Science-granting councils in Sub-Saharan Africa: A typology of diverse science funding configurations

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The background

The IDRC commissioned CREST in January 2013 to undertake an in-depth study of science granting councils in Sub-Saharan Africa. The specific objectives of the study were formulated as follows:

1. To describe the various organisations and their institutional arrangements supporting STI in the various countries;
2. To describe and analyse the changing mandates of science granting councils in SSA;
3. To identify and describe in detail the *modi operandi* of the recently established science granting councils in promoting STI in SSA;
4. To analyse subsequent strategies for funding of STI in countries where science granting councils do not exist;
5. To assess the science granting councils' partnership modalities and collaboration; and
6. To highlight current trends and identify strategic pointers that are likely to influence IDRC's future programming in SSA.

The commitment to investment in R&D

The STI vision of NEPAD is that of "an Africa that is well integrated into the global economy and free of poverty". The overall goals are:

- To enable Africa harness and apply science, technology and related innovations in order to eradicate poverty and achieve sustainable development; and
- To ensure that Africa contributes to the global pool of scientific knowledge and technological innovations.

Aligned with the NEPAD objectives many governments have made commitments to increase their gross domestic expenditure on R&D (GERD), and to put in place the necessary policies by 2015. GERD acts as a measure of how dedicated a specific country is to conducting research. Few Sub-Saharan Africa (SSA) countries, however, spend more than 1% of their Gross Domestic Product (GDP) on R&D with Malawi (1,70%), Uganda (1,10%) and South Africa (1,05%) being the only countries in SSA to have succeeded thus far.

