examples of target crops within which to examine examples of rapid adoption or slow adoption of new varieties and reasons for rapid/slow adoption in particular cases;
- **Pilot plant breeding programs** within which to test demand led approaches to plant variety design
  - Crops x countries x institutions matrix

## **Issue 2 Implications of demand led approaches for education, training and professional development of plant breeders in Africa**

**Topics for consideration in future education, training and professional development programs, in the light of current national, regional and international programs**

- Scope, balance and content of courses and modules on demand led plant variety design
- Dissemination of course materials/modules for continuing professional development
- Master Classes in demand led plant variety design
- Potential partners in course/module design, dissemination, conduct of Master Classes and other means of continuing professional development of plant breeders

## **Issue 3 Implications of demand led approaches on policies and institutions**

**Issues to be considered in the context of current programs and initiatives of Pan African and sub regional organisations, and by private sector seed companies on:**

- Challenges of incorporating demand led approaches into R&D programs
- Balance of demand led vs technology driven approaches in new varietal development
- Policy implications of demand led approaches to new variety development by public and private sectors
- Changing role of the private sector in the development and distribution of new varieties
- Policy issues to be addressed, in the light of evidence generated on factors affecting the design and adoption of new high performing varieties.

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# Demand led plant variety design

## Executive Summary

May 2014

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### The Issue

Agriculture in Africa is at a tipping point. Agriculture is moving from subsistence systems to more market led systems, as small scale producers generate surpluses of products to sell in local, regional and/or international markets. Enabling small scale producers to access the expanding local and regional markets within Africa is one of the critical challenges facing policy makers.

Central to the transformation of agriculture in Africa is identifying market demand and developing products with suitable characteristics to meet market requirements. Such demand can originate from producers, processors, and/or consumers. A more customer focussed and demand led approach to plant varietal design will impinge on public and private sector plant breeding programs. Decisions on determining the preferred traits for which to breed new varieties are paramount for success. Both the private and public sectors have considerable experience worldwide in developing crop varieties that fit the needs of customers. This experience in plant variety design can add value to public as well as private sector breeding programs in emerging economies. As economies mature and markets expand, it can be expected that, in addition to national and international public breeding programs, increasingly private companies will become involved in breeding new high performing varieties (HPVs) to meet customer requirements and market demand in emerging economies.

The uptake of new plant varieties by small holders in Africa over the past 15 years is in the order of 35%, and this is considerably lower than comparable uptake of new plant varieties in Asia (60%) and South America (80%). Several factors contribute towards this low uptake of HPVs, including lack of access to seeds, credit and other inputs. One factor that has been little explored is the suitability of new varieties to meet customer demand, especially reflecting changing demands to meet new market opportunities.

### The Response

The goal of this project is to contribute to the transformation of African agriculture by enabling small scale farmers to better participate in local and regional markets, by developing more high performing plant varieties that meet market demands.

### Objectives

***Objective 1: Plant variety design: To enable plant breeders to develop more high performing varieties that meet customer requirements and market demand***, by having increased access to and ability to implement start-of-the art knowledge, methodologies and best practices from the public and private sectors on demand led plant variety design.

***Objective 2: Education and training: To build capacity within plant breeding programs on demand led variety design***, through strengthening education and training programs for plant breeders, including through new curriculum development and professional development courses on demand led plant variety design.

***Objective 3: Policy analysis and advocacy: To provide evidence to support new policy development and investments in plant breeding*** that will help generate more high performing varieties to meet emerging market demands, with emphasis on Africa.

## Research questions and research strategy

**Question 1: Current situation: Does current breeding of new plant varieties in Africa respond adequately to the needs of customers (farmers and consumers) and market demand, for both pre and post-harvest traits?**

**Research strategy:** Review and confirm the level of adoption for HPV in selected species and environments; determine the most frequent constraints limiting adoption, lack of match with market demand and identify interventions to improve this match; Conduct an analysis of successes and failures in adoption of new varieties, across a range of 15 crops, globally; identify 5 crops for more in depth analysis of varietal adoption factors, especially in Africa; distillation of critical success factors of popular varieties/products for target crops; (for example what factors accelerate or limit new variety uptake; what is the relative importance of varietal traits, in comparison with other factors limiting uptake, in selected case studies? Identify best practices in plant variety design.

**Question 2: Future scenarios: Could the suitability of new plant varieties be accelerated by wider use of demand led approaches to plant variety design that reflect the needs of farmers and consumers, when breeding for both pre and post-harvest traits?**

**Research strategy:** Assess public and private sector approaches to plant variety design, including use of market research to identify current and future needs of farmers and consumers, both pre and post harvest; adapt or develop methodologies (including those used by the private sector) to enable plant breeders in emerging economies ready access to reliable data on changing market demands, to factor in when determining their future breeding targets; pilot test new approaches with national breeding programs, for at least 2 crops.

**Question 3: Policy environment: Do current policies (national, sub regional, Pan African) enable the design and development of new plant varieties that fit with new and emerging market demands? What policy improvements would be desirable to increase the future rate of adoption of new high performing varieties?**

**Research strategy:** Assess current policies of selected countries, sub regional organizations and continental bodies that affect new plant variety design, development and distribution; identify gaps and areas for improvement in the policy environment to support the wider use of demand led varietal design, as a contribution towards increased adoption of high performing varieties, with an initial focus on Africa.

