



The role of the Agricultural Research Council in delivering high performance varieties to subsistence or smallholder farmers

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A presentation to a UPOV Workshop
Geneva, Switzerland
2 November 2012



The ARC mandate

To conduct research, development and technology transfer in order to:

- Contribute to better quality of life;
- Facilitate/ensure natural resource conservation;
- Promote agricultural development & development of the agricultural sector



The ARC's R&D mandate and scope

- **GRAIN CROPS**
 - Maize, sorghum, barley, sunflower, soya bean, dry beans, wheat, oats, groundnuts, cowpea, bambara nuts, tobacco, new crops
- **HORTICULTURE**
 - Vegetables (leafy, root & tuber vegetables), tropical & subtropical crops, deciduous fruits, citrus, viticulture, temperate crops
- **NATURAL RESOURCES and ENVIRONMENT**
 - Soils, climate, water, biocontrol agents, weed control



- **LIVESTOCK (production & diseases)**
 - Cattle, sheep, goats, poultry, pigs
 - Vaccines development, artificial insemination technology
 - Diagnostics (ELISA and lateral flow) and surveillance
 - Ryegrasses
- **AGRICULTURAL ENGINEERING**
 - Customised agricultural implements design and manufacturing
 - Agro-processing technology
 - Irrigation control and optimization
 - Rainwater harvesting



ARC intellectual asset classes

- Composition
- **Plant Breeder's Rights – predominant**
- Patents
- Copyrights (publications)
- Trademarks
- Trade secrets
- Know-how



South Africa and UPOV

- Member country to UPOV 1978
- Plant Breeder's Rights Act 1976 (Act 15 of 1976)
- Act amended in 1996
 - conformity to Constitution
 - Alignment and compliance to UPOV 1991
 - Country has not acceded to UPOV 1991
- Plant Improvement Act, 1976 (Act 53 of 1976)
- Ministry responsible for Agriculture, now includes Forestry and Fisheries



Breeder's Rights Applicability

- **PROCESS:**
 - Resident of South Africa or any other UPOV country
 - Agency mandate for non-residents, mainly administrative and legal compliance
 - Specified administrative process
 - Includes variety listing
 - Submit quantity of propagating material for examination
- **EVALUATION:**
 - National authority maintains reference collections (some at ARC)
 - Fruit and some ornamentals: breeder or the agent establishes trials on own site
 - National authority conducts planting trials for examination over three growing cycles
 - Examination focus: **Distinct, Uniform, Stable**



Granted Plant Breeders' Rights

- Enables commercialization & technology transfer
- Conducted through Plant Improvement Act (variety listing)
- Period of Breeder's right:
 - 25 years for trees and vines
 - 20 years for all other crops
 - Initial 5 years – sole right to the PBR holder
 - Remaining 15 years – PBR holder must issue licence to anyone requesting, within the prescribed legislation
 - National authority may expropriate rights for national interest – food security needs
 - National authority may issue a compulsory licence
 - Automatic expiry of rights following prescribed period
 - Farm-retained seed permitted



IPR from publicly-financed R&D Act (IPR Act)

- The Intellectual Property Rights from Publicly Financed Research and Development Act, 2008 (Act No 52 of 2008).
- Purpose: Publicly funded R&D must be protected and exploited (through commercialization) to benefit the people of South Africa
 - A portion of state funds must return to the state
 - Recipients of public funding for R&D must
 - act in a manner conducive to public good
 - acknowledge & reward innovation
 - enable economic growth through enterprise development
 - Promote the publishing of scientific results



ARC's interpretation & response to the IPR Act

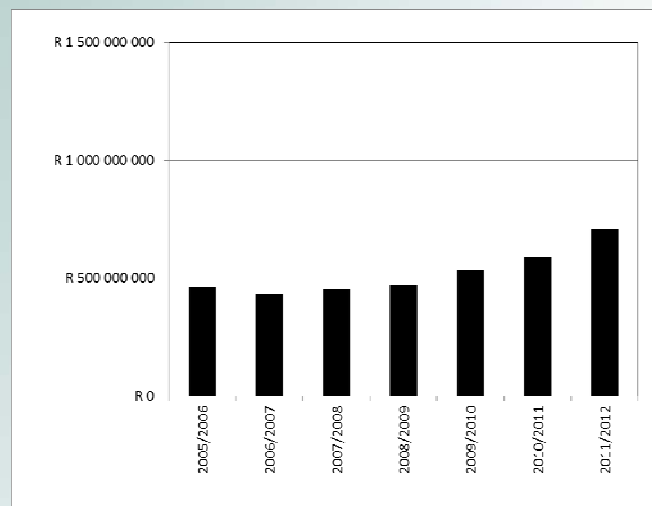
- Technology Transfer Office established
 - Executive for Technology Transfer
 - Intellectual Property Manager
 - Commercialization Manager
 - Corporate Legal Advisor
- ARC Intellectual Property Rights Policy developed
- Policy development to facilitate technology transfer
 - Licencing policy
 - Commercialization policy
 - Incubation and SMME development framework
 - Income generation policy
 - Policy for the management of joint ventures
 - Investment into R&D