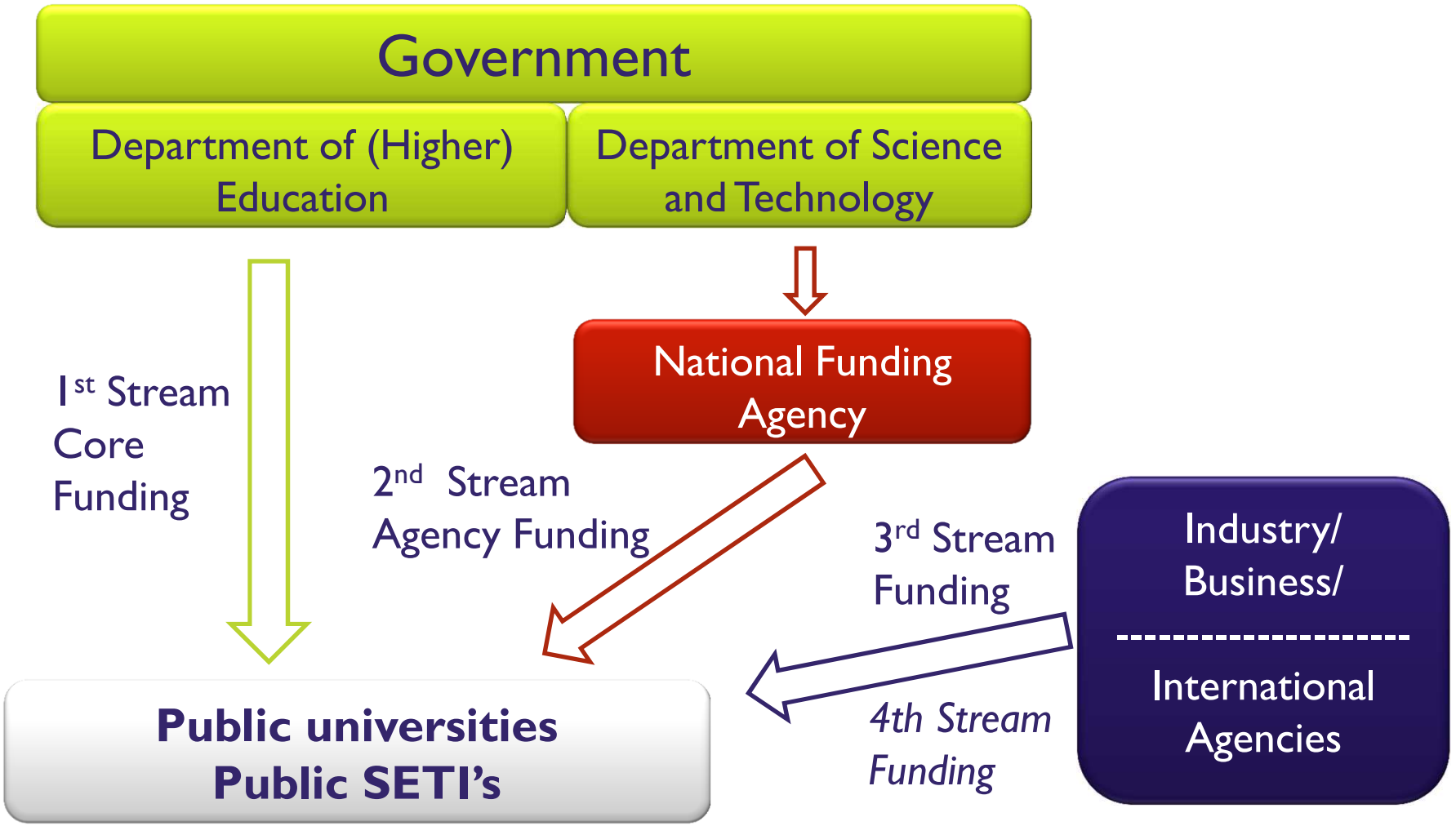
A renewed interest in S&T funding

After the decline in the 1990s of support for S&T development in Africa, a new realisation by most role-players has emerged in recent years of the importance of developing STI capacity in developing countries. High profile reports outlining new visions, priorities and directions for African STI have emerged, particularly the UNESCO Higher Education, Research and Innovation: Changing Dynamics (2009) Report, NEPAD's African Innovation Outlook reports (2010 and 2014) and the UN Rio+20 Report (2012) as well as the World Bank Africa Strategy in strengthening competitiveness and employment.

These reports call for the international community's intervention to assist in promoting technology development, transfer and utilisation in Africa to enhance knowledge to support African countries to develop effective STI institutions and the concomitant capacity to become global knowledge partners. The UN Millennium Project Report (2009) argued that STI underpins every one of the Millennium Development Goals (MGDs) and therefore becomes a prerequisite for sustainable development.

MODES OF FUNDING

The orthodox interpretation



First findings (1)

Our study has revealed – not surprisingly – that all four modes of funding are found in the different countries.

- Formula-based core funding is especially prevalent where universities receive block grants to support their core activities (teaching and learning and to a lesser extent research). In some countries public research institutes and science councils also receive core funding or block grants to fund their core research and innovation business.
- Performance-based core funding is less typical. The only case that we are aware of is the research subsidy funding of the DHET in SA which is based on research and knowledge outputs.
- Direct project funding is quite prevalent as many Ministries of S&T houses a fund or various funds for research and innovation support. Although it is competitive and (somewhat) transparent, the administration of the funds are done "in-house".
- Agency-funding occurs where the government has established a national council or foundation to administer national funds on its behalf.

Implications (2)

There are a number of "tacit tensions" implied by these different funding modes:

- Between competitive and non-competitive funding
- Between direct and agency-mediated funding
- Between core funding and project funding.

These different modes encapsulate different values and beliefs about what is the most efficient way of disbursing public funds but also what is most just and fair. It is not clear that one mode is unequivocally superior to another. Each mode has its own strengths and limitations. These are summarized in the table overleaf and raises possible points for discussion at the workshop.

Strengths and limitations of different modes of funding

Mode	Sub-category	Strengths/ advantages	Weaknesses/ limitations
Core funding	Formula-based	Normalise for size of institutions Relatively easy to administer (but requires credible institutional data)	Preserves the status quo (does not reward excellence or innovation)
	Performance-based	Principle of fairness Performance rewarded acts as incentive to improve performance	Requires additional administration on part of universities and responsible Ministry or Government Department
Project funding	Direct	Government can steer high-priority research directly	Non-transparent and may lead to preferential and biased funding (and forms of patronage)
	Channelled through agent	Principle of fairness Principle of transparency	Administrative costs can become prohibitive Danger of inefficient bureaucracy

A CONCEPTUAL FRAMEWORK

Principal-agent theory

Research funding councils can be seen as a link in a chain of principal-agent relationships, with the government as principal to the research funding council, and the research funding council as principal to the scientific community. A research council would be both agent (in relation to the government) and principal (in relation to the scientists) at once. In simple terms, research councils are positioned both as agents of state funders/societal interests (their task it to deliver the goods), and as principal with respect to individual research providers and scientists.

Science granting councils and their roles

The literature shows that there exists a clear consensus regarding the definition and main functions of science granting councils. Science granting councils are intermediary, quasi-public, institutions which are positioned between the state and individuals/institutions that perform research (Rip). The primary purpose of research councils, traditionally, has been to "organise part of the funding relationship between government and universities as a peer-review based competition for project funding" (Van der Meulen). They are "expected to mediate the political and policy interests in scientific research into the world of science and technology and promote the interests of science and technology in the policy world" (Van der Meulen). Caswill (2004) considers research councils to be the collective of public sector agencies that allocate state resources to high quality academic research in the natural sciences, social sciences, arts and humanities. These agencies operate in the intermediary position between the knowledge production system and state policy, between state and academy.

