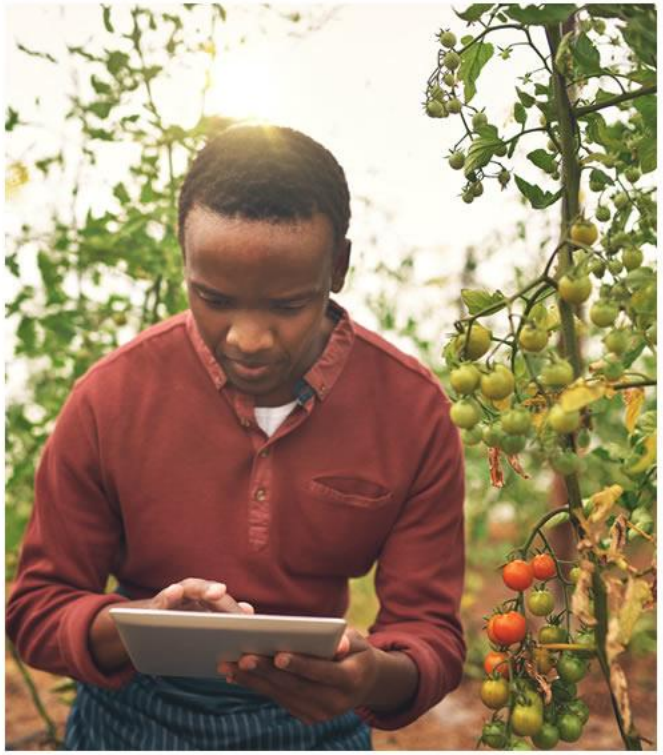
AUDA-NEPAD
AFRICAN UNION DEVELOPMENT AGENCY

Shadrack Moephuli, CEO: Agricultural Research Council



Agricultural Innovations for Africa's Food Nutrition Security

AFRICAN AGENDA 2063

PAN AFRICAN VISION

An integrated, prosperous and peaceful Africa, driven by its own citizens, representing a dynamic force in the international arena

ASPIRATIONS

- **Prosperous Africa, Inclusive Growth & Sustainable Development**
- Integrated Continent, Politically United with Vision of African Renaissance
- Good Governance, Democracy, Human Rights, Justice and Rule of Law
- Peaceful and Secure Africa
- Cultural Identity, Common Heritage, Values and Ethics
- People Development, Woment, Youth and Children
- Strong, United, Resilient and Influential Global Player and Partner

ASPIRATIONS TOWARDS PRIORITY AREAS

GOALS

1. Quality of Life and Well being of Citizens
2. **Education, Skills, Science & Innovation**
3. Healthy, well nourished people
4. **Transformed Economies**
5. **Agriculture, Increased Productivity, Production**
6. Ocean Economy – Growth
7. **Environment, Climate Change Resilience**
8. United Africa
9. **Financial and Monetary Institutions**
10. **Infrastructure**

•PRIORITY AREAS

- **Incomes, Jobs, Poverty, Inequality & Hunger**
- **Education & STI skills driven revolution**
- Health and Nutrition
- **STI based Industrialization, Value Addition & diversity**
- **Productivity and Production**
- Marine Resources, Energy & Ports Operations
- **Natural Resource Management, Climate, Disasters**
- Institutional Arrangements
- **Financial and Monetary Systems**
- Communications, Infrastructure & Connectivity

SCIENCE, TECHNOLOGY AND INNOVATION STRATEGY FOR AFRICA 2024 (STISA – 2024)

Mission: Accelerate Africa's transition to an innovation-led, knowledge-based Economy

Priority Areas:

- Eradicating Hunger and Achieving Food Security
- Prevention and control of Diseases
- Communication (Physical and Intellectual Mobility)
- Protection of our Space
- Live – Together – Build the Society;
- Wealth Creation

SCIENCE AGENDA FOR AGRICULTURE IN AFRICA (S3A) – FARA

Framework and guidelines for:

- Identifying broad areas of science to be developed with partners
- Facilitating transformation of national science and technology institutions
- Human capacity building
- Increased investment in scientific research and innovation
- Alignment of actions for impact
- Facilitating partnerships for African institutions
- Solidarity in science through sharing information, technologies, facilities and expertise to address Africa's challenges