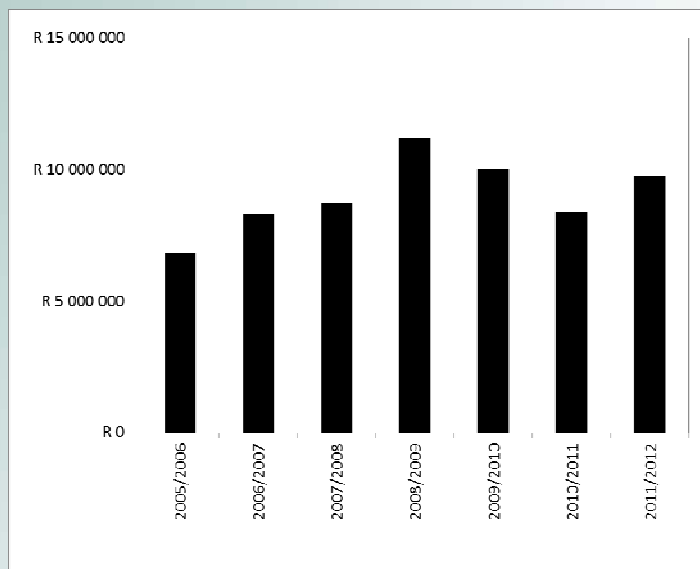
ARC PBR record

- An analysis of the current (2011) PBR register
 - 2424 PBR's registered
 - 332 belong to the ARC
 - 14% contribution by the ARC alone..
- Approximately 20 new registrations
- Officially updated in the 2012 edition

Parliamentary grant funding



Income generated from licensing



ARC OTT performance compared to national and regional benchmarks



Source: US, Canada, Europe and UK - *Benchmarking of Technology Transfer Offices and What it Means for Developing Countries*, A Heher; ¹ ARC Annual Financials 2009/2010; ² ASTP Survey 2009

ARC OTT performance compared to selected case studies



Source: Latest available annual reports

ARC licensing income as a percentage of R&D spend

- The ARC's licensing income as a percentage of R&D spend is comparable to, and also surpasses that of other country and regional averages in a number of benchmarks
- The ARC ranked 3rd out of the 8 case studies that were examined by Deloitte South Africa
- The ARC outperformed its local peers



Smallholder farmer definition in South Africa

- 300,000 - 400,000 farmers
- Collectively on 14 million ha of agricultural land
- Marginalized into regions of poor productive land, with little or no infrastructural support, and water resources



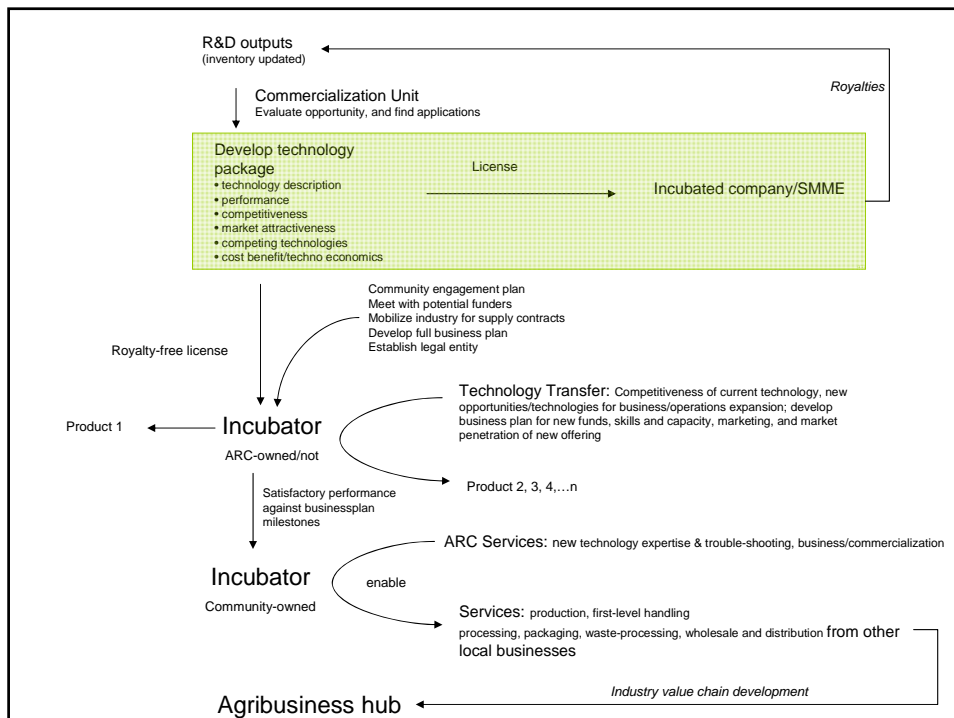
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- Generally have low levels of production efficiency
 - • Production
 - linked primarily to poor farm management skills
 - e.g. natural resource management, production and infrastructural management, financial services, technical support;
 - Existing value chains
 - lock smallholder farmers out of markets;

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- *Training and information dissemination*
 - ARC-developed
 - Accredited through the AgriSETA (Agricultural Sector Education Training Authority),
 - The actual training is delivered by ARC scientists, and trained extension officers.