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MODELS OF SCIENCE FUNDING IN SSA

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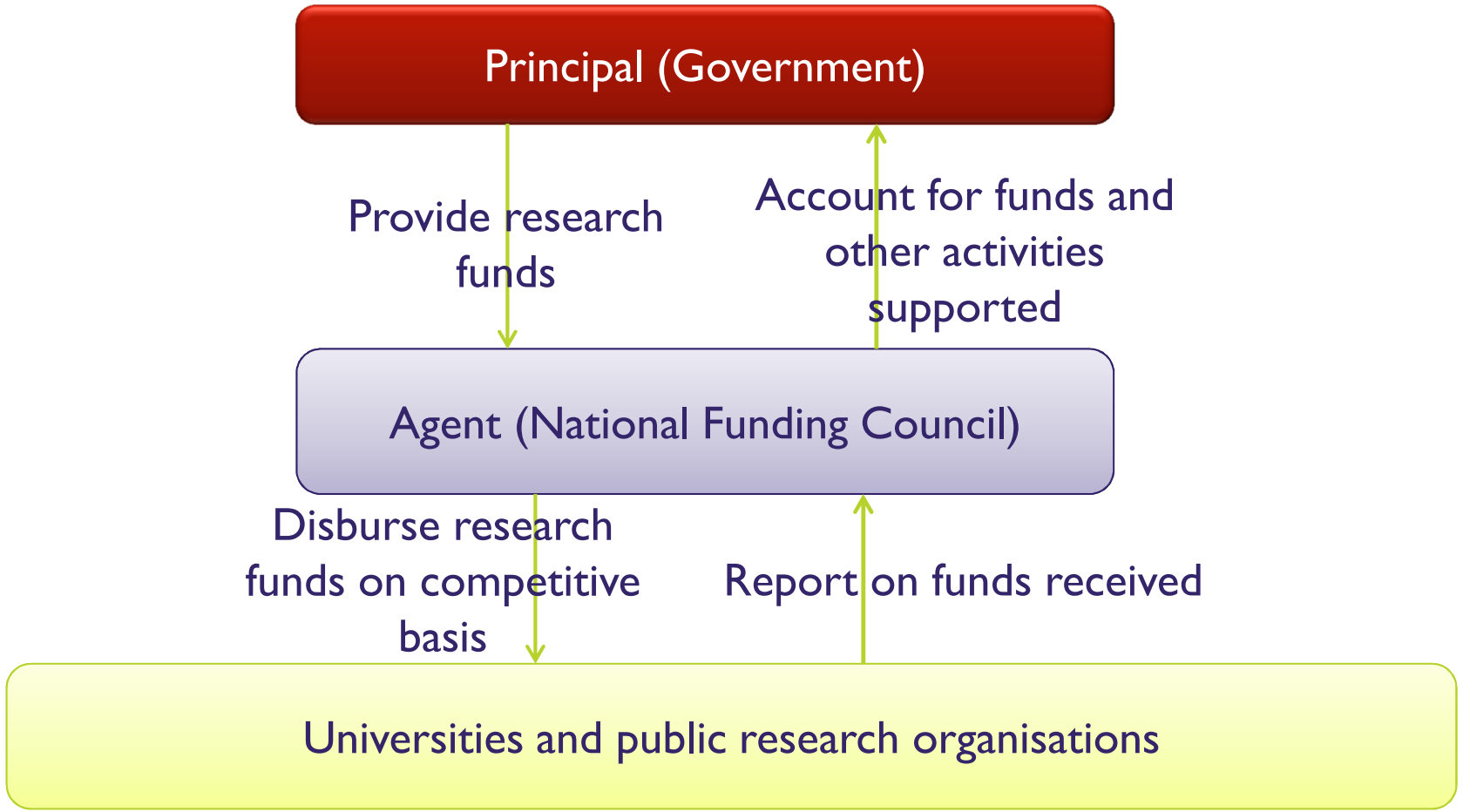
The paradigm case of science funding models

In its most basic form, which is the simplest manifestation of the principal-agent principle at work, government delegates its responsibility as far as science or research funding is concerned, to a (relatively) autonomous body – usually referred to as a National Research/Science Foundation or Council. Although such a Foundation or Council receives its monies directly from government and has to account for it on a regular basis (usually annually), it derives its autonomy and independence through a statutory act of establishment and the appointment of a separate Board or Council. This Council then establishes the required structures, policies and procedures to ensure fair, transparent and efficient disbursement of funds to public universities and research organisations. Foundations would typically establish different "funding instruments" (scholarships, bursaries, travel grants, grants for emerging and established scholars, capacity-building grants and so on) to give effect to their mission.

THE PARADIGM CASE
Principal-agent separate



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THE SECTOR-DIFFERENTIATED MODEL

The Sector-Differentiated Model

In some cases, often because of historical developments but also because of inter-departmental rivalries and vested interests, governments decide to establish different research funding councils or foundations for different sectors in the science system. We refer to this as the **sector-differentiated model**. There are some examples of this in Africa. In SA there are three bodies that have a statutory responsibility for research funding: the National Research Foundation (which reports to the Department of Science and Technology), the Medical Research Council (which reports to the Department of Health) and the Water Research Commission (which reports to the Department of Water Affairs and Forestry. With this configuration, it is not surprising to find that the funding agencies report to the different "principals" within Government.