SCIENCE AGENDA FOR AGRICULTURE IN AFRICA (S3A) – FARA

Priority Themes

1. Sustainable productivity in major farming systems
2. Food Systems and value chains
3. Agricultural biodiversity and natural resource management
4. Mega trends and challenges for agriculture in Africa
5. Cross – cutting themes
   a) Sustainable Intensification
   b) Modern genetics and genomics
   c) Foresight capabilities

CLIMATE CHANGE: EARLY WARNING SYSTEM FOR RIFT VALLEY FEVER

- Understanding impact of Climate Change on distribution of pests and diseases
- An increase in temperature will not only increase vector populations (mosquitoes, midges) but will also shorten both the time span between blood meals (increased biting rate) and the intrinsic incubation period by increasing the speed of virus development within the insect.
- Early warning systems for disease outbreaks could provide short- and long-term decision support for risk management and production of vaccines and diagnostic kits. A RVF early warning system was developed in a geographical information system (GIS) environment by retrospective analysis of rainfall and rainfall-associated climate variables in target areas during the 2008-2011 RVF epidemics in South Africa. This model correctly identified the risk in nearly 70% of instances at least a month before an outbreak.

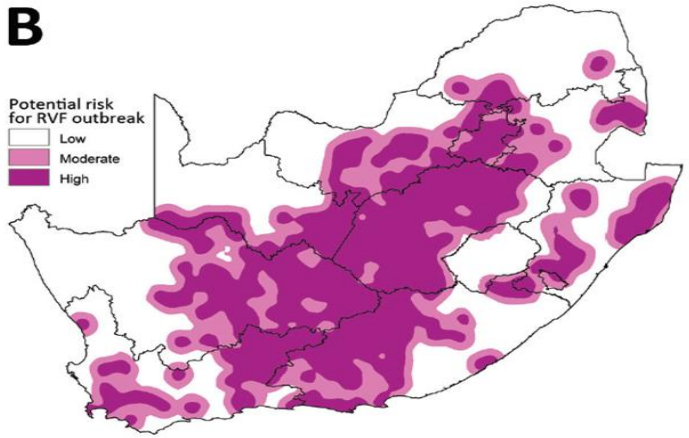
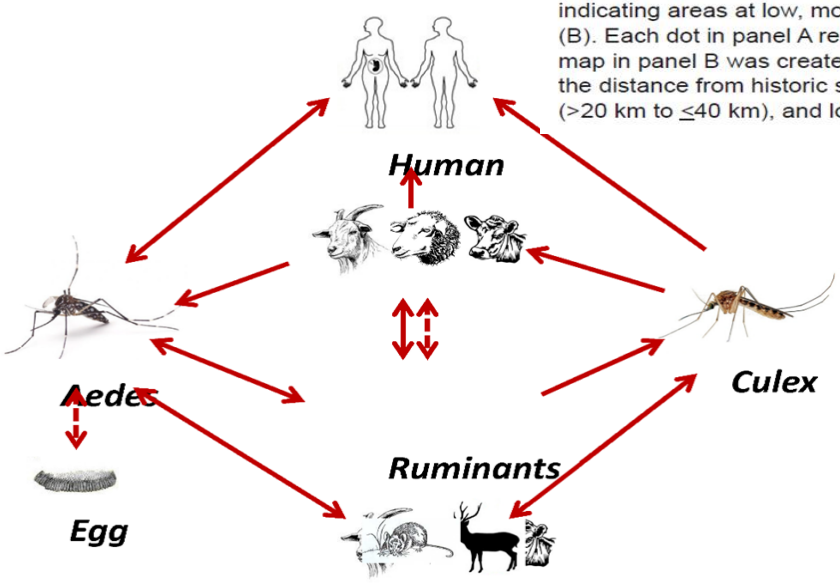
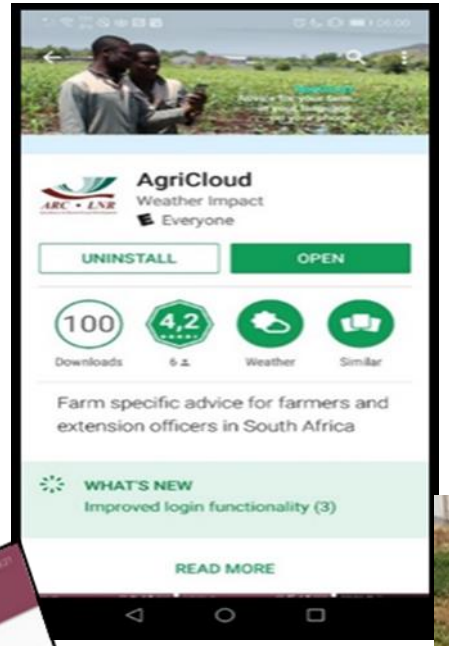