ARC response

- *Enterprise and incubator development*
 - ensuring the transfer of ARC-developed technologies, either to individuals organized within entities
 - to SMMEs, established to eventually be self-sustainable and commercially viable;
 - diversifying the agricultural sector, through increasing the number of options available to emerging farmers and their agribusinesses,
 - play significant roles in the agriculture value chain.

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Orange-fleshed sweet potatoes

The ARC's Bophelo cultivar:

- Result of ARC breeding programme
- Protected
- Addresses Vitamin A deficiency
- Introduced to rural farming communities.



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- Tshiombo Community
 - 100 small holder farmers
 - 1.5 ha each
 - Approached the ARC for assistance with production
 - Extended to an opportunity for production and marketing of produce into retail stores.

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- The funding for this initiative was provided by the South African Department of Science and Technology.
 - Partner University
 - University of Limpopo
 - Nursery for virus-indexed cuttings



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- The NAMC (National Agricultural Marketing Council)
 - support to emerging farmers in
 - market access, knowledge acquisition, training, and mentorship.



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- Identified the barriers of entry into the market.
 - the establishment of a formal entity with which supply contracts could be negotiated with retail stores
 - the standard, consistency, reliability of supply and quality of produce demanded by the retail stores, and
 - the establishment of a packing facility.

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- The PPECB (Perishable Products Export Control Board)
 - product quality and grading training
 - food safety, good agricultural practice
 - responsible use of pesticides
 - Pre-audits against certain certification standards.
 - Currently sell to local market
 - demand for superior product has been created

Packhouse



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- **Impact**

- access to the ARC's high-value cultivars
- net profit of R130, 000 per harvest per smallholder farmer
- informal market only.
- the potential for sales is greater as the ARC concludes supply contracts with retail stores and significant players such as Walmart.

Floriculture

- Nieuwoudtville, N. Cape province
- *Lachenalia*, *Ornithogalum* and *Eucomis*
- Northern Cape Dept of Agriculture and ARC partnership
 - Technology and funding
- Export 300,000-500,000 bulbs per annum to the Netherlands
 - Dutch flower market
- Low local sales





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- Need other product offerings
 - Seasonal
 - In-licensing opportunities sought
 - Value chain not optimized to benefit the community
 - IP management company to manage the technology development, bulking-up, commercialization and export using commercial principles (high-throughput, differential pricing for different markets, packaging)
 - Access to EU markets sought



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- New Citrus cultivar called Sonet
 - A result of an ARC breeding programme
 - Licensed for commercialization in SA and SADEC region, as well as internationally
 - Will be sought after in global markets
 - Others: Valley Gold, African Sunset



The ARC's new Sonet selection



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- Local licensing agreement with a South African company
 - for the commercialization of some of the ARC's citrus varieties.
 - A condition of the license: ensure the participation of smallholder citrus producers in the commercialization value-chain.
 - Facilitated partnership with the Citrus Growers' Association to access ARC

Deciduous fruit

- A new blushed pear selection, Cheeky™
- Result of ARC breeding programme.
- Keeps its delicate blush during warm periods
- Good storage ability of up to 12 weeks
- Pleasant taste after storage
- Comes on the market when there are no other blush pears.
- Blush pears fetch premium prices.



- **Impact**

- using a single ARC cultivar, the Cheeky® Pear variety, the income accruable to licensees of this cultivar, from a potential of 1000 ha is estimated at R138million per annum, with a the potential to create 1260 farm worker jobs.



- The ARC-Small Grain Institute

- Training and Advisory

- the verification of wheat cultivars suitable for production in resource limited agricultural areas via on-farm trials
- the characterization of cultivars
 - yield potential and yield stability in selected resource- limited areas under dryland and irrigated conditions



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- the comparison of agronomic characteristics and quality parameters of these cultivars in different environments
 - reliable recommendations that are based on applicable scientific research
 - relevant technology to smallholder farmers
 - production guidelines
 - farmers' days marketing events
 - technology demonstrations.

- ***Impact***

- based on royalties received, and an average of 9.5% royalty rate for a few of the ARC's wheat cultivars, the estimated revenue accrued to wheat farmers who have licenses the ARC's cultivars was R36.7million in 2011/12.

Other examples

- ***Groundnut varieties for dryland and irrigation areas***
 - Registered new variety
 - Dryland areas
 - Others for irrigation areas
- ***Feasibility study for the establishment of rice-production in South Africa***
 - Can be done!
 - Global partnerships sought



Summary

- As a public entity ARC utilizes PVP to enhance benefit sharing:
 - Effective technology transfer - mainly for agriculture development and growth
 - Enable competitiveness of the agriculture sector
 - Contribute cultivars that are important for food security
 - Incentivise innovation through:
 - Further investments into R&D
 - Providing a share of the revenue generated to inventor
 - Stimulate enterprise development
 - Facilitate access to poor farmers for development



Acknowledgements

- ARC
- ARC contributors to this paper
- UPOV



Thank you

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