The Sector-Differentiated Model

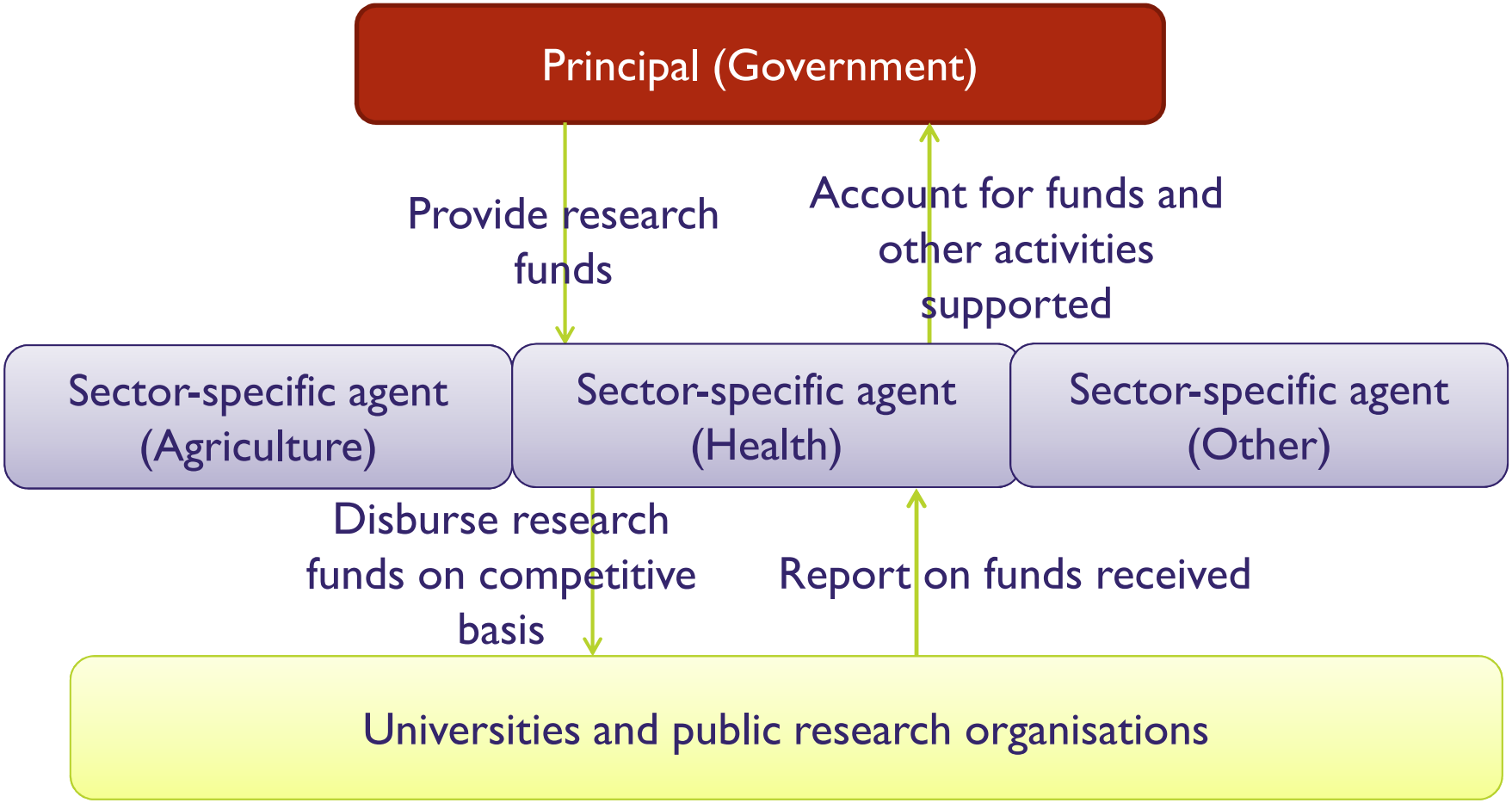
This model is also applicable to Burkina Faso. In Burkina Faso there are three funding agencies which report directly to their respective ministries: FONRID reports to the Ministry of Scientific Research and Innovation; FONER is responsible to the Ministry of Secondary and Higher Education; while FARES reports to the Ministry of Health.

An interesting variation on the sector-differentiated model, which can be seen in South Africa, Zambia and other countries, is where the R&D "sector" and innovation/commercialisation "sector" are each served by a sector-specific agent (the NRF and Technology Innovation Agency in the case of South Africa, the National Research Fund and the Kenya National Innovation Agency (in Kenya).

The obvious challenge within the sector-differentiated model is to co-ordinate funding decisions between the different funding bodies.