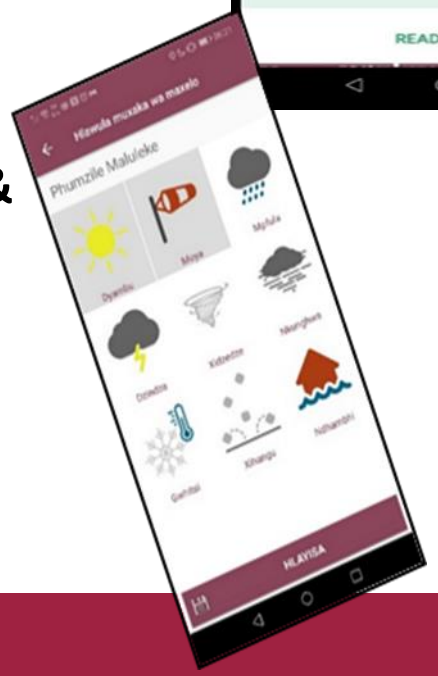
Figure 1. Historic sites of Rift Valley fever (RVF) outbreaks in South Africa from 1950 through 2011 (A) and a base map indicating areas at low, moderate, and high risk for an outbreak (B). Each dot in panel A represents a RVF outbreak. The base map in panel B was created by an interpolation method based on the distance from historic sites: high risk (≤20 km), moderate risk (>20 km to ≤40 km), and low risk (>40 km).



DIGITAL TRANSFORMATION OF FARMER DECISIONS RAIN FOR AFRICA (R4A)

AgriCloud is an online weather based agricultural advisory system that:
Enriched weather & climate data with agric info and local knowledge
Generates real-time personalized forecasts & warnings
All tailored to farmers own needs.
Impact: Available in all 11 South African official local languages.
Trained more than 1000 extension officers
Reach across South Africa
Delivery Methods with SA Weather Services & Partners:
Mobile App
Platform by subscription
API for other platforms





DROUGHT TOLERANCE AND DISEASE RESISTANCE

Developing hybrid maize varieties for:

- moderate drought tolerance in Sub-Saharan Africa
- insect – pest resistance (e.g. Fall Army Worm – FAW)
- increase yields by 20 to 35 %

Use conventional marker assisted breeding

Matibidi farmer with WEMA crop free of FAW

AGRICULTURAL INNOVATION FOR FOOD SECURITY (NERICA)

NERICA: New Rice for Africa

- Interspecific hybrid rice cultivar
- Disease resistance and improved yields
- 240 million people in West Africa – a staple food
- Africa Rice Centre

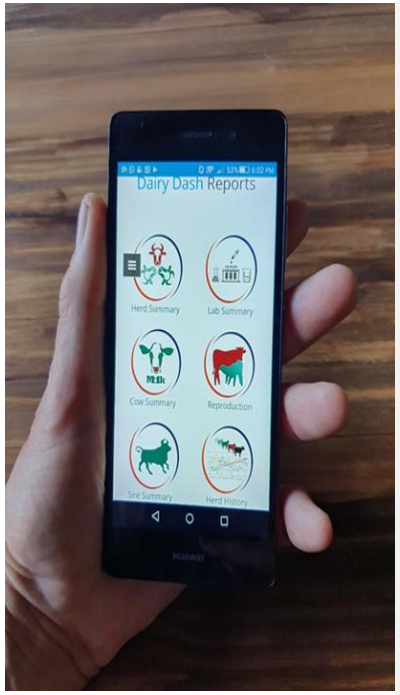
Multidisciplinary assessment of agricultural innovation and its impact: a case study of lowland rice variety WITA 9 in Côte d'Ivoire