Based on exploring the above research questions and strategy, the project aims to:

- Develop, disseminate and communicate about a set of *new decision support tools* to support plant variety design, that will enable R&D programs in Africa to obtain and evaluate information about market demands, for pre and post-harvest traits; and use this information to help set targets and product specifications within plant breeding programs;
- Encourage *market-led approaches* that contribute towards setting breeding targets within crop improvement programs, especially in Africa. This will enable research leaders to have access to and interpretation of high quality data about a range of business drivers and views of stakeholders. These business drivers and stakeholders will influence demand and the rate of uptake of new technologies, specifically new varieties of crops.

The project, in pursuing its objectives, will seek to understand and learn from best practices in plant variety design globally, in both the private sector and in public research agencies with outstanding track records in uptake of their research outputs.

The project has a three year timetable. Year 1 activities will focus on design, data gathering, and case study development with partners in Africa and internationally; Year 2, moves to testing hypotheses and working on breeding challenges within African NARS and developing a set of decision support tools for variety design with plant breeding programs; and Year 3 focuses on scaling up implementation of innovative, demand driven approaches to plant variety design, including through contributing new approaches in plant variety design to postgraduate training and professional development programmes; synthesising lessons learned from the studies conducted with selected public and private plant breeding programs in Africa, Australia and internationally; and the broader dissemination of results to inform the policies of African and international partners in the public and private sectors.

### **The Partners**

The initiating partners for the project are the Syngenta Foundation for Sustainable Agriculture (SFSA), the Australian International Food Security Research Centre (AIFSRC) and the Crawford Fund. The project builds on and expands the partnership established in 2012 by the Crawford Fund, the Doyle Foundation, the Syngenta Foundation for Sustainable Agriculture and the University of Queensland Global Change Institute (UQ/GCI) on “ *A Wider Canvas: Emerging Issues in Global Food Security*”.

The proposed partners in Africa include *Biosciences eastern and central Africa (BecA)*; the Association for Strengthening Agricultural Research in eastern and central Africa (ASARECA); the West Africa Centre for Crop improvement (WACCI), University of Ghana; Conseil ouest et centre africain pour la recherche et le développement agricoles /West and Central African Council for Agricultural Research and Development (CORAF/WECARD); the Forum of Agricultural Research in Africa (FARA); and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM).

The details of how to develop more demand led approaches to plant variety design are being discussed with partners in Africa through 2013/14. These initial discussions are being pursued through a series of consultative and planning meetings for project implementation, commencing in January 2014. These include meetings with the BecA/ILRI Hub in eastern Africa (January/February 2014) and a forthcoming meeting in West Africa on biosciences in Africa (February 2014), co-sponsored by NEPAD (New Partnership for Africa’s Development), BecA, CORAF/WECARD and SFSA. Inputs from other national, regional and international partners will be sought during these consultations, and their participation in the project will be welcomed. A consultative meeting with a broad range of potential partners will be held in Nairobi in May 2014.



## **Annex 1: Summary of Objectives, Outcomes and Outputs**

**Objective 1: Plant variety design: To enable plant breeders to develop more high performing varieties that meet customer requirements and market demand**

***Outcomes (achieved within 5-10 years of project completion, in conjunction with others beyond project participants)***

- Increasing use of innovative, market driven approaches to plant variety design by national, regional and international plant breeding programs in Africa, leading to greater availability of new, high performing crop varieties that respond to customer needs;
- In the longer term, increased levels of adoption by small scale farmers of new crop varieties that meet market needs.

***Outputs (delivered within the 3 year life of the project)***

- Identification of a *suite of plant varieties with rapid adoption and understanding the critical success factors* that led to their successful uptake
- *Best practices in plant variety design* identified, for the particular crop x farming system x customers studied, based on public and private sector experiences
- *Best practices in market research* to understand customer needs in emerging markets identified
- *Demand led plant variety design* introduced, appropriate for selected crop x farming systems x customer case, through partnerships with selected national, regional and international plant breeding programs in Africa; (the target crops and breeding programs with whom to develop and test new approaches to plant variety design will be identified jointly with partners in Africa in early 2014, during a series of consultations and design workshops).
- *Decision support tools for plant variety design*, incorporating best practices, developed and available for plant breeders.

**Objective 2: Education and training: To build capacity within plant breeding programs on demand led plant variety design**

***Outcomes***

- Innovative market driven approaches to plant variety design are incorporated within the national and regional education and training programs for plant breeding as well as in the ongoing professional development of plant breeders in Africa

***Outputs***

- *New curricula developed* on demand led plant variety design, in conjunction with African universities for use in post graduate education and professional development programs
- *Dissemination of new curricula* on demand led plant variety design, for inclusion in post graduate studies, open access fora, and in the conduct of Master Classes for professional development of plant breeders.
- *Alumni of African university post graduate plant breeding programs* implement demand led variety design in their national plant breeding programs and publish their results.

***Objective 3: Policy analysis and advocacy: To provide evidence to support new policy development and investments in plant breeding*** that will help generate more high performing varieties to meet emerging market demands, with emphasis on Africa.

**Outcomes**

- Innovative market driven approaches to plant varietal design incorporated within new science and technology and agricultural policies developed at the national, regional and continental level in Africa.

**Outputs**

- **Policy analysis** of current African science and technology (S&T) and agricultural R&D policies, with respect to their balance of technology promotion (Push) vs demand led approaches (Pull).
- **Policy briefs** summarizing the evidence base in support of demand led product design, to strengthen new plant variety development and uptake by smallholders.
- **Advocacy** with national, regional and Pan African partners on demand led plant varietal design and its contributions towards increased adoption of high performing varieties.

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