THE SECTOR-DIFFERENTIATED MODEL

Principal-agent separate by sector



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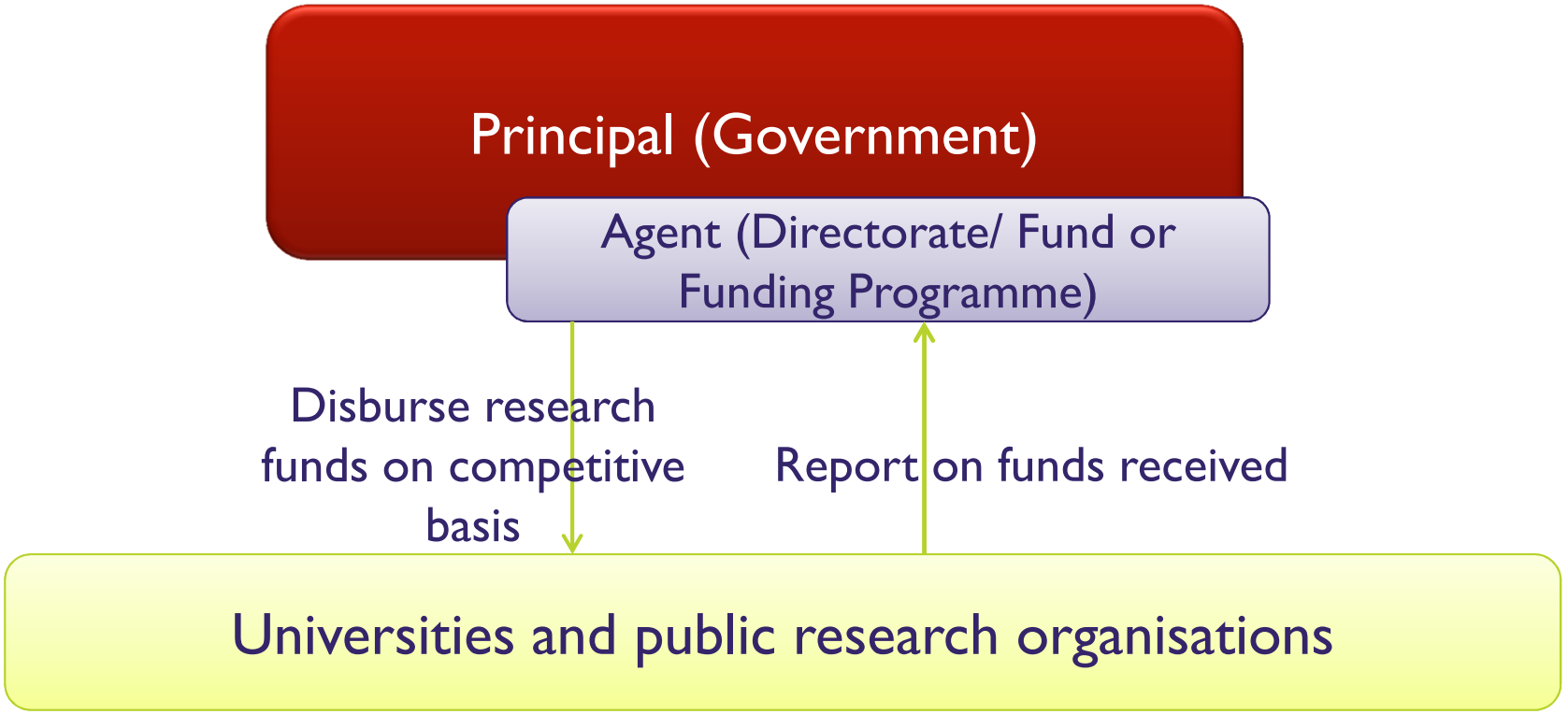
THE EMBEDDED AGENT MODEL