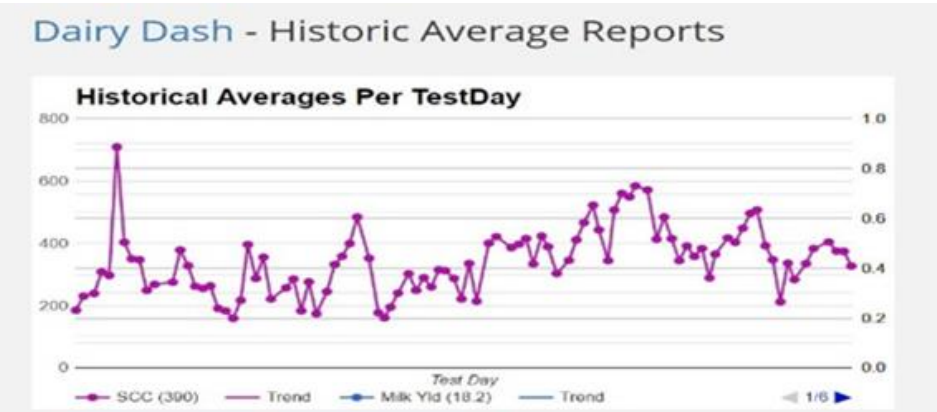
Kazuki Saito, Amadou Touré, Aminou Arouna, Rose Fiamohe, Drissa Silué, John Manful, Amadou Bèye & Andrew Abiodun Efisue (2019) *Plant Production Science*, 22:4, 428-442, DOI: 10.1080/1343943X.2019.1667834

- Resistance to bacterial leaf blight and rice blast
- Highest yield among varieties tested – yield advantage 0.7 t/Ha
- Adoption increased farmer's income by US$91 per Hectare per season
- Consumers willingness to pay

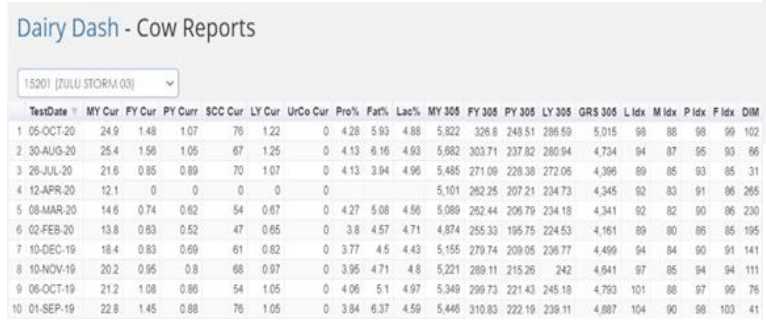
LIVESTOCK MANAGER: DAIRY PRODUCTIVITY MOBILE APP

- ARC has developed a mobile app to assist dairy farmers with day-to-day herd management to improve productivity and profitability
- linked to the National Animal Improvement Database (locally called the Integrated Registration and Genetic Information System - INTERGIS)
- Livestock Manager is used by farmers at different level of development or scale of production
- Farmer adoption growing





	FarmID	Name	Age	Pty	DIM	Milk	SCC	Lact%	> 400	SCC -1	SCC -2	SCC -3	SCC -4
1	16189	STANLEY 03	4 | 1	2	312	12.1	0.999	3	3	9737 [2]	80 [2]	230 [2]	934 [2]
2	16137	LIFEBOAT 02	5 | 2	3	466	4.8	3.328	3.01	3	1310 [3]	1133 [3]	241 [3]	44 [3]
3	13078	SEAGULL 02	7 | 3	4	431	8.8	962	3.6	8	751 [4]	461 [4]	444 [4]	89 [4]
4	12171	VANCOUR	7 | 11	5	401	16.6	570	3.01	4	835 [5]	270 [5]	426 [5]	126 [5]
5	13163	CONTESSA 03	6 | 11	5	312	12.7	0.999	3.86	24	2272 [5]	9999 [5]	1029 [5]	2297 [5]
6	140147	STAGPARTY 02	6 | 2	4	341	10.6	1,225	3.73	6	216 [4]	146 [4]	176 [4]	451 [4]
7	15197	PLEASURE 04	5 | 0	3	256	6.3	1,277	3.76	12	756 [3]	2726 [3]	5714 [3]	273 [3]
8	16076	TESCO 02	4 | 6	2	392	7.8	1,021	3.78	3	611 [2]	4133 [2]	286 [2]	122 [2]
9	15219	ENDOLINT 03	4 | 11	3	261	3.8	1,110	3.83	9	559 [3]	677 [3]	228 [3]	4350 [3]
10	130219	JOYCE02	6 | 9	4	443	11.9	844	3.88	11	414 [4]	1040 [4]	1529 [4]	72 [4]



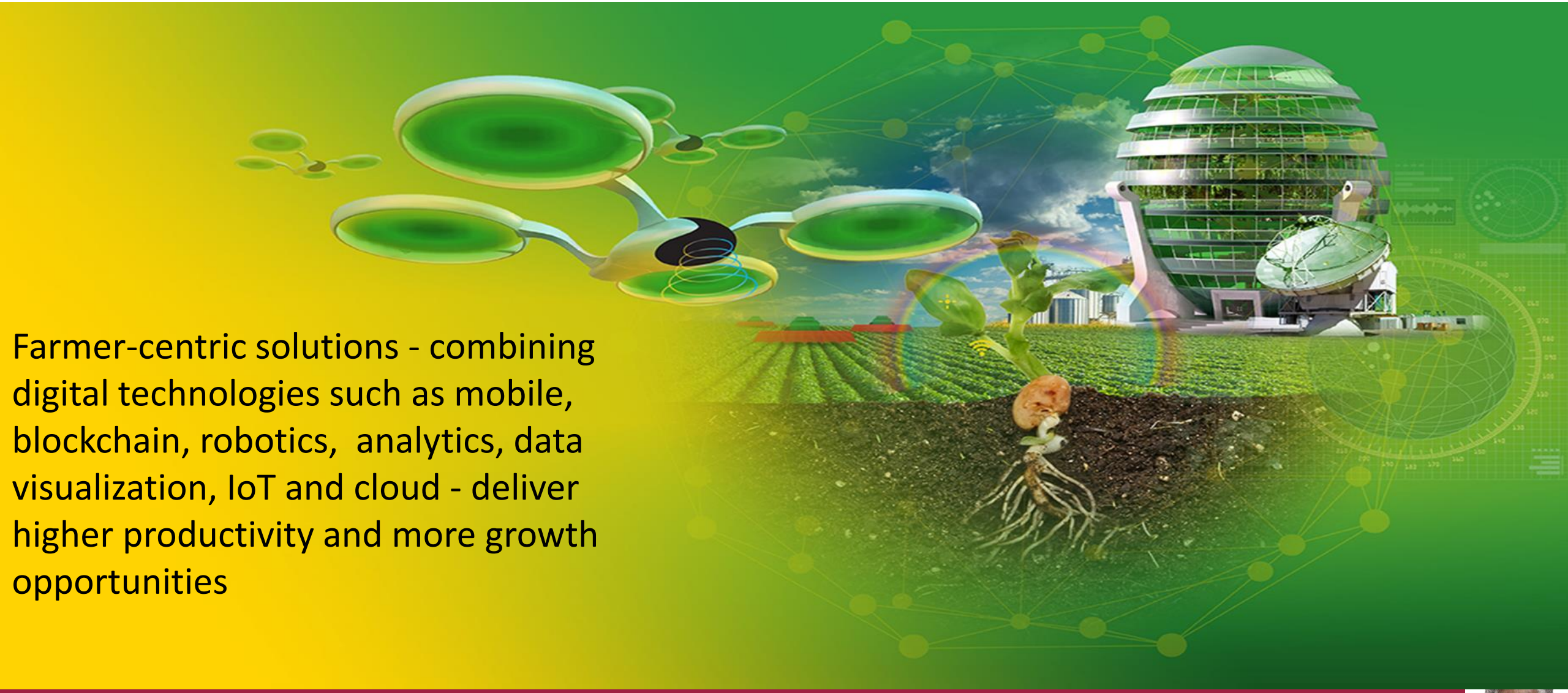
	TestDate	MY Cur	FY Cur	PY Curr	SCC Cur	LY Cur	UrCo Cur	Pro%	Fat%	Lac%	MY 305	FY 305	PY 305	LY 305	GRS 305	L Idx	M Idx	P Idx	F Idx	DIM
1	05-OCT-20	24.9	1.48	1.07	76	1.22	0	4.28	5.93	4.88	5,822	326.8	248.51	286.59	5,015	98	88	98	99	102
2	30-AUG-20	25.4	1.56	1.05	67	1.25	0	4.13	6.16	4.93	5,682	303.71	237.82	280.94	4,734	94	87	95	93	86
3	26-JUL-20	21.6	0.85	0.89	70	1.07	0	4.13	3.94	4.96	5,485	271.09	228.38	272.05	4,396	89	85	93	85	31
4	12-APR-20	12.1	0	0	0	0	0				5,101	262.25	207.21	234.73	4,345	92	83	91	86	265
5	08-MAR-20	14.6	0.74	0.62	54	0.67	0	4.27	5.08	4.56	5,089	262.44	206.79	234.18	4,341	92	82	90	86	230
6	02-FEB-20	13.8	0.83	0.52	47	0.65	0	3.8	4.57	4.71	4,874	255.33	195.75	224.53	4,161	89	80	86	85	195
7	10-DEC-19	18.4	0.83	0.69	61	0.82	0	3.77	4.5	4.43	5,155	279.74	209.05	236.77	4,499	94	84	90	91	141
8	10-NOV-19	20.2	0.95	0.8	68	0.97	0	3.95	4.71	4.8	5,221	289.11	215.26	242	4,641	97	85	94	94	111
9	06-OCT-19	21.2	1.08	0.86	54	1.05	0	4.06	5.1	4.97	5,349	299.73	221.43	245.18	4,793	101	88	97	99	76
10	01-SEP-19	22.8	1.45	0.88	76	1.05	0	3.84	6.37	4.59	5,446	310.83	222.19	239.11	4,887	104	90	98	103	41