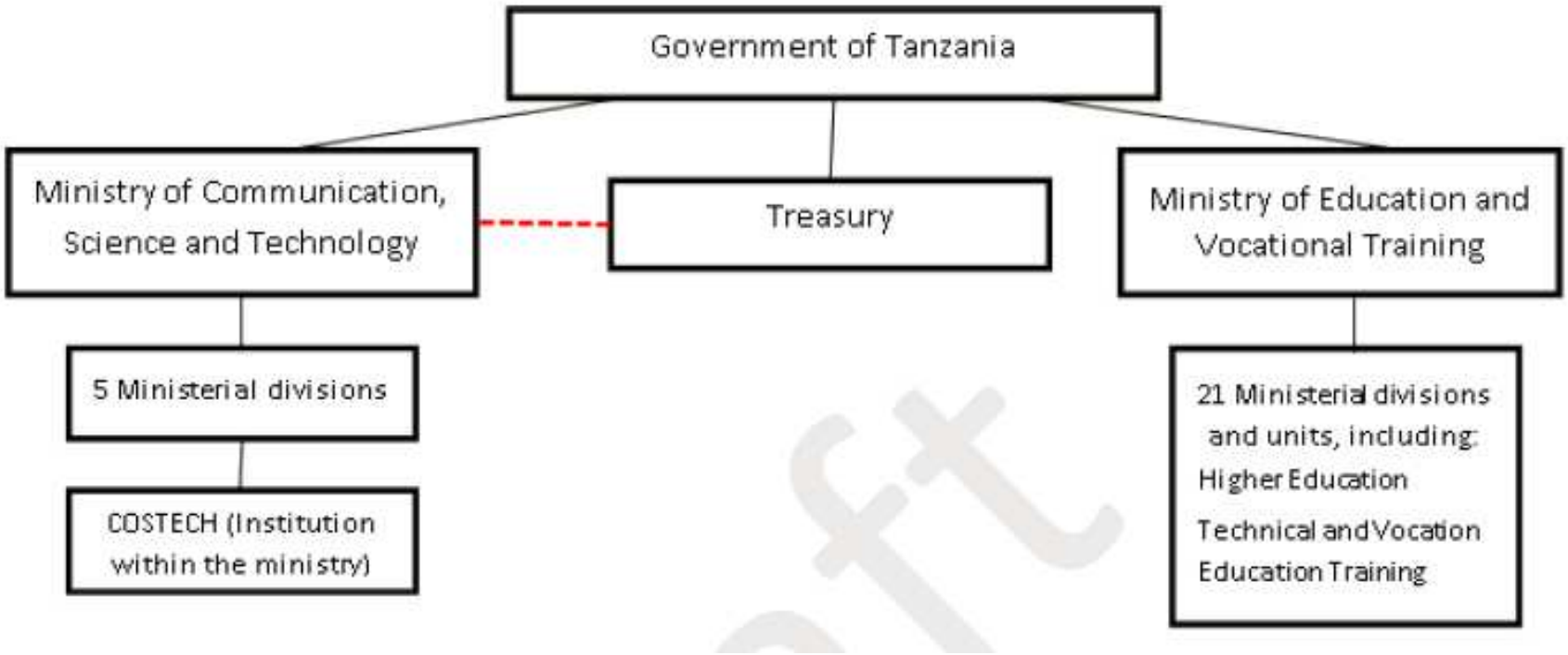
Definition of the Embedded-Agent Model

An important variation on the Paradigm Case is the **Embedded-Agent** Model. Here the "agent" is not institutionally separate from the government (Ministry or Department of Science and Technology/ Higher Education) but are housed or located within it. The "agent" is organisationally part and parcel of a government department. In cases such as these, it is typical that the "agent" is (1) either a sub-department or directorate within a Ministry or Department of S&T; or (2) a Fund/ Funding Programme that is administered by a department. It is evident that the agent is simply an extension of government with no obvious autonomy or independence from the department in which it is located. Even if it engages in transparent and fair resource allocations practices, the perception from the outside will always remain that such a Directorate/Fund is too close to the government of the day.

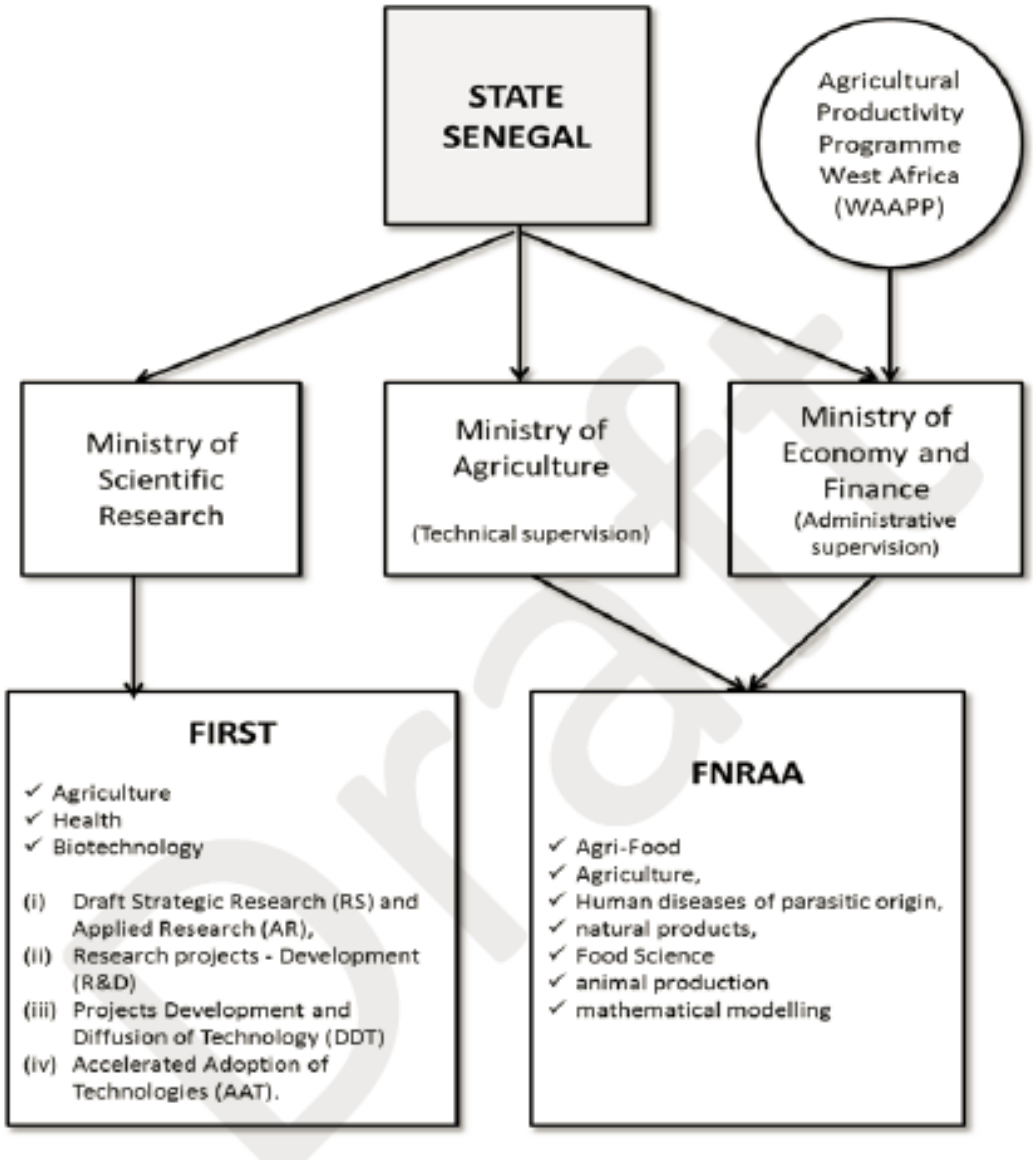
The Embedded "Agent" model



Embedded-agent model: Tanzania



Embedded-agent sector-differentiated model: Senegal



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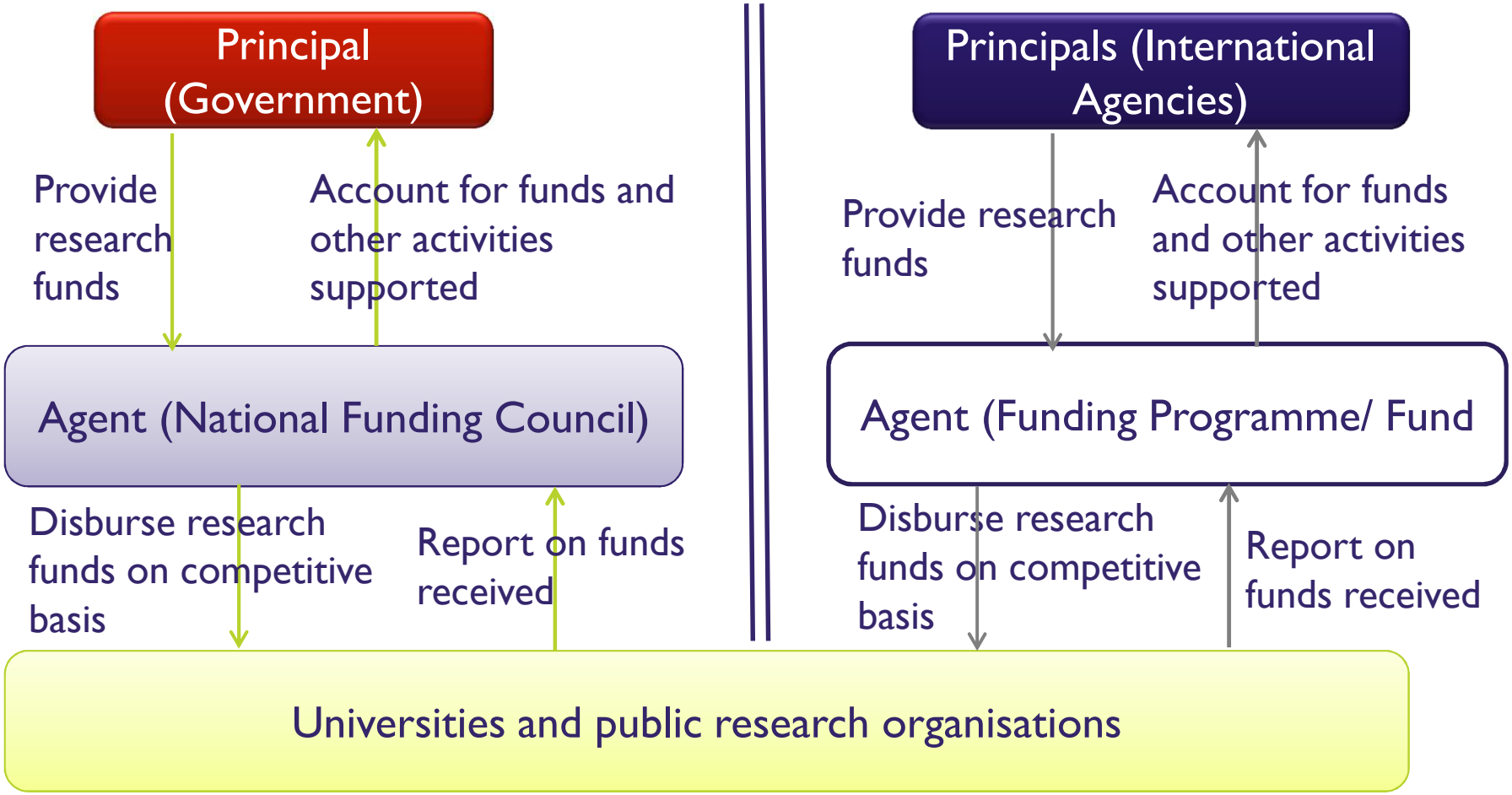
THE MULTIPLE PRINCIPALS—AGENTS MODEL