TECHNOLOGY PRIORITIES: AGRICULTURAL INNOVATIONS FOR FOOD SECURITY

Technologies and solutions that increase yields sustainably, amenable to adoption by wide range of farmers in different geographies, affordable and easily accessible.

- Transforming Production Systems
- Improved Post – harvest handling, processing and storage
- Land, water and irrigation management including conservation agriculture
- Climate smart agriculture – use of drought tolerant crop varieties and farming systems
- Modern genetics and genomics for genetic improvement of agriculturally important species of crops, livestock, fish and trees – to characterize genes with functions for use in breeding programmes through a variety of modern technologies, including hybridization, genotyping, marker assisted selection, to develop new higher yielding plant varieties that pest and disease resistant as well as drought tolerant to meet market demands and nutritional needs of population.
- Mechanization, including precision agriculture (e.g. drones etc) in farming systems.

DIGITAL TRANSFORMATION OF AGRICULTURE THROUGH INNOVATION



Farmer-centric solutions - combining digital technologies such as mobile, blockchain, robotics, analytics, data visualization, IoT and cloud - deliver higher productivity and more growth opportunities

AFRICA's AGRICULTURAL INNOVATIONS FOR FOOD SECURITY

- Agricultural Innovation System – network of organisations, enterprises and individuals focused on bringing new products, processes and forms of organising into economic use, including policies that affect their behaviour and performance
- Evidence – based & participatory policy making for appropriate agricultural technologies
  - ReSAKSS – Regional Strategic Analysis and Knowledge Support System
  - Dynamic Research Evaluation for Management (IFPRI model)
  - Assessment of National Agricultural Innovation System
- Roadmap for Food Nutrition Security for Sustainable Agriculture (FNSSA)
- Partnerships are key to transform Africa's Agricultural Innovation Systems
- Increased investments in public and private research essential to unlock innovation
- Innovation must lead to efficiency, profitability and sustainability of agriculture
- Interventions, including investments to mitigate risks to innovation
  - financial instruments,
  - Insurance schemes
  - Innovation support funds etc

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- Dr. Yolisa Pakela – Jezile

THANK YOU!

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