The Multiple Principals-Agents Model

A "popular" configuration of the paradigm case found in our study can be labelled the "**multiple principal-agents**" model. In addition to the funding that is channelled from government (via some council or fund) to the universities, there are also various other "principals" at work in the national science system. These are typically international funders, foundations and development agencies (SIDA, Wellcome Trust, NORAD, DFID, AUSAID, DAAD, Carnegie Corporation of New York, Ford Foundation, Gates, PEPFAR, CORAF, and many others) who all channel funds from their home governments to universities and research organisations in African countries. In the representation below we emphasise that these two configurations are often found to co-exist (like "parallel universes") in the same system. We will henceforth refer to these parallel systems as the government and non-government science funding channels. We found that there is often very little or no co-ordination or interaction between these two funding channels. Such a situation obviously raises many questions: about priority setting, parallel lines of reporting and accounting, duplication, and so on.

'MULTIPLE PRINCIPALS-AGENTS' MODEL



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Variations on the Multiple Principals-Agents Model

Our study has shown that there are a number of variations on the multiple principals-agents model. We distinguish two such variations. These variations predominantly arise because of the differences in the "strength" of government funding in relationship to non-government science funding in a country. In the case where government spends relatively significant amounts of money on research (at least 0,5% GERD/GDP), the government science funding channel is strong and hold its own vis-à-vis the non-government funding channel. However, it is common knowledge that many African governments do not spend more than 0,2 or 0,3% of GDP on R&D. This often translates into a situation where government funding is weak and, therefore, has to rely heavily on external NGO funding for research in the country.

This leads to two versions of the multiple principal-agents model: the **equivalent** and **non-equivalent** model. The most common model found in our study is the non-equivalent model where there is relatively weak government but strong non-government funding.

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Variations on the Multiple Principals-Agents Model

Within the equivalent model, there is greater equivalence or parity between the government and non-government funding models. In the case of Cote d'Ivoire the government actively collaborates with another government (Switzerland) to manage the parallel fund. We also see this configuration with the FIRCA in Côte d'Ivoire. This agency is positioned between the government and professional agricultural institutions. FIRCA was an initiative both by the Côte d'Ivoirian government and the World Bank. FIRCA therefore directly reports to the Ministry of Agriculture, but also indirectly to agricultural professionals in Senegal. FIRCA acts as a service provider to these professionals by funding basic and applied research, disseminating of results, encouraging technology transfer as well as supporting the institutions' structures for which these professionals contribute financially to the FIRCA.

Our study suggests that countries such as Namibia, Botswana, Ethiopia and Zimbabwe (to mention a few) are examples of the non-equivalent variation. In all of these countries, international agencies (such as Sida, Gates and others) provide significantly more funding for science in the country than the government does.

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Embedded agent model: Non-equivalent variation

Where foreign funding for scientific research is significantly bigger than government investment in R&D (the non-equivalent model) two different variations may be possible: either the paradigm case with foreign funding being channelled parallel to it, somewhat independently and targeting researchers at grassroots level, or an embedded case with foreign funding being channelled parallel to it. Mozambique seems to be an example of the latter. Mozambique does not have a national funding council but only a fund associated with a ministry. Yet, in terms of GERD by source of funding, 57% of funds are from abroad compared to only 28% from government. Thus, this is a non-equivalent model but without a national funding council.

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Issues for further reflection

- Why does the establishment and full-implementation of a research funding council in some countries lag behind?
- What is the right balance between core/block and competitive modes of funding?
- How does the presence of international funding agencies affect the mode of science funding in a country?
- How does a country address the challenges of co-ordination and priority setting within a multiple principals-agents funding model? Are these challenges different from the challenge of co-ordinating funding in a sector-differentiated model?
- What are the essential and non-essential functions of a national science funding council